

IX. SUPPORT SERVICES

This chapter discusses the support areas Portland Fire and Rescue Department include information technology, apparatus and building maintenance, and dispatch and communications. Often these services are under appreciated until there is a problem. The quality of support services often determines whether emergency response is carried out effectively. For example, there is a direct correlation between the level of training personnel receive and how well they perform at the scene of an emergency.

INFORMATION TECHNOLOGY

This review of information technology focuses on assessing how well technology and data needs are being met and being used to improve efficiency and effectively manage the primary functions of PF&R. For the purposes of this review, information technology (IT) refers to the people and processes involved with selecting, installing, and maintaining the network, hardware and software components necessary to provide computing capability for PF&R. This section will focus on the effectiveness of the:

- Network that connects fire stations to fire administrative offices and to other systems (e.g., Computer Aided Dispatch (CAD));
- Computer hardware used (desktop computers, peripheral equipment (printers, faxes, etc.) and other computer devices (laptops, mobile data computers (MDC), handheld PDAs) used in apparatus, automobiles and by PF&R employees;
- Fire bureau specific application systems; and,
- Administrative systems used by all City departments.

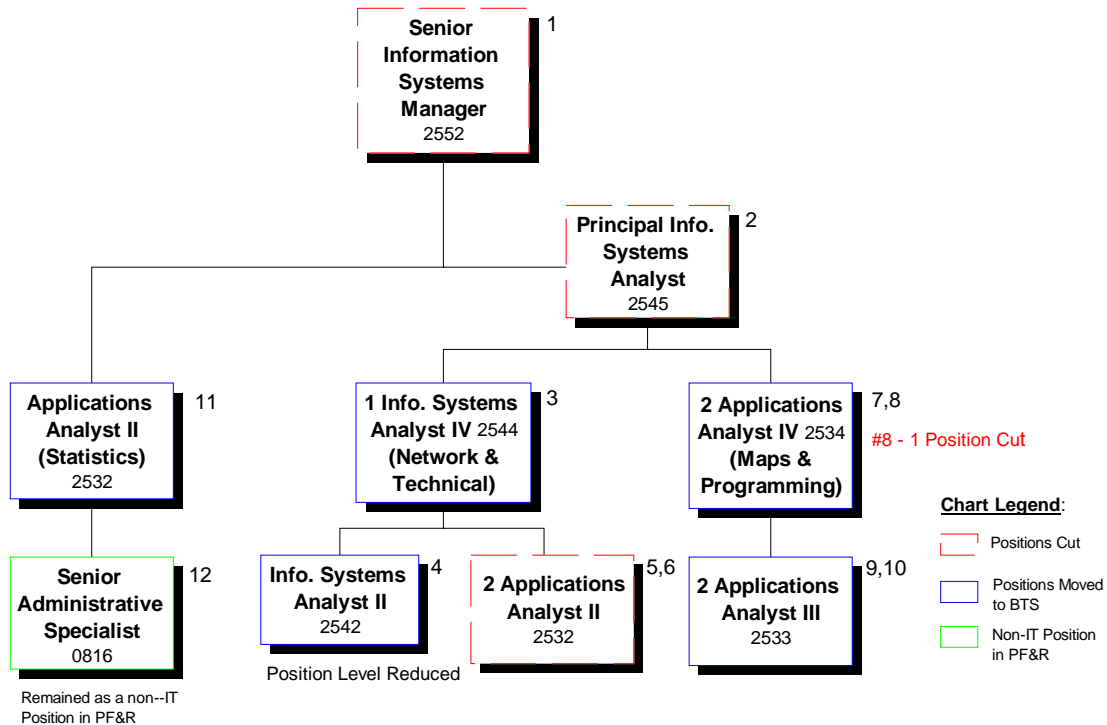
The scope of the study did not include management practices used to safeguard data and systems and to recover in case of a failure or disaster, nor detailed review of technology components (hardware, network or software). This review also does not include telecommunication service (cellular phones, pagers, voice mail, etc.), 800 MHz radio communication technology, or Computer Aided Dispatch (CAD) software used for 911 call taking and fire and police dispatching.

History of PF&R IT Services – In 1992, a new section called Fire Information and Communications Services was added to PF&R. Each fire station was equipped with a personal computer and email services become available in late 1993. All fire and rescue stations came on-line, and day-to-day business aspects (e.g., station journals, training, and other communications) were computerized.¹¹³ Until about 2000/2001, the IT section of PF&R provided most of the network, technical, operations and applications support for fire specific needs. PF&R had an internal IT organization that provided all the IT support for the design, programming and maintenance of departmental specific software applications; installation and maintenance of the

¹¹³ <http://www.portlandonline.com/fire/index.cfm?&a=2528&c=26324>, 28 December 2005.

local area network; technical support for computer hardware and peripherals; data analysis and mapping. The City IT group provided and supported the application systems used by all City departments such as accounting, budgeting, purchasing, personnel, and payroll. Below is the organization of the PF&R IT Section as it existed in the year 2000.

Figure 33: Portland Fire & Rescue IT Section In 2000



Current Consolidated BTS Delivery of IT Services – Approximately four years ago, the City of Portland decided to consolidate information technology services for city bureaus into a centralized IT organization, the Bureau of Technology Services (BTS). After the BTS consolidation, there was a reduction of 45.5 percent (5 of 11 positions) in the number of IT positions assigned to PF&R. One other position (a senior administrative specialist) remained in PF&R as a non-IT position. Additionally, the two network and technical resources assigned to PF&R are not dedicated to PF&R as they also support two other bureaus (Parks and Neighborhood Involvement).

At this time (excluding the one application analyst for statistics), three programming application analysts are assigned 100 percent to PF&R. According to the BTS Service Level Agreements (SLA) PF&R application development is limited to making “minor enhancements and changes that typically require less than four hours.”¹¹⁴ Although the SLA may state a four hour threshold, BTS applications analysts have flexibility to complete enhancements and

¹¹⁴ BTS SLA 04-05 – Bureau Specific Provisions – Fire and Rescue, page 2, sent by Scott Fisher via e-mail to Martha Word-Haley, 4 March 2006, 10:18:40 AM.

changes in excess of four hours. The BTS supervisor (for the analyst) and Senior Business Operations Manager meet biweekly to review work assignments of the analysts.

The following table compares the number of IT positions assigned to PF&R in 2000 pre-consolidation to those assigned in December 2005 post-consolidation. Also shown is the number of positions decreased and the number of remaining IT positions.

Table 58: IT Positions Assigned to PF&R Pre & Post BTS Consolidation

#	PF&R Internal IT Positions In 2000	BTS IT Positions Assigned to PF&R in December 2005	Increase (Decrease)	IT Positions Remaining
1	1 Sr. Info. Systems Manager		-1	0
2	1 Prin. Info. Systems Analyst		-1	0
3	1 Info. Systems Analyst IV (Network & Technical)	1 Info. Systems Analyst IV (Network & Technical)	0	1
4	1 Info. Systems Analyst II (Network & Technical)	1 Technician II (Network & Technical)	0	1
5,6	2 Applications Analyst II		-2	0
7	1 Applications Analyst IV (Maps & Programming)	1 Applications Analyst IV (Programming)	0	1
8	1 Applications Analyst IV		-1	0
9,10	2 Applications Analyst III (Programming)	2 Applications Analyst III (Programming)	0	2
11	1 Applications Analyst II (Statistics)	1 Applications Analyst II (Statistics)	0	1
11			-5*	6

*The Senior Administrative Specialist stayed in the department, but was transferred to a Non-IT position. Therefore, the net loss of IT positions is technically six.

In addition to these six remaining IT resources, BTS assigned a Bureau Business Representative (BBR) to PF&R to serve as the customer service liaison between PF&R and BTS. This representative also is charged with supporting the Bureaus of Emergency Management and the Bureau of Emergency Communication (BOEC) (911, fire and police dispatching). It was estimated that approximately 25 to 30 percent of his time is spent on PF&R customer service related issues.

The BTS consolidation has significantly decreased the number of IT positions available to do PF&R specific work and reduced the internal IT management capabilities of PF&R to the extent that PF&R management does not have confidence that they can affect change.

We do not question the need for or rationale for IT consolidation in Portland. The city-wide savings of consolidation may be considerable. We are trying to address weaknesses identified during interviews with PF&R personnel and through observation. A consolidated IT service delivery model can work well and be effective in providing fire departments with information technology services. Salt Lake City is a good example we can cite of a centralized city IT organization that provides outstanding IT support services to its fire department at a cost

that is perceived to be cost effective. Needless to say, when a major reorganization of IT service delivery occurs, it may be years before all the formal processes can be established to insure that all the necessary lines of communication and coordination work well.

However, the transition for PF&R is particularly difficult because:

- It was satisfied with the pre-consolidation IT support.
- There is concern that fire-specific systems that meet the day-to-day operational needs very well will be replaced with systems that do not meet the needs as well.
- Resources have been shifted from PF&R to BTS without a good understanding of how PF&R fits into the overall plan to provide city-wide systems and move toward e-Government.
- There is a perception that the costs of the consolidated services are greater than the value received.

Costs estimates developed by PF&R indicate that information technology costs increased by \$236,486 or 18.5 percent from the year prior to consolidation (FY01–02 costs of \$1,281,518) to the year of consolidation (FY02–03 costs of \$1,518,004).¹¹⁵

IT Staffing Estimates for PF&R – To make the IT consolidation work better from PF&R perspective, we recommend that PF&R adopt the same strategy used by the Police Bureau, which is to pay for a dedicated BTS IS Manager.

Recommendation 99: PF&R should request a dedicated BTS IS manager. We think this will help provide the internal capability to communicate PF&R’s needs to all parts of BTS and to plan, coordinate, and assist with implementing major information technology projects. This manager could also help PF&R’s management envision how fire needs can be integrated into the broader city vision of e-Government to increase citizen access to City Council, Bureaus and Offices, and City services via IT. The manager could also develop a vision for PF&R on which Bureau specific applications should and should not be moved toward e-Government and how this can be accomplished while continuing to provide the day to day emergency operations support that is essential.

As a rule of thumb, we use the following table as a guide to approximate the number of IT support staff needed for non-programming support (user support and help desk, hardware installation and support and network support).

Table 59: IT Staffing Levels Needed per Number of Users

Staffing Type	Number of Users		
	1-500	501-1000	1000+
User support and help desk	1 – 4	3 – 5	5+
Personal computer hardware installation & support	1 – 2	2 – 3	3+
Network management & support	1 – 3	3 – 5	5+

¹¹⁵ E-mail from Scott Fischer to Martha Haley, forwarded from Julie Prahel, Subject: FW: INFORMATION TECHNOLOGY COSTS, dated 1/11/2006 5:13:40 PM.

For fire departments, the number of users can not be the only measure used to determine the number of IT staffing needed. The number of different locations and the 24/7 working schedule must also be considered. However, there are not IT or fire industry guidelines to use for these complicating factors. Therefore, we use the total number of employees to estimate the number of IT support staff needed.

NUMBER OF USER SUPPORT & HELP DESK ANALYSTS NEEDED: PF&R has 702 total users (650 actual uniform employees and 52 civilian employees). This number of users suggests that approximately four user support analysts are needed to provide computer training and help desk support. Currently, BTS provides help desk support during normal business hours Monday through Friday and by BTS Operations during non-normal business hours. The number of user support hours currently used by PF&R was not evaluated. However, the help desk function provided to PF&R seems to be limited to and may only be sufficient to record user problems. The resolution of user problems seems to be limited to normal business hours rather than to a 24/7 basis.

Recommendation 100: PF&R should work with BTS to identify all user support needs and those that are not being met. These needs should be separated into regular business hours and 24/7 requirements. Service level agreements, including response times, should be developed for each of the major requirements.

Until this evaluation is completed, we cannot recommend more user support analysts. However, PF&R should consider implementing cost effective alternatives to augment user support during non-standard business hours. One approach is to train firefighters on each platoon as expert or super users. These ‘super users’ could provide fire specific application support and general hardware and network support on a 24/7 basis. These ‘super users’ could also be used to train station personnel in the use of technology and PF&R specific applications. It may be advisable to eventually have a super user in each company. Procedures could also be developed on when user problems should be escalated to an on-call technician.

There is little if any computer training. In fire departments, basic training including keyboarding as well as basic computer skills are needed in addition to training on the standard desktop software for word processing, e-mail, spreadsheets, presentation and others as needed. Additional training is needed in PF&R specific application systems. The Battalion District Inspectors try to meet this training need for FIRES2000 for the Company Inspection Program.

Recommendation 101: Identify the technology training needs for fire station personnel, administrative personnel and PF&R management. A multiple year training plan should be developed.

NUMBER OF HARDWARE & NETWORK SUPPORT STAFF NEEDED: PF&R currently has approximately 335 total computer devices. Of these, 285 computer devices (185 desktops, 15 laptops, 70 mobile data computers and 15 Motorola 900 terminals) are currently used and approximately 50 PDAs that were used for beta testing field inspection data collection. So

between 300 and 350 computer devices require hardware support. Generally, one to two technical support personnel should be sufficient to support up to 500 users. However, with hardware spread across 28 fire stations and 5 administrative offices, a minimum of two hardware support personnel is needed. Currently, BTS provides less than two hardware support personnel for PF&R because those assigned to PF&R also support two other bureaus. The availability of these two hardware support analysts is further reduced by expected time off due to vacations, holidays, sick leave and other leave and training time. Thus to achieve full time support of two hardware analysts roughly three analysts are needed.

Recommendation 102: PF&R should work with BTS to determine if a third hardware support analyst should be dedicated to PF&R or if there are more cost effective alternatives to provide additional hardware support.

As with the user support analysts, the hardware support needs should be separated into regular business hours and 24/7 requirements. Service level agreements, including response times, should be developed for each requirement and possibly for each crucial device supported. For example, mobile data computers on apparatus and other devices may need replacing within a specific time frame.

Recommendation 103: Consideration should also be given to maintaining a small number of spare computers devices that could be configured or pre-configured and installed within a specified period of time. BTS should consider not charging the annual fee for these spares until they are put in service.

NUMBER OF NETWORK SUPPORT ANALYSTS NEEDED: Again, for 728 users, the number of network support personnel should be approximately 4. Currently, dedicated network support staff is not assigned to PF&R.

Recommendation 104: PF&R should work with BTS to define the network support needed for the 24/7 emergency response operations of PF&R. Consideration should be given to providing, at a minimum, on-call network support 24/7 that can be on-site within a specified period of time.

Improving the network connectivity to the fire stations is the most pressing and highest priority IT issue for PF&R. Although a longer term city wide solution may be desirable, the immediacy of the problem demands an immediate interim solution. Insufficient network speed and capacity severely impedes the ability of fire station personnel to develop information technology skills and to fully use its capabilities.

Recommendation 105: PF&R should work with BTS Communication and Networking to identify and install an immediate solution. Non-network solutions such as cable or DSL service should be considered as an immediate interim solution. PF&R defined this as a serious problem at least two years ago.

NUMBER OF PROGRAMMING ANALYSTS NEEDED: There are three programming analysts dedicated to PF&R. With roughly 15 systems to support, three programming analysts should be

sufficient for maintaining and performing minor enhancements to the existing applications. When these applications need to be rewritten using new web-based technology, more application analysts may be needed. Additional programming requirements for major enhancements or new development projects should be determined during the project planning phases on a project by project basis.

Table 60: Summary of IT Staffing Estimated & Recommended Needs

IT Support Staffing Areas of Specialization	Current BTS Staff Assigned to PF&R	Estimated IT Staff Needed to Support PF&R	Recommended Increase in BTS Staffing for PF&R
IS Manager Dedicated to PF&R	.25 - .3	1	.75 - .7
User Support & Help Desk	FTE's ¹¹⁶ Unknown	4	TBD ¹¹⁷
PC Hardware Support	<2	3	1
Network Management & Support	0	4	TBD ¹¹⁸
Programming Analysts	3	3	0 ¹¹⁹

Information Technology Strengths & Weaknesses – As compared to other fire departments that TriData has studied, PF&R is above average in the use of application systems to support the primary functions of the department: fire incident, daily fire station journal, time and attendance, staff scheduling and web-based departmental information. PF&R is well below average in the use of networking technology to connect 28 fire stations and five administrative locations to the fire specific systems and possibly to CAD. The city systems used by all bureaus for accounting, budgeting, personnel, payroll and purchasing are old and we believe plans are being developed to upgrade or replace these systems.

The primary strengths of PF&R information technology are:

- A five year Fire Strategic Plan sets the business course for PF&R.
- A well-established Computer Advisory Committee (CAC) (comprised of management representatives from all areas of the Bureau) provides business oversight for all IT projects. CAC also prioritizes all IT projects and recommends all projects to the Core Team for approval.¹²⁰ Additionally, there are 3 standing subcommittees on web site, mapping, and applications.
- PF&R's specific applications in general and specifically FIRES2000, Station Journal, Personnel System, Training, and Fire Incident System are functionally mature applications that well satisfy PF&R needs.

¹¹⁶ FTE represents full time equivalent number of employees.

¹¹⁷ TBD=to be determined. The training needs and 24/7 user support needs must be jointly evaluated by PF&R and BTS. Cost effective alternatives, such as 'super users', should be considered in lieu of dedicated BTS staff.

¹¹⁸ PF&R and BTS Communications to evaluate the network support analyst needs for PF&R.

¹¹⁹ Major software modifications and/or major new development requirements must be evaluated on a project by project basis.

¹²⁰ Portland Fire & Rescue Computer Advisory Committee Chapter, page 1.

- The primary network and technical support analyst and application analysts are very knowledgeable of PF&R business and systems.
- BTS provides excellent web based tools for web page development by non-programming personnel.
- The Bureau's specific applications are written using Visual Basic, which is one of the three development tools supported by BTS.

PF&R is far ahead the average fire bureau in that most do not have a strategic business plan that form the basis for an information technology plan. We seldom see a CAC committee in place although we routinely recommend establishing one. PF&R is among the best at computerizing most of the functional needs and has one of the top web pages we have seen. Web development can be especially effective in fire code enforcement and public education efforts.

The areas of PF&R information technology needing improvement are:

- The network bandwidth to the fire stations is unsatisfactory and inadequate for transferring the data required for FIRES 2000 (the system that supports the Company Inspection Program) and all other applications, both internally and externally. The networking technology is slow (i.e., frame relay rated at 56Kb but we were told that the actual speed may be closer to 28.8Kb.)
- PF&R's specific applications are not be technologically capable of being used as E-government applications. This could result in PF&R having to use applications that do not satisfy the Bureau's specific needs as well as current applications do.
- PF&R is limited to making minor enhancements or modifications to the current Bureau specific application systems. This could be an impediment when major new development is needed.
- A lack of dedicated IT management for PF&R to:
 - Assess specific Bureau needs for telecommunications, 800MHz radio, Local Area Network (LAN), mobile data computing, strategic planning and applications, help desk support, etc., and customer service level agreements for network performance, break and fix response, application availability.
 - Work with BTS to develop plans to meet fire specific needs,
 - Manage the delivery of the network, technical, telecom, radio, application, mapping, etc., projects,
 - Provide IT expertise and guidance to the PF&R Core Team in how to use technology to improve efficiency and effectiveness,
 - Coordinate with the Bureau of Emergency Communication to insure that PF&R needs are being met, or to
 - Coordinate with Emergency Management to insure that PF&R technology (radio, phone and computer) is compatible with the regional and national emergency management and homeland security technology.
- A perception that the cost of BTS services exceeds the value of the services provided.

IT Standards for Emergency Service Bureaus – As emergency first responders, PF&R needs include excellent, possibly redundant, communication whether via computer devices, radios, cellular phones, hand held devices, mobile data computers and etc. These needs exceed the day-to-day business needs of most city departments. This suggests that the public safety organizations (e.g., PF&R, Police and Emergency Management, Emergency Communications) possibly need a higher level of BTS routine support. Routine support might include 24/7 network and technical support, possibly redundant network and hardware solutions and other fail-safe solutions that non-public safety organizations do not need. Perhaps two sets of standards for routine support for emergency and regular city bureaus are needed.

Perhaps the billing via interagency service level agreements could reflect the total cost of providing a higher level of routine support for emergency bureaus. The current practice of billing for time and materials for services provided outside the normal business hours may create needlessly aggravation and complexity for emergency service bureaus. These extra charges are difficult to budget and could possibly cause emergency bureaus to delay or omit necessary work.

Recommendation 106: *PF&R in conjunction with BTS Communications and Networking, IT Operations and Strategic Technology divisions should develop networking, communication, hardware and application standards for crucial emergency first responders.*

Recommendation 107: *PF&R with BTS should develop a disaster recovery plan that provides for recovering PF&R Bureau specific applications as needed and for providing various IT support during emergency events.*

PF&R Specific Applications – BTS supports approximately 15 application systems for PF&R. Of these, five are identified as requiring 7 x 24 BTS support.

Table 61: BTS Application Systems

Application	Description	Support
AMS System	Apparatus information and work orders	NBD
Clothing System	Clothing inventory and distribution	NBD
Journal System	Station journal and productivity entry	7x24
Payroll System	Payroll exception reporting	7x24
Personnel System	Sworn and Non-Sworn Personnel date entry	7x24
Training System	Fire and EMS training records entry and reporting	
FIRES2000	Fire inspection entry and invoicing	7x24
Prefire System	Building prefire data and drawings	N/A
Hydrant System	Incident entry and reporting	NBD
Incident System	Incident entry and reporting	7x24
Juvenile Firesetter System	Data entry & reporting of juveniles involved with fires	NBD
Permit Tracking	Fire and other permits	NBD
Receipt System	Permit cash receipt system	NBD
Service Request Tracking	Project request, ranking and tracking system	NBD
Video Library		

Most of these systems are programmed using Visual Basic 6.0 and a SQL database. Only two systems are .net applications. From an information technology perspective, these systems will need to be updated to web based technology in the next few years. From a user satisfaction perspective, these systems fulfill most of the needs of PF&R. The Permit Tracking System is being converted to TRACS (the permitting system used by the Bureau of Development Services) and FIRES2000 for construction and special use permits respectively. A brief description on most of the systems is provided below.

Incident System – When the unit is cleared from the scene, the CAD data in text format is sent to the Incident System. Data is recorded as a responder record for the responding unit(s) (e.g., unit data, address and times). They could capture but do not capture the back in-quarters time as the unit may respond to another incident prior to returning to quarters. The unit officer completes the responder record, corrects the times as needed and pulls the unit personnel assigned.

Then the incident is saved as either fire, EMS, accident, exposure, casualty or other incident. Fire incidents of suspicious origin cannot be closed out by the station; Fire Investigations must close the report. Patient reports are created on EMS incidents to record procedures done on the patient. Bills are not generated for these procedures as the emergency transport agency, AMR, transports the patient, bills for the transport and insures compliance with HIPPA. Many regulatory and statistical reports are generated from this system. Patient information is downloaded from life pack units and EKG units.

Incident times recorded are initiated by CAD such as fire under control and closed. The received call time can be recorded, but usually is not sent to the Incident System. Responder times may be recorded by either the dispatcher or the unit via the Mobile Data Computer (MDC) on each apparatus. These times include dispatch, in route, on scene, with patient and cleared from scene. In quarters time is not required, but rig ready time is usually captured. The depart scene time for AMR is also collected, but the arrive destination and depart destination times usually are not provided by CAD.

We were told that units forget to press the buttons on the MDC to record times perhaps because they also radio dispatch. MDC time recording inaccuracies may also be due in part to system issues that have not been corrected. Dispatch may not be recording the times of these radio events. Accurate times are crucial to unit management and long range planning for stations and units.

NFIRS reporting is done through the state of Oregon. Once a month, an Access database is created and sent to the State for fire incidents and casualties. Once a year, a summary of incidents is provided. This is a cumbersome way to transfer data, but as long as the state requires this format, PF&R may be required to continue this process. The efficiency savings would be extremely small.

The most important impediment to efficiency is the network connection to the fire stations. PF&R is currently using dial-up services, and need to upgrade their internet and intranet services to high speed cable or DSL technology. This is the speed currently available to the fire stations.

Journal System – This system is used at the fire stations and battalion head quarters. It apparently satisfies the needs. The personnel roster is a key component of the Journal and it feeds the Incident System with the specific employees working on the responding apparatus. Apparatus equipment is also maintained in this system. Tables are maintained to display trade times and staffing replacements. The history of staffing replacements is displayed for BHQ. Reports are generated for call back availability, FMLA tracking, and station activity/productivity (how much time was spent training, conducting fire inspections, cleaning, etc.).

Personnel System – All sworn and non-sworn employee information (rank, skills, emergency contacts, etc.) is maintained in this system. This is a key system for PF&R that seems to have most, if not all, of the functions of sophisticated time and attendance packaged software products. It seems to satisfy and staff scheduling and time and attendance reporting of PF&R. New employees and transfers are entered into the system. Time off for vacation, sick, overtime, holiday, etc. are accrued. A call shift function allows for employees to volunteer to be called in. The Training System data is displayed, including certifications for EMS and other training. Injury reports are e-mailed to the supervisor, safety officer and Battalion Headquarters. Tables are provided for individual employees to enter original vacation requests and to add or cancel requests. Shifts are color coded for ease of use by Battalion Headquarters. Inventories are maintained for cell phones, computers and pagers. Vacation picks are controlled by union and PF&R's rules and procedures. It creates the relief shift schedule for Battalion Headquarters.

Training System – This system provides tables for maintaining the type of training that is mandatory and when it is required. This system seems to satisfy the requirements. Training 'talks to' the Journal System and can be viewed from that system. Reports are produced on who has not received mandatory training and who has received EMS, fire and other training.

Prefire System – This system records any building data and drawings made during prefire surveys. It is linked to FIRES2000, the inspection system that maintains an inventory of inspectable properties.

FIRES 2000 – This system supports the fire inspection functions [both the Fire Marshal Office (FMO) and Company Inspection Program (CIP)]. The system maintains an inventory of all commercial buildings that are subject to periodic fire inspections. This is an excellent capability that most fire departments do not have. The building data includes contact information, square footage, number of stories, height of building and foot print. The type of occupancy is identified by the UBC and 901 codes.

Fire inspection data is maintained which includes frequency of inspection. Inspections cycles are maintained by occupancy type. The system generates a pre-inspection letter to notify the owner of an impending inspection. The results of the inspection are entered by the inspectors. A log is generated for the Senior Inspector for review, correction and approval. Once the senior accepts the inspection, the system generates an invoice. If re-inspections are required, a report can be run to determine the re-inspections and/or inspections due.

When payments are received they are posted to the invoices. The system can report the outstanding balances. A report is run to make bank deposits.

A beta test was conducted using hand held devices (PDAs) to enter fire inspection data in the field. This test was not satisfactory because of the ability to become proficient in their use due to the infrequency of inspections. We hope PF&R will continue trying to develop the capability to capture inspection data in the field. PDAs were not large enough to be satisfactory. Checklists and the ability to reference the Fire Code are also important capabilities to have in the field.

The FMO and the companies are very satisfied with FIRES2000 with the exception of the network speed to the fire stations. Future plans include linking FIRES2000 to TRACS for fire construction permitting (alarms, sprinklers, hoods, etc.) and fire construction inspection. This will provide access to all construction permits and construction inspections. Users of FIRES2000 will be able to view data in TRACS. We heartily support this approach.

Non-construction fire permits (i.e. special use permits) will be incorporated into FIRES2000. Permit data will be maintained from the permit application through the permit inspections.

Hydrant System – The location, main size, owner, data tested, gate valve location and flow may be recorded when hydrants are inspected and tested.

Juvenile Firesetter System – This system captures data related to juveniles referred to PF&R or involved in setting fires. Data on the referral, interview, behavior, family situation, fire information, appointments and results of follow up are maintained.

Permit Tracking System – This system is a Microsoft Access Database that is being converted. The fire trade permits are being moved to the TRACS system used by the Bureau of Development Services. We think this a good move as it will provide citizens, contractors, developers, architects, etc. access to all permits on a construction project. The special use permits for fireworks, lock boxes, etc. are being converted to FIRES2000. This will be a positive move also as FIRES2000 uses a more robust technology.

Service Request Tracking – This system is an ASP.net application that is used to track service requests for PF&R specific applications, computer problems, help desk requests. E-mails are sent to the appropriate people when the request status changes. It also tracks requests

for enhancements and staff workloads and performs other specialized capabilities. This system integrates with the BTS service request system and the central BTS help desk which track only 'break/fix' issues.

Future Application Needs – There were several applications that need to be considered in the future. This is not intended to be an all inclusive list. Future development needs should be identified by the CAC.

AUTOMATIC VEHICLE LOCATOR SYSTEM: PF&R has tried an AVL system but determined it was not functional with the City's grid system, transportation routes, bridges, rivers, freeways, etc. This system should be reconsidered. Implementation of an AVL system is beneficial because it allows dispatchers to see the actual location of any unit on a computer-generated map of the city. The AVL data could also be integrated into the CAD system to calculate the truly closest unit to any given emergency and make a dispatch recommendation accordingly, rather than making dispatches on the basis of the fixed station locations. In addition to improving dispatching, AVL improves personnel safety because a unit that is in trouble can be quickly located.

INTERACTIVE VOICE RECOGNITION SYSTEM: This system can be very beneficial for scheduling fire construction inspection requests. This is a system that several city departments could find useful to improve efficiency.

BLACKBERRIES: The use of Blackberries or similar digital communication devices can be very beneficial as an alternative method to establish command control. Long Beach Fire & Rescue makes excellent use of Blackberries for this purpose and to maintain close communication between core leaders.

INVENTORY AND WORK ORDER SYSTEM: There may be a need in Logistics for such a system. Similar needs may exist in other city departments.

APPARATUS, EQUIPMENT, AND FACILITY MAINTENANCE

This section of the report will focus primarily on PF&R front-line, special service, and reserve units serviced by Apparatus Maintenance.

Selected fire stations throughout the City were visited during our site visit. During these visits, the emergency apparatus and equipment was visually examined, and the station personnel were interviewed to discuss the operational condition and suitability of the apparatus for hazards encountered in the station's response area. The fire apparatus was very well-equipped and maintained to a very high standard of readiness. In fact, PF&R has some of the best-equipped and maintained apparatus that we have encountered in the course of conducting our studies. It was quite evident from the interviews conducted with station personnel, that they are highly motivated and take a great deal of pride in their apparatus, equipment, and station facilities.

To gain a better understanding as to the type and condition of the fleet of emergency apparatus, it is necessary to examine the fleet by service category including front-line, reserve, and special apparatus.

PF&R Fleet – Having adequate, safe, and reliable emergency vehicles is essential to PF&R’s mission. PF&R operates a wide variety of fire apparatus, specialty equipment, light support vehicles and other forms of motorized equipment that requires a significant capital outlay to maintain. Fleet management involves the purchase and maintenance of vehicles used by PF&R, including maintenance facilities, shop equipment, parts inventory and maintenance records.

PF&R has its own apparatus maintenance facility, which is independent of the City’s other fleet service facilities. The City of Portland has consolidated the majority of the City’s vehicle maintenance activities under City Fleet, a division of the General Services Bureau. Under this plan, all PF&R’s non-emergency administrative, support, and some light duty emergency vehicles are maintained by the City Fleet vehicle maintenance facilities.

SUMMARY OF EMERGENCY APPARATUS: An ongoing problem faced throughout the fire service is the age, appropriateness and operability of its apparatus. Fire apparatus are crucial to the effectiveness of the overall emergency delivery system. Agencies that fail to closely monitor the age and road-worthiness of their fleet incur greater costs in the long term from the higher maintenance and repairs of an aging fleet. Table 62 shows the apparatus inventory for PF&R, including its age.

Table 62: PF&R First-Line Engine/Pumper and Truck Inventory¹²¹

Unit	Make	Year	Age	Unit	Make	Year	Age
Engine 1	H&W/Spartan	1996	9 Yrs	Engine 23	3-D/Spartan	1993	12 Yrs
Engine 2	H&W/Spartan	1996	9 Yrs	Engine 24	Casper/LaFrance	2005	0 Yrs
Engine 3	Shawano/LaFrance	2003	2 Yrs	Engine 25	3-D/LaFrance	1998	7 Yrs
Engine 4	Casper/LaFrance	2005	0 Yrs	Engine 26	Am LaFrance	1998	7 Yrs
Engine 5	3-D/LaFrance	1998	7 Yrs	Engine 40	H&W/LaFrance	1999	6 Yrs
Engine 6	Western/Spartan	1992	13 Yrs	Engine 41	Shawano/LaFrance	2001	4 Yrs
Engine 8	Casper/LaFrance	2006	0 Yrs	Engine 42	3-D/Spartan	1993	12 Yrs
Engine 9	Shawano/LaFrance	2001	4 Yrs	Engine 43	Shawano/LaFrance	2001	4 Yrs
Engine 10	HW/Spartan	1996	9 Yrs	Engine 45	H&W/Spartan	1996	9 Yrs
Engine 11	Shawano/LaFrance	2003	2 Yrs				
Engine 12	Casper/La France	2004	1 Yrs	Truck 1	Sutphen	1991	14 Yrs
Engine 13	Casper/LaFrance	2004	1 yrs	Truck 2	Spartan LTI	1993	12 Yrs
Engine 14	Shawano/LaFrance	2001	4 Yrs	Truck 3	Spartan LTI	1994	11 Yrs
Engine 15	H&W/Spartan	1996	9 Yrs	Truck 4	Simon LTI	1989	16 Yrs
Engine 16	3-D/LaFrance	1998	7 Yrs	Truck 8	AM LaFrance	2001	4 Yrs
Engine 17	Western/Spartan	1992	13 Yrs	Truck 13	Spartan	1994	11 Yrs
Engine 18	Western/Spartan	1992	13 Yrs	Truck 22	Spartan	1995	10 Yrs
Engine 19	Casper/LaFrance	2004	1 Yrs	Truck 25	Am LaFrance	1999	6 Yrs
Engine 20	Marion/Spartan	1990	15 Yrs	Truck 41	Thibault	2001	4 Yrs
Engine 22	Casper/LaFrance	2006	0 Yrs				

Table 63 shows the average age of apparatus by type and mileage (November 2005).

Table 63: PF&R's Fleet by Age and Mileage¹²²

Apparatus	Quantity	Average Age	Age High/Low	Total Mileage	Average Mileage	High/Low (Thousands)
Engines	29	7	15/1	1,485,506	51,224	105/2
Aerial ladders	9	10	16/3	541,893	60,210	88/26
Special Units ^A	29	11	37/1	411,511	15,241	114/1
Marine Units ^B	6	21	78/3	—	—	—
Reserve Engines	11	18	24/12	995,882	90,534	116/7
Reserve Aerials	3	22	26/19	214,023	71,341	72/70
Fleet Total	87	12.8		3,633,815	48,670	

^A Special units include: 4 air units, 6 brush units, 1 command unit, 2 decon trailers, 1 dive rescue van, 1 foam unit, 3 hazardous material units, 1 marine response vehicle, 1 Special Operations Response SOR van, 1 heavy squad, 1 trench unit, 1 utility pick-up, 1 water tender, and 5 rescue units.

^B Marine units include: 2 frontline fire boats, 1 reserve fire boat, 3 rescue boats.

¹²¹ Information in the chart based on background data sent by PF&R at the beginning of the project (November 2005)

¹²² Information as of November 2005. It does not reflect new vehicles for Station 8 and Station 22.

PF&R has a total of 191 vehicles that include 87 fire suppression and special service units, and 104 administrative, support, and light duty emergency vehicles.¹²³

FRONT-LINE FIRE ENGINES AND TRUCKS: PF&R front-line fire apparatus is comprised of 39 pieces of equipment that include 29 engines, nine ladder trucks and a squad. Fifty-five percent of PF&R combined front-line fire apparatus is under 10 years old. The median age of the PF&R’s front-line fleet is nine years, and an average age per unit of eight years. Table 64 shows the number, percentage, and type of front-line apparatus based on age.

Table 64: Front-Line Engines and Trucks by Percentage of Age

Front-Line Apparatus	1-5 Yrs.	6-10 Yrs.	11-15 Yrs.	16-20 Yrs.
Engines*	12	10	5	2
Ladder Trucks*	3	2	4	0
Totals	15	12	9	2
Percent of Total	39%	32%	24%	5%

* Reflects new apparatus purchased thru FY05–06.

PF&R’s front-line apparatus conform to NFPA 1901 Standard for Automotive Fire Apparatus, and other internal specifications. PF&R has standardized the basic design of their front-line apparatus with over 50 percent of the current front-line fleet manufactured by American La France Fire Apparatus. All PF&R front-line apparatus are equipped with Mobile Data Terminals (MDTs).

PF&R’s 29 engines are equipped with 1,500 gpm pumps, and a minimum capacity 500-gallon booster tanks, and carry 1,200 feet of 3-inch supply hose. More than half of the engines are equipped with onboard foam systems. The configuration of compartment space on apparatus has been standardized, which allows personnel to operate quickly and more efficiently during emergency operations. The apparatus is functionally well-designed, and equipped with state-of-the-art fire suppression and ALS equipment.

Standardizing PF&R’s front-line apparatus enhances operational efficiency during emergency operations, and also helps reduce acquisition, maintenance and repair costs. By standardizing apparatus design, PF&R is in a better position to purchase multiple units depending on the type of apparatus it desires. It also saves money since standardized apparatus use common parts in their construction, which allows PF&R to stockpile parts commonly used to repair apparatus at lower costs.

Ladder trucks are typically provided in relationship to the degree of urban development, including number of high-rise structures, population density, and the need for special equipment and rescue capabilities. PF&R has nine front-line ladder trucks of various types, which consist of one 100-foot aerial platform (Truck 1), one 100-foot service aerial (Truck 2), and seven 100-foot

¹²³ Information provided by apparatus maintenance

tractor drawn aerial ladders (Trucks 3, 4, 8, 13, 22, 25 and 41). Tractor drawn aerial ladders are well suited for urban areas because they have better maneuvering capabilities on narrow city streets and in heavy traffic congestion normally found encountered in urban areas.

Four of PF&R’s ladder trucks are due for replacement over the next four years including trucks 1, 2, 4 and 13.

RATIO OF ENGINES TO TRUCKS: The ratio of engine companies to ladder trucks varies in relation to the degree of urban development, and the need for aerial apparatus. In densely populated cities, the engine-to-truck ratio is either 3:1 or 2:1 depending on the population density. PF&R’s nine ladder trucks provide an engine-to-truck ratio of approximately 3:1, which is a good balance for the size of the area covered, population, call demand and the risks present. PF&R compares favorably to the comparison group, which average ratio is also 3:1. Table 65 shows the number of engines and trucks used across the selected comparison jurisdictions.

Table 65: Comparison of Front-Line Engine–Truck Ratio and Engines per 10,000 Population

Jurisdictions	Engines	Trucks	E:T Ratio	Engines/ 10,000 pop
Cincinnati, OH	26	12	2.2	0.79
Kansas City, MO	33	12	2.8	0.75
Charlotte, NC	37	14	2.6	0.62
Seattle, WA	34	11	3.1	0.60
Portland, OR	29	9	3.2	0.52
Denver, CO	26	14	1.9	0.47
Sacramento, CA	22	8	2.8	0.47
Long Beach, CA	22	4	5.5	0.46
Average	29	11	2.7	0.57

PF&R’s 0.52 engines per 1,000 population, is consistent with the average comparison group. Engines per 1,000 population varied from a low of 0.46 in Long Beach with a population of 475,460 to a high of 0.79 in Cincinnati, with a population of 317,361. In comparison to other fire departments, PF&R engine to truck ratio is about average.

Apparatus should not be purchased based solely on ratios. Ultimately, it is the location of the trucks that determines the number of engines needed and hence the ratio. The need for truck companies becomes greater with the increase in population density usually associated with large numbers of multiple family dwellings or high-rise buildings.

RESERVE APPARATUS: Vital to any fire department is its reserve apparatus fleet. There must be adequate replacement vehicles readily available when needed to maintain the operability of the department. Table 66 summarizes PF&R’s reserve apparatus inventory, including the age of each unit.

Table 66: PF&R Reserve Engine and Truck Inventory*

Unit	Year	Age*	Unit	Year	Age*
Engine 2R	1989	16 Yrs	Engine 23R	1993	12 Yrs
Engine 4R	1987	18 Yrs	Engine 24R	1989	16 Yrs
Engine 5R	1989	16 Yrs	Engine 34R	1986	19 Yrs
Engine 12R	1982	23 Yrs	Engine 43R	1988	16 yrs
Engine 13R	1989	16 Yrs			
Engine 14R	1981	24 Yrs	Truck 10R	1986	19 Yrs
Engine 18R	1988	17 Yrs	Truck 19R	1979	26 Yrs
Engine 24R	1989	16 Yrs	Truck 20R	1985	20 Yrs

*All age information as of November 2005

With regard to reserve apparatus, the NFPA standards state that as long as the piece is in good operating condition, age may not be a factor. The one caveat is that no engine or ladder should be more than 25 years old.

Under PF&R’s apparatus replacement plan, when front-line fire apparatus are retired from active service they are normally placed into reserve status for an additional five years. After 25 years, these apparatus are either assigned to the training division for an additional three years or are donated.

The department currently has 14 reserve engine and truck apparatus, which consist of 11 engines and 3 ladder trucks (Table 67). (Other reserve apparatus, such as fire boats, are discussed below in Special Services Vehicles.) At least two pieces of the reserve apparatus (reserve truck 19 and reserve engine 16) exceed the NFPA maximum service life recommendation, which states older apparatus can remain in reserve status for as long as it remains in good condition. While it is most preferable not to use or rely on apparatus over 25 years old, PF&R does have an adequate and sound reserve fleet.

Table 67: Reserve Apparatus

Auxiliary Front Line Apparatus	0-5 Yrs.	6-10 Yrs.	11-15 Yrs.	15-20 Yrs.	21-25 Yrs.	26-30 Yrs.
Engines	0	0	1	8	2	0
Ladder Trucks	0	0	0	2	0	1
Total	0	0	1	10	2	1
Percent of Total	0%	0%	1%	71%	14%	1%

Recommendation 108: The fire department should sell or retire its oldest engine and truck as soon as possible. The NFPA recommends that fire departments maintain at least a ratio of 8:1 front-line to reserve apparatus. Since PF&R adequately meets the NFPA reserve apparatus requirement, and has no special maintenance problem, disposal of these older units would have little impact on the department suppression capabilities.

Truck 19R, a tiller or tractor-drawn apparatus, is the only one of its kind in the reserve fleet. This type of truck is beneficial for traveling on narrow streets. However, more important than that is the length and effective reach of the ladder. If this vehicle is retired, PF&R still has adequate reserve truck capacity. A one-for-one replacement with the reserve tiller truck is not required.

SPECIAL SERVICES VEHICLES: The majority of the Bureau’s special service vehicles were observed and reviewed, and appear to be in very good condition. Special service apparatus are typically used less frequently than fire suppression apparatus and have relatively low mileage and, therefore, are replaced based on age alone. The typical service life of a special service unit is 30 years, which is an exception to the Bureau’s apparatus replacement plan criterion.

Over the next 15 years, PF&R is scheduled to replace seven special service units, which are identified in their apparatus replacement plan. Two of PF&R’s marine vehicles are over 25 years old. Fireboat Campbell is 78 years old and the Marine Response Vehicle is 37 years old. Fireboat Campbell is a PF&R reserve fireboat. It is in immaculate condition, similar to the balance of PF&R’s other marine craft. PF&R recently purchased a new marine response vehicle that is scheduled to be placed in service soon. PF&R received a donation of a personal watercraft unit, which provides rapid river rescue response.

Table 68: Special Service Apparatus and Support Vehicles

Category	0-5 Yrs.	6-10 Yrs.	11-15 Yrs.	15-20 Yrs.	21-25 Yrs.	26+ Yrs.
Air Units		1	1	1	1	
Brush Units	4		2			
Command Unit				1		
Decon Trailers	2					
Dive Rescue Unit				1		
Foam Unit				1		
Hazmat Units	2		1			
Marine Craft*	3	2			1	1
Marine Response Unit*						1
Rescue Units	5					
Special Operation Van			1			
Heavy Rescue Squad				1		
Trench Rescue Unit			1			
Utility Unit	1					
Water Tender		1				
Total Units	17	4	6	5	2	2
Percent of Total	47%	11%	16%	14%	6%	6%

* Fireboat Campbell 78 years old and Marine Response Unit 37 years old

PF&R recently purchased five new special service units through an Urban Area Security Initiative (UASI) grant. These new apparatus include a structural collapse unit, mobile command

unit, hazardous material response unit, and two Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) heavy rescue units. These units replace state assets on loan to the PF&R, and other city assets that have exceeded their service life.¹²⁴

PF&R maintains five new rescue units in “ready reserve” status. One unit is staffed on a 24-hour callback basis to support the Police Department Special Emergency Response Team (SERT) during special operations. The four remaining rescue units are maintained by PF&R as rehab units for firefighters during major incidents, as back-up in case the City’s EMS third party provider experience labor problems or strike, and as emergency transport units during major incidents or a natural disaster. Two of the rescue units have been temporarily activated by PF&R to lighten the EMS response burden on fire suppression units. The units are staff by personnel whose station is undergoing renovation.

ADMINISTRATIVE AND SUPPORT VEHICLES: Table 69 shows the administrative and support vehicles operated the by PF&R. These vehicles are in addition to the front-line apparatus and other emergency response apparatus.

Table 69: Administrative and Support Vehicles

Vehicle Type	Number of Units
Sedans	50
Police Utilities	4
Mini Passenger Vans	7
Mini Cargo Vans	5
Full Size Passenger Vans	2
Full Size Cargo Vans	7
12 foot Step Vans	2
High Cube Van	1
¾ ton Pick-up Trucks	6
1 ton Pick-up Trucks	3
1 ton+ Pick-up Trucks	2
Subcompact SUV's	4
1 ton Flat Bed Truck	1
Total Vehicles	104

City Fleet, a division of the City’s General Services Bureau, is responsible for the repair and maintenance of PF&R’s administrative and support vehicles. City government transferred this responsibility to City Fleet in an effort to consolidate and centralize the city’s vehicle maintenance. Although City Fleet is responsible for repair and maintenance of these vehicles, all costs associated with repairs, maintenance, and replacement is paid for by PF&R via interagency agreement to City Fleet.

¹²⁴ The new special service units are not reflected in Table 68 because they were not yet in-service.

Each city bureau has a designated fleet manager who is responsible for tracking vehicle mileage and coordinating preventive maintenance, and purchasing new administrative and support units. The responsibility for the maintenance of light duty emergency units was the responsibility of City Fleet. PF&R assumed this responsibility to improve service levels; however, due to staff reductions resulting from budget cuts, this responsibility was transferred back to City Fleet. Only those special service units reflected in the department's apparatus replacement plan are maintained by apparatus maintenance. Specifications for the replacement of light-duty emergency response units are the responsibility of superintendent of apparatus maintenance, and replaced based on the City Fleet replacement schedule.

The fire department budgets approximately \$165,000 annually for the repair and maintenance for these vehicles, and an additional \$259,177 for the replacement of administrative, support vehicles, and emergency special service units. Fleet vehicles are on a nine-year replacement cycle, depending on the mileage and mechanical condition of the vehicle.

City Fleet performs vehicle maintenance based on manufacturer service recommendations. Administrative and support units undergo preventive maintenance every 4,000 miles or eight months. Preventive maintenance includes three levels of service:

- **A-Service:** Oil change and lubrication, lights including warning lights, and general safety checks.
- **B-Service:** A-Service plus brake inspection, electrical systems check, and a more extensive safety inspection, lubrication of all doors, etc.
- **C-Service:** A and B Services plus transmission and radiator inspections.

According to City Fleet, at least two A and B services are performed annually on administrative and light emergency units, and the C-Service is performed approximately every 16,000 miles. The total cost of the basic preventive maintenance services is \$330 per vehicle, which does not include the cost of fuel and air filters, or other necessary mechanical repairs, which are charged based on time and materials.

Overall, PF&R and maintenance personnel appeared to be pleased with the quality of maintenance and repair service provided by City Fleet, with the exception of the time and logistics required to complete the service. At this time, apparatus maintenance lacks a sufficient number of mechanics to take on the maintenance responsibility of the administrative and support fleet. (This will be discussed below, in Apparatus Maintenance.)

Apparatus Maintenance – Emergency response vehicles are very specialized and require sophisticated upkeep. They must be dependable beyond the “fail-safe” standard. These apparatus are expensive and carry a large amount of specialized equipment and tools that in many instances can cost as much as the vehicle itself. They must perform reliably at the scene of an emergency.

OVERVIEW: Over all, vehicle safety and maintenance is the responsibility of the Apparatus Maintenance. The personnel assigned to Apparatus Maintenance have done an excellent job maintaining PF&R’s fleet of front-line and other emergency apparatus. Eight personnel are assigned to Apparatus Maintenance, which include the Apparatus Maintenance Supervisor, six full-time Emergency Vehicle Technicians (EVT’s) counting one temporarily-filled vacant full-time EVT position, and one part-time EVT position. Table 70 lists the number of personnel, and their positions within Apparatus Maintenance.

Table 70: Staffing Apparatus Maintenance

# of Personnel	Title	Assignment
1	Vehicle Maintenance Supervisor II	Apparatus Maintenance Supervisor
4	Vehicle and Equipment Mechanics	Emergency Vehicle Technician
1*	Vehicle and Equipment Mechanics	Vacancy
1	Vehicle and Equipment Mechanics	Emergency Vehicle/SCBA Technician
1**	PT Vehicle and Equipment Mechanic	Emergency Vehicle Mechanic

* Temporarily filled ** .56 FTE

Over the past five years, Apparatus Maintenance has lost several positions for various reasons. These include the office administrator, a shop foreman position, and one emergency vehicle technician position. The loss of these positions has made it difficult for apparatus maintenance to keep pace with growing maintenance demands. Apparatus maintenance must pay overtime weekends and evenings in an effort to keep pace with the growing demands. In addition to overtime, many repairs normally handled by Apparatus Maintenance are outsourced to local vendors because there are not enough personnel to perform the work. The fiscal year is only half over, and apparatus maintenance has already exceeded the dollar amount paid to outside vendors.

The Apparatus Maintenance Supervisor spends most of his time coordinating the day-to-day maintenance, supervising mechanics, and performing administrative duties. The loss of the shop foreman position has made it practically impossible for the Apparatus Maintenance Supervisor to focus his full time and attention on the broader picture of planning, organizing, directing, and coordinating Apparatus Maintenance activities with other divisions within PF&R, and other outside interests.

Apparatus maintenance also lost administrative support that played a key role in coordinating the shop’s administrative and clerical activities. The Apparatus Maintenance Supervisor has attempted to juggle these administrative activities in addition to his normal duties, but despite this gallant effort, many of the shops administrative matters are falling through the cracks.

Data is not being entered into the Apparatus Maintenance Data System (AMS) in a timely fashion. It was reported that repair tickets have not been entered in the system since March 2005.

Employee training records have not been updated for at least a year and in some cases, even longer. Simply put, apparatus maintenance needs administrative support, and quick, if not full-time, at least on a part-time basis. Having up-to-date and accurate information concerning the status and condition of PF&R's fleet is critical, especially in matters concerning planning and budgetary issues.

Recommendation 109: PF&R should fill the current fulltime EVT vacancy at Apparatus Maintenance with a permanent position. PF&R mechanics are overloaded with vehicle repairs and schedule maintenance. A shortage of mechanics and a steadily increasing workload has resulted in overtime pay just to keep pace with vehicle repairs, and the situation is not expected to improve anytime soon. Filling the vacancy will help ensure that at least five full time EVT's are on the floor each day.

Recommendation 110: PF&R should upgrade the Apparatus Maintenance part time EVT position to a full-time. The additional EVT position would lesson the workload on mechanics and help reduce overtime, and costs associated with send overflow work to vendors.

Recommendation 111: PF&R should restore the shop foreman's position. This position is critical to the day-to-day supervision of EVT's and coordination vehicle maintenance activities on the shop floor. Having a foreman to coordinate the shops day-to-day maintenance activities allows the Supervisor to focus his full-time attention on the broader aspect of planning, organizing, and directing PF&R's maintenance needs.

Recommendation 112: PF&R should provide Apparatus Maintenance with either full-time or at least part-time administrative support. The Apparatus Maintenance Supervisor spends much of the day balancing the shops administrative needs with coordinating and managing PF&R's maintenance activities. The combination of the two has become overwhelming for one person to effectively handle. Data normally entered into the Apparatus Maintenance Data System has been collecting for months and has not been entered into the system, and the situation only appears to be getting worse. Administrative support, even if part-time, would be a tremendous help in at eliminating the backlog of paperwork, and will free the Supervisor to coordinate and manage the apparatus maintenance functions.

MECHANIC CERTIFICATIONS: Because of the complex systems associated with fire apparatus, an emergency vehicle technician must have knowledge and training that exceed that of typical automotive mechanics. The emergency equipment mechanic must be able to inspect, diagnose, maintain, repair, and test the many functions of the fire apparatus. It is the responsibility of PF&R to assure that its vehicles are maintained by qualified mechanics in accordance with their competencies.¹²⁵

The emergency services have always ensured that response and rescue personnel are trained and certified to the appropriate levels based on "accepted standards," such as NFPA standards for firefighters and fire officers. Emergency vehicle technicians also need training, education, and certification in their specialty. Servicing emergency fire apparatus by certified technicians should lead to more reliable equipment, enhancing the safety of the public and

¹²⁵ NFPA Fire Protection Handbook, 19th Edition Volume I

emergency personnel. It also increases firefighter confidence in the quality of the maintenance and reliability of the PF&R's emergency equipment.

According to the Deputy Chief of Logistics, PF&R's mechanics are not required to have EVT training and certification. However, training records provided by apparatus maintenance show that the EVT's are well-trained and experienced. All EVT's have attained certification on their own time. The EVTs have been certified through either the Emergency Vehicle Technician Commission and/or the National Institute of Automotive Service Excellence (ASE). The majority of the mechanics have also taken other professional development and technical courses, in addition to those required under the EVT and ASE certification programs.

PF&R has been proactive in their support for professional development. PF&R offers to arrange and pay for any training and certification examination. However, according to some PF&R officials interviewed, many of the mechanics are frustrated over investing their time and energy in training and not being fairly compensated for obtaining a higher level of proficiency. This could have a significant impact on PF&R's apparatus maintenance program. In order to maintain their certifications, mechanics must recertify in the discipline every few years. Training records indicate that many of the mechanics certifications are approaching expiration or have already expired. With the City's continued effort to consolidate vehicle maintenance under a central maintenance facility, it would be in the best interest of PF&R to resolve this issue as quickly as possible. If PF&R's mechanics fail to maintain their EVT recertification, the city might move to transfer fire apparatus under the City's central maintenance facility, as many other cities have already done.

PF&R should explore establishing incentives to entice mechanics to seek training and maintain their mechanic certifications. One method would be to tie pay increases to different levels of mechanic certifications and recertification. Any such program should be tied to the NFPA standards for the Emergency Vehicle Technicians position.

Recommendation 113: PF&R should consider establishing a mechanic certification program consistent with the Emergency Vehicle Technician Certification Commissions Apparatus Technicians ratings, of Level I, II, and Master Fire Apparatus Technician. PF&R should consider developing proficiency pay or other incentives to entice mechanics to obtain Master Fire Apparatus Technician certification. To ensure continuing education, mechanics would have to train and recertify to retain any offered incentive. According to fire officials, the tradesman assigned to the building maintenance unit must be licensed and certified in their particular discipline. It is not unreasonable to require fire apparatus mechanics to hold and maintain their certifications as well.

PREVENTIVE MAINTENANCE: Despite a shortage of mechanics and a reduction in the shop's workload, PF&R has one of the best-maintained fleet of apparatus that we have seen. Most of the credit goes to the station personnel who are the first link in the preventive maintenance chain, and Apparatus Maintenance staff who maintain PF&R's apparatus.

PF&R has a comprehensive preventive maintenance program that begins in the fire stations. Station personnel inspect the apparatus on a daily basis and make any minor repairs when possible. Problems that exceed their capability are promptly referred to Apparatus Maintenance for repair.

PF&R's basic preventive maintenance follows the NFPA 1915 Standard for Fire Apparatus Preventive Maintenance Program. Preventive maintenance appointments are scheduled by the Apparatus Maintenance Supervisor. Front-line apparatus undergo scheduled preventive maintenance every six months, and reserve apparatus once a year regardless of vehicle mileage. For busy apparatus, preventive maintenance should be based on both time and/or mileage. According to the Apparatus Maintenance Supervisor, apparatus mileage for some of the City's busier stations has almost doubled as the result of EMS response activity. Normally, this would signal the need to increase the number of scheduled appointments. However, there are not enough mechanics to handle additional check-ups and keep pace with other equipment repairs.

A basic check-up takes approximately 18 hours to complete. Apparatus maintenance budgets approximately \$130,200 per year for preventive maintenance activities, or \$1,400 per unit per visit for a basic preventive maintenance service, which includes parts and labor.¹²⁶ However, this amount could be higher depending on the extent of any other problem discovered during the check-up. Maintenance records provided by PF&R shows the costs of major repairs to apparatus have increased 138 percent in the past five years. The largest dollar increase was between FY02-03 and FY03-04. Table 71 shows the increase in major repair costs.

Table 71: Major Repairs Costs 2001- 2004

Fiscal Year	Major Repair Costs	Percent Change
FY00-01	\$144,528	
FY01-02	\$147,743	2.2%
FY02-03	\$208,766	41.3%
FY03-04	\$287,328	37.6%
FY04-05	\$343,856	19.7%
Overall Change From FY00-01 to FY04-05		138%

There may be a positive correlation between the increase in the number and amount of repair costs and increased call volume. The number of fire apparatus responses (to engines and ladder trucks) has increased since rescue units were phased out of the Bureau. Some rescue units

¹²⁶ The total budget is an estimate. It assumes \$1,400 per maintenance visit of front-line and reserve apparatus. Front-line apparatus are maintained at least twice per year, and reserve apparatus once. The equation is $(39 \text{ front-line apparatus} \times \$1,400 \times 2) + (\$15 \times \$1,400) = 130,200$.

are used to deliver services where fire stations are being remodeled. Additionally, maintenance repair costs may have increased because more maintenance and repairs are outsourced to other vendors due to an inadequate number of EVT's in Apparatus Maintenance. Age of units may also contribute to increased repairs and repair costs.

Recommendation 114: Review maintenance records and data to determine why costs have increased so much. Disaggregating the data may reveal some variations that are not common, and could be fixed easily.

Recommendation 115: Based on PF&R's increase response activity, Apparatus Maintenance should reevaluate the amount of time between preventive maintenance services of apparatus assigned to the City's busier stations. The cost of a preventive maintenance service is a bargain compared to the cost associated with major repairs to engine and drive trains. It has also been reported that vehicle mileage in some of the City's busier stations has almost doubled over the past few years. That being the case, it presents a strong argument to perform preventive maintenance based on both mileage and time (or whichever target the apparatus meets first).

MAINTENANCE FACILITY: Basic maintenance is performed at the apparatus maintenance facility by PF&R's EVT's. The facility has four large bays and is better equipped than others we have seen. Although the facility is large in terms of square footage, the shops ceiling is only 15 feet high. The low ceiling clearance makes it very difficult to work on the newer apparatus inside. If it becomes necessary to tilt the cabs to work on the engine, transmission, or pump, these units have to be worked on outside. This makes it very difficult for mechanics especially during periods of inclement weather.

Additional Maintenance: Personnel assigned to the Apparatus Maintenance are cross-trained to perform a wide variety of maintenance and repair tasks including repairs to single and multi-stage centrifugal pumps, hydraulic systems, brake systems, and limited repairs to engine and drive train. Major repairs that exceed the shop's capabilities, including major engine and transmission work, body work, and front-end alignments, and tire repair and replacement are outsourced for repair.

During one of the scheduled check-ups, apparatus maintenance performs annual pump tests and tests both ground and aerial ladders. At least every five years, aerial ladders under go the NFPA 1914 Manufacture Non-Destructive Recertification Test. This test is performed by an outside contractor. One of the EVT's is crossed-trained and certified as a Self-Contained Breathing Apparatus (SCBA) repair technician, which give apparatus maintenance the capability to internally test and repair breathing apparatus. Having this capability is a tremendous cost savings to PF&R, and reduces the down time of the Bureau's breathing apparatus.

Due to the heavy workload, EVT's perform limited repairs to power tools, nozzles, and other small equipment. The majority of small power tool and equipment are contracted out for repair. Most fire department shops handle these type of repairs internally, which saves a significant amount of money and normally reduces the down time of the equipment. These types

of repairs are so prevalent that many departments assign a full time position for this purpose alone. If PF&R should hire additional EVT's as previously recommended, one of those individuals could be assigned this responsibility. Ideally, all of the EVT's should be involved in this task.

APPARATUS MAINTENANCE SYSTEM (AMS): This system was developed exclusively for Apparatus Maintenance by the City's information technology department. The current software is capable of generating variations of basic reports which include tracking apparatus repairs, apparatus preventive maintenance check-ups, vehicle fuel consumption, mileage, annual ground ladder tests, annual aerial ladder and pump tests, outsourced repair work, and apparatus specifications.

The current software is not capable of tracking the length of time that apparatus is out-of-service, which is important for assessing the efficiency of the department in keeping its equipment available, and for identifying apparatus that experience a disproportionate number of operational problems and/or mechanical breakdowns.

The system is not capable tracking the shop's parts inventory. The current method used for tracking parts is antiquated and unreliable. Basically, it is the mechanics responsibility to submit a handwritten list to the shop office of the parts used to repair apparatus so that they can be replenished. It was not known if the AMS can be adapted to function as an automated inventory tracking system. It may be possible to up-grade the existing Apparatus Maintenance System to fulfill this need. Ideally, the AMS should generate the repair orders, and charge all parts used in the repair of the apparatus and/or equipment to the repair ticket. This will provide the shop an accurate accounting of the parts used, actual repair cost per unit, and quantity of parts on hand.

It is not known if existing AMS software can be upgraded to handle these additional applications, or whether it is even worth the expense of trying to upgrade the system. Another consideration would be to purchase an off-the-shelf software package that would address apparatus maintenance needs. There are many excellent user-friendly off-the-shelf Fleet Management software products for under a \$1,000 that addresses all of these concerns.¹²⁷

Recommendation 116: Upgrade the AMS software to track inventory parts. If the software does not have these upgrades, consider purchasing an off-the-shelf program to track inventory and parts data. There are many inexpensive user-friendly Fleet Management software packages available that can accomplish exactly what PF&R seeks. We urge PF&R to at least contact an outside software manufacturer, and examine their product capability. These systems are specifically designed for managing large fleets. Many of the websites are interactive and will demonstrate the many capabilities that these system possess, such of tracking apparatus

¹²⁷ One example is a product called Innovative Maintenance Systems. Their software is currently used by fire and police department throughout the United States.

preventive maintenance, repairs, down time, parts and inventory, reports including a wide variety of analytical reports.

Apparatus Replacement – An aggressive and structured apparatus replacement program ensures the reliability of PF&R’s fleet without placing a sudden financial burden on local government to replace an excessive number of vehicles at one time. During the 1980s, PF&R adopted a 15-year/100,000 miles apparatus replacement plan. PF&R’s plan is modeled after the National Fire Protection Association recommendation that front-line fire apparatus be retired after 10 to 15 years of active service depending on the apparatus routine workload, physical condition, and maintenance and repair cost history. Mileage is not a factor in the NFPA replacement plan.

Under the PF&R plan, front-line apparatus are retired from active service after 15 years or 100,000 miles. These units are then placed into reserve status for an additional five years. Displaced reserve apparatus are generally assigned to the training academy for an additional two to three years for training purposes, and then finally disposed of.

The normal life expectancy for front-line apparatus will vary from jurisdiction to jurisdiction, depending on the amount of use the equipment receives, and the adequacy of PF&R’s maintenance program. Age in and of itself should not be the sole factor in determining when to retire apparatus. Other factors such as the apparatus mileage, operational condition, and maintenance costs should be factor in as well.

Portland’s plan is consistent with the upper end of NFPA and other national standards, based on age. The NFPA sets out recommendations regarding the age of first-line as well as reserve apparatus in the *Fire Protection Handbook (19th Edition)*. For first-line apparatus the NFPA states, “In general, a 10- to 15-year life expectancy is considered normal for first-line pumping engines. First-line ladder trucks should have a normal life expectancy of at least 15 years.” After 15 years of front line service units are to be placed in a reserve status for an additional 5 years. Portland will also replace a unit when it exceeds 100,000 miles. (More discussion on mileage is noted later in the chapter.) Notwithstanding the repeated budget constraints in recent years, the replacement program has been kept up-to-date. As of June 30, 2005, PF&R has five engines, one truck and one squad that exceed the replacement schedule.

PF&R uses a collaborative approach when replacing apparatus. The Deputy Chief of Logistics and the Apparatus Supervisor jointly determine which apparatus are to be retired based on the department’s replacement criteria. An apparatus committee comprised of over 20 personnel including command officers, fire suppression personnel in different areas of expertise, and union representation provides recommendations from the user’s perspective. The Apparatus Supervisor is responsible for developing the apparatus specifications based on the apparatus committee’s recommendations, and available funding. This system has proven to be very

successful. PF&R front-line apparatus are some of the best equipped and maintained apparatus we have ever seen.

Under the replacement plan, 1/15th of PF&R's front-line apparatus should be replaced on an annual basis. Based on 39 pieces of front line apparatus, the department would need to replace at least two to three pieces of apparatus annually to keep pace with replacement schedule. At this rate of replacement, the average age of the department's front-line apparatus would be approximately 8 years.

As a result of past budget constraints, PF&R's replacement plan is slightly behind schedule (by one year). Based on apparatus deliveries thru FY05, the median age of PF&R's apparatus is nine years, and the average age is eight years. If PF&R can maintain the apparatus replacement plan, it will ensure that the department's apparatus remain reliable and safe. It will also ensure that they stay abreast of all new safety and technological enhancements, and other improvements made by apparatus manufacturers.

Under the department's replacement plan, all delayed purchases are carried over and added to the list of apparatus scheduled for replacement that fiscal year. That could result in a backlog of apparatus awaiting replacement.

Delays in or under-funding of apparatus replacement will eventually lead to a growing backlog. The result will either be a large financial hit on the City (trying to make up the difference at one time) or compromised safety by having older apparatus that are more vulnerable to mechanical problems. The best way to eliminate backlogs is by spreading the replacement of apparatus as evenly possible over the course of the replacement plan.

One way to manage the problem is by not using mileage as a primary criterion for replacing apparatus for several reasons. Mileage alone is not a reliable predictor, particularly in cases where apparatus are properly cared for and maintained (as is done in Portland). Mileage and the vehicle's age should be used in conjunction with other indicators such as the condition of the apparatus, maintenance history, and workload. All of these factors should be taken into consideration in their totality. PF&R apparatus are well maintained and in excellent condition. There is no doubt based on our observation that the replacement of some of the apparatus over 100,000 miles could be delayed at least a year if properly maintained.

Another solution is to consider a lease or lease purchase arrangement. Under such a program income tax benefits and depreciation accrue to the actual, commercial owner of the apparatus; and the fire department, which is tax exempt, realizes savings in overall life cycle costs. Additionally, the department does not have to expend a large sum of money at one time but can spread the cost of apparatus over several years. The department does not have capital tied up in the event the department wishes to trade, exchange, or dispose of the apparatus. Closed and open-ended leases are available, and the department should carefully evaluate them. Any lease or lease purchase agreement should clearly spell out who is responsible for maintenance, repairs,

and liability. Any agreement should also clearly state the conditions under which the either party may terminate the agreement.¹²⁸

Recommendation 117: Maintain the current 15-year apparatus replacement schedule for engines and ladder trucks. The current replacement criteria is appropriate within the Portland system, and front-line units may see some relief if additional rescue units are added to the fleet. The current fleet of front-line engines and trucks has a replacement value of over \$20 million in 2005 dollars (about \$400,000 per engine and \$950,000 per ladder). A straight-line calculation utilizing a 15-year replacement schedule would indicate that approximately \$1.6 million in replacement costs per year should be earmarked for apparatus replacement.¹²⁹ This number is exclusive of secondary vehicles (Tenders, Brush Units, Air & Light, Hazardous Materials Vehicles, Fireboats, Staff and Utility vehicle, etc.), which also have considerable budget impact.

There will be challenging periods ahead, when the schedule replacement of apparatus may have to be delayed which will undoubtedly create a backlog. However, addressing the problem now will help minimize future backlogs making them less painful to overcome and put the replacement plan back on track.

PF&R does not utilize a Fire Impact Fee for the purchase of capital items necessitated by new growth. Many agencies utilize this alternative revenue stream to build new fire stations, and purchase apparatus and equipment. Impact fees typically cannot be used for the replacement of exiting capital. The intent of impact fees is to fund the additional capital items that are required to serve new growth. It is estimated that as many as 75,000 new housing units are planned for the city. Fire and EMS impact fees in many communities have been set at \$500 per household. The formula for developing an impact fee is very complex and must evaluate the value of all assets held by the agency and the pro-rated share of that value among the existing housing inventory. If we assume an impact fee of \$500 per new household built, and the assumption of 75,000 new housing units, this would equate to over \$37 million in additional revenue for capital purchases.

Recommendation 118: Consider the adoption of a Fire Impact Fee to help fund the additional capital that will be required as a result of new growth. PF&R and City Council should work together to balance the replacement plan by eliminating the backlog.

A secondary consideration may be to consider a lease/purchase program. Under such a program PF&R could leverage their purchasing power by spreading the cost of more apparatus over several years. The department does not have capital tied up in the event the department wishes to trade, exchange, or dispose of the apparatus. Closed and open-ended leases are available, and PF&R should carefully evaluate them. Any lease purchase agreement should clearly spell out who is responsible for maintenance, repairs, and liability.

¹²⁸ National Fire Protection Handbook, Nineteenth Edition.

¹²⁹ Number should also include inflation and compounding interest

Facility Maintenance – One of the most important elements of a fire station is whether or not it represents a safe and efficient environment for personnel to use. PF&R is in the final phase of a \$53.8 million renovation project for PF&R’s fire stations. The purpose of the renovation project is to bring the City’s fire stations into compliance with all federal, state, and local essential facilities standards, which include seismic upgrade and building code, and the America Disabilities Act (ADA) improvements. All renovations and new stations are complete except for Stations 1, 15, 18, 21, 24, 27 and 43. The department expects that renovations to Stations 15, 24 and 43 will be completed in 2006. No decision has been made as to whether PF&R Administrative Office Headquarters and Station 1, will undergo renovation or be relocated. The decision on Station 18 and 21 has been delayed pending recommendations contained in this report.

Seventeen randomly selected fire stations were visited during our site visit to evaluate the condition and station accommodations, and meet with station personnel. What we found was very impressive. The City’s \$53.8 million renovation project was a very worthwhile investment. PF&R stations are textbook examples out of the NFPA Fire Protection Handbook as to how a fire station should be designed. The fire stations, including those that have not been renovated were clean and meticulously maintained both inside and out, which was quite a surprise considering many of these stations were originally built during the 1950s and 1960s. Renovations had been completed on all but four of the stations we visited; these include stations 1, 15, 18, and 24. The following are some examples of building renovations and upgrades:

- Seismically upgraded
- Smoke detectors
- Individual sleeping rooms
- Specially ventilated PPE
- Physical fitness area
- Natural gas generator
- Medical supply storage
- Automatic sprinklers
- Fire alarm system
- Decontamination room
- Two PC’s/CAD
- Watch office
- Exhaust extraction system
- ADA Accessibility

Functionally, the stations we visited easily accommodated the current apparatus and crews operating out of the station. In fact, many of the single company stations have the capacity to accommodate additional apparatus, including aerial ladders if necessary. This is a concern in the southwest quadrant of the city where ladder truck coverage is very thin. Stations 5 and 18 could accommodate a ladder truck. (This was discussed in Chapter V, Station and Apparatus Deployment).

The reason PF&R facilities are in such good condition is because they are internally responsible for maintenance and repairs to their infrastructure. PF&R’s Building Maintenance unit is responsible for maintaining PF&R facilities. We found this to be an unusual arrangement since most cities normally centralize all building maintenance activities under one city department. The City of Portland at one time attempted to merge PF&R’s Building Maintenance

unit with City's Facility Services division but abandoned the idea because the City felt the Facility Service division could not meet PF&R's high standards and reduce costs.

Surprisingly, all of PF&R's facilities are maintained by only eight personnel who are assigned to the building maintenance unit. These include a one senior facility maintenance supervisor, one facility maintenance supervisor, one painter, one electrician, two facility maintenance mechanics, and two carpenters. The department's facility maintenance mechanics are general trade personnel who perform basic repairs to facilities similar to building engineers. These are non-uniformed civil service positions. All tradesmen who work out of Building Maintenance are required to be licensed tradesmen in their field of expertise.

There is an enormous benefit in having PF&R maintain their facilities. It ensures that all maintenance needs and unsafe conditions are quickly addressed reducing the risk of on-the-job injuries, and improving personnel safety. The department has better quality control and accountability over maintenance of their facilities. Overall, quality maintenance results in lower maintenance cost, improved safety, and better employee moral.

PF&R's massive renovation project is still underway. The project is coordinated by the Senior Facility Maintenance Supervisor. This person meets on a regular basis with design engineers and architects to discuss any issues or concerns involving the project, and is ultimately responsible for ensuring the projects remain on schedule.

The day-to-day operation of Building Maintenance is coordinated by the facility maintenance supervisor. This individual schedules repairs and routine maintenance of PF&R's facilities. Approximately 1,700 work orders are handled by building maintenance on an annual basis. According to Portland fire officials, it costs PF&R approximately three quarters of what it costs General Services to maintain the Portland Police Bureau facilities.

DISPATCH AND COMMUNICATIONS

911 and dispatch duties are the responsibility of the Bureau of Emergency Communications (BOEC). This agency acts as the primary system access point for Multnomah County including the cities of Portland and Gresham, the Port of Portland, and American Medical Response (AMR). All emergency dispatching of fire, EMS and law enforcement for Multnomah County is done from BOEC. Non-emergency communications are transferred to the appropriate service point.

BOEC is a separate public service agency with its own management and line staff. Employees are trained in multiple aspects of emergency communications including all major branches. The communications system is an 800 Mhz, truncated system, with each agency having assigned talk groups. The system compliments the extensive automatic and mutual aid provided by allowing for easy inter-agency communications.

Fire Department Representation – PF&R has limited representation at BOEC. An emergency operations chief is responsible with providing liaison between BOEC and PF&R. The current representative is knowledgeable with the working of the system and provides the best oversight possible for the situation.

An operational liaison is provided by a lieutenant that staffs the fire dispatch area on weekdays between 0700 and 1900 hours. When the lieutenant is working, all communications issues are channeled through him. During evening hours or when the lieutenant is unavailable, either the on-duty chief officers or the designated chief liaison is contacted.

Until recently, a PF&R lieutenant was assigned to communications on a 24/7 basis. A casualty to citywide budget cutting, staffing was reduced to the current 12-hour, daytime person. Field personnel have commented that since this occurred, the quality of oversight and of dispatching has declined. Inaccurate fire dispatching, failure to follow the medical priority dispatch protocols, and other similar complaints were voiced throughout the city.

Medical Priority Dispatch – In Portland, a coordinated multiple agency response is essential to successfully provide public safety. BOEC not only receives calls, but must prioritize their importance, provide pre-arrival instructions, and determine which agencies will be dispatched. This challenge makes accurate use of medical priority dispatch an essential element.

Most of the complaints from the field involve “over-dispatching” fire first responders on medical emergencies. Often, first responder fire units arrive to find the patient’s condition to be either less serious or different from the dispatch information. Unfortunately, the examples cited by field personnel are anecdotal, with few records available for analysis.

The Medical Director for BOEC is Dr. Jui, who also serves as the Medical Director for all jurisdictions partnering with the center. Dr. Jui advised that there is a quality management component to dispatch, but concedes that more is needed. BOEC staff has quality management personnel, but their duties allow insufficient attention to these matters.

Both the fire department involvement and medical priority dispatch issues center around the lack of attention to the processes critical to PF&R. The following recommendations should benefit both areas.

Recommendation 119: *PF&R should have 24-hour representation at the fire dispatch center.* This should be a lieutenant who has the ability to provide liaison with dispatch personnel and assist with medical priority dispatch quality management. When the assigned officer is off-duty, another qualified officer or firefighter should substitute.

Recommendation 120: *The medical director should assure that between two to five percent of all EMS requests are reviewed for medical priority dispatch quality management purposes.* Appropriate remedial education and other actions should be instituted.

Recommendation 121: The EMS Program Manager should collect information on medical priority dispatch compliance and make that part of the EMS quality management profile. She could also assist the communications battalion chief and on-duty lieutenant by coordinating field complaints and questions.

PF&R is a national model for automatic and mutual aid programs. The seamless operation between agencies works as a powerful tool to enhance public safety. The same goals should be set for work between PF&R and BOEC.

Recommendation 122: BOEC and PF&R personnel should develop a closer working relationship. For example, the BOEC and PF&R quality management personnel should have more contact. Fire dispatch personnel could be offered annual ride-a-long opportunities with the PF&R battalion chiefs.