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The Cost of Providing EMS: A Perspective of the First Response Fire District Providing EMS

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

As a fire district providing first-response, non-transport EMS in light of today's current economic climate, it is critical that Clark County Fire District 3 (CCFD3) manages its financial resources with responsibility and conservation. CCFD3 receives emergency and non-emergency calls for fires, motor vehicle collisions, hazmat, swift water rescue, public assists, and EMS. The focus of this research was on the cost of providing EMS in an all-risk fire district like CCFD3. The problem was that CCFD3 could not quantify the expense for providing first-response EMS. The purpose of this research was to identify a formula that quantifies the expenses for providing EMS at CCFD3. The descriptive method of research was utilized in conducting this research while answering three research questions (a) what are the indirect costs of providing first response EMS, (b) what are the direct costs of providing first response EMS, and (c) is there a formula that can be utilized to determine the direct and indirect costs of providing first response EMS? In conducting the research, an interview was held with a Washington State Auditor to identify the definition of direct and indirect costs. Then, Washington State laws were reviewed regarding fire district budgets and cost accounting. Finally, the 2010 budget for CCFD3 was utilized to create a formula for allocating direct and indirect costs across 10 of the National Incident Fire Reporting System (NFIRS) categories. Results showed that \$389,266.57 was spent on EMS in 2010. In comparison, an EMS cost survey performed by Clark County EMS District #2 (CCEMD2) found the 2010 cost to be \$963,149. An unintentional result was the cost associated with all 10 NFIRS call types. Recommendations to solve the problem include comparing formulas with CCEMD2, improving data collection at CCFD3, and implementing accounting measures to track costs according to the NFIRS categories.

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Introduction

Clark County Fire District 3 (CCFD3) is located in the foothills of the Cascade Mountains, north of Vancouver, Washington. The district was born out of necessity in 1946 by the local residents, mostly of Scandinavian descent. It was an all-volunteer district that provided basic fire suppression activities. In 1974, CCFD3 started responding to calls for medical emergencies, and thus began the service of first response, non-transport, emergency medical services.

The budget in 1946, according to hand written ledgers, was \$2,192.04, all of which were donations from the local farmers and residents (Hockinson Fire Association, 1946). The 2010 budget of \$3,630,851.15 is predominantly made up of tax dollars from the residents in the district (Clark County Fire District 3 [CCFD3], 2010). The present-day budget encompasses much more than just basic fire suppression activities of 1946. They include prevention, public education, hazmat, swift water rescue, motor vehicle collisions, capital expenditures, daily operating costs and emergency medical services. This cost of providing first response, emergency medical services (EMS) in a non-transport fire district is the focus of this research.

According to Heightman (2009), it costs close to a half-million dollars per year to staff an advanced life support (ALS) ambulance on 24/7 basis. This cost includes the staffing, supplies, operating costs, oversight and capital outlay. In its budget, CCFD3 has a category that identifies EMS costs as they relate to EMS supplies, but this category doesn't take into account the other indirect costs of providing EMS.

The problem is Clark County Fire District 3 cannot quantify the expense for providing first response EMS. One of the seven values of CCFD3 is "Responsible Use of Funds – We

Protect Public Investment by Conservative Fiscal Management” (CCFD3, 2010). If CCFD3 cannot identify how the tax payer’s money is spent, how are they to be fiscally responsible?

The purpose of this research is to identify a formula that quantifies the expenses for providing EMS at Clark County Fire District 3. If a formula can be identified regarding EMS costs, this will allow CCFD3 to budget according to the direct needs of the community, and provide the highest level of service, at the appropriate time, in the most cost effective manner.

The three research questions used were (a) what are the indirect costs of providing first response EMS, (b) what are the direct costs of providing first response EMS, and (c) is there a formula that can be utilized to determine the direct and indirect costs of providing first response EMS? The descriptive method of research was utilized in conducting this research.

The district budget from 2010 was utilized to identify the direct and indirect costs of providing first response EMS and then correlated with 10 categories of call types utilized by the National Fire Incident Reporting System (NFIRS). Once distributed, a formula was developed to calculate the costs.

Background and Significance

Clark County Fire District 3 (CCFD3) provides structural and wildland fire protection, emergency medical services, public education, and fire prevention for a population of 25,000 within 80 square miles including rural and suburban areas. The area is residential with high-dollar communities and limited commercial occupancies. It also has unique topography ranging in elevation from 300 to over 2200 feet and includes rivers, streams, a state park, state highways, lakes, and wilderness terrain. In 2010, the Fire District responded to 1107 calls, of which 570 were emergency medical alarms (CCFD3, 2010). Responses to these calls were handled by any one of four stations staffed with a combination of 21 career and 23 volunteer fire personnel.

In Clark County there are three EMS districts, two of which receive their first response and transport EMS services from a public-based fire district or EMS agency. The third EMS district, Clark County EMS District #2, has a first response, non-transport, fire district response provided by CCFD3 and three other fire districts. American Medical Response (AMR) provides the transport services on a contractual basis. Clark County EMS District #2 is governed by the three elected county commissioners and overseen by the Emergency Medical Service Administrative Board (EMSAB), an all-volunteer board made up of representatives in local health care and businesses. This board is responsible for making recommendations to the county commissioners about the contract for private ambulance services. The private contract for EMS transport services is due to expire in 2013 and the board has begun planning for the next contract period.

In 2005, CCFD3 went from providing Basic Life Support (BLS) response with Emergency Medical Technicians (EMT) and EMTs with IV training to a part time Advance Life Support (ALS) response with the hiring of one paramedic. Since then, the district has taken on two additional paramedics, allowing for more frequent ALS first response.

All of the personnel are cross-trained to provide non-emergency and emergency services, including: fire suppression, EMS, Hazmat, prevention, public education, swift water rescue, wildland fire suppression, and public assists. The costs of providing these services are accounted for in the districts annual budget.

The majority of revenues generated for CCFD3 derive from property taxes of residents in the fire district. The State of Washington allows up to \$1.50 tax per \$1,000 assessed value for fire districts (Revised Code of Washington 52.16.040 [RCW], 1989). On an annual basis, the district fire chief prepares the budget based on the assessed value of the district and presents it to

the Board of Fire Commissioners for approval. Fire districts in the State of Washington are required, per *Revised Code of Washington (RCW) 43.09.200* (1995), to prepare their budgets in accordance with the Budgeting, Accounting and Reporting System (BARS). One of the subcategories, Ambulance, Rescue, and Emergency Aid, is the category used for budgeting EMS; but with an all-risk fire department providing multiple services, some of the EMS expenses come from other subcategories including Communications, Dispatch, Legislative, Capital Expenditures, Emergency Services, and Fire Control. By identifying how much of the budget in these other subcategories are indirectly related to EMS, CCFD3 can have a better understanding of the total cost of providing first response EMS.

The following research meets The National Fire Academy's Executive Fire Officer Program and The Executive Analysis of Fire Service Operations in Emergency Management course by planning and budgeting for a fire district so they can be prepared for a natural or man-made disaster. In addition, this research addresses The United States Fire Administration Goals and Objectives by improving local planning and preparedness, as well as improving the fire and emergency services' capability for response to and recovery from all hazards (United States Fire Administration [USFA], 2010).

Literature Review

The purpose of this literature review was to identify what research had been completed regarding EMS costs and the fire service. The first goal was to identify what the health care industry considers the costs of providing EMS to be. The second priority was to identify what direct and indirect costs exist for fire districts or businesses that provide multiple services with the same personnel and capital facilities. Finally, what formulas exist that calculate direct and indirect costs of multiple services within a single entity?

The literature was obtained from the Learning Resource Center at the National Fire Academy in the form of Applied Research Projects and journals. There proved to be very little peer-reviewed research in the fire service that addresses cost allocation. In addition, there was no peer-reviewed research that identified a common formula used to identify EMS costs for a first response fire district. Budgets and accounting practices were identified from Internet searches and a review of on-line journals. Also, the current cost allocation survey performed by Clark County EMS District #2 was reviewed to identify the system used to determine EMS costs in the district. A local automotive dealership was identified as a private business that could provide cost allocation practices as it pertains to the private sector.

According to Evans (2010), fires account for about 7% of the time allocated by the fire service in the United States, while the cost of providing that service, according to the National Fire Protection Agency (NFPA), was \$362 billion in 2008 (Hall, 2011). Evans (2010) goes on to report that \$165 billion of that cost is spent on fire-service labor attempting to prevent \$18.6 billion in property loss. He concludes by stating that the fire-based EMS system needs to demonstrate its economic value to justify the existence of the fire service. Gunderson (2009) presents an equation that can help administrators justify their fire district existence by combining the effects of quality and cost in providing service and then quantitatively expressing the value. This equation he labels the Value Quotient.

Gunderson (2009) defines the Value Quotient cost component as the cost per capita to provide EMS to a defined community. This is obtained by dividing the total cost of EMS by the total number of people in a defined geographic area. In his article, Gunderson does not define what cost categories are used to determine the final cost of EMS. The quality component of the Value Quotient is defined in his article as the percentage of patients who survive a cardiac arrest

and go on to live quality lives. He does not discuss other outcome data or other possible ways of measuring quality. Gunderson (2009) postulates that the Value Quotient can be expressed numerically by taking the percentage of quality lives saved from cardiac arrest and dividing by the cost (total cost of EMS per capita), and thus can be measured over time.

A structured review of published literature pertaining to the economic value of out-of-hospital care was conducted in a study by Lerner, Maio, Garrison, Spaite, and Nichol (2006). Lerner et al. (2006) concluded that the care provided by the out-of-hospital providers needs evaluation from a cost perspective to assist communities in determining a responsible use of their financial resources. Of the 3,533 published articles found in the initial MEDLINE search, only two were considered cost-benefit analyses. One of the two articles reviewed the cost of ambulance service for a one year period, and the other was an analysis of costs as they pertain to air ambulance services. One recommendation at the conclusion of this research was that out-of-hospital emergency care should be able to easily identify the population served, what interventions are being done, the effects of the interventions and alternatives, and their associated costs.

Lerner, Nichol, Spaite, Garrison, and Maio (2007) completed and published a second peer-reviewed article identifying a comprehensive framework for determining the cost of an EMS system. To define this framework, a consensus panel analyzed peer-reviewed and non-peer-reviewed resources and received input from independent experts. They identified 10 categories that need to be considered when identifying the cost of an EMS system. They include, in no rank of priority: medical oversight, bystander response, administrative overhead, communications, equipment, human resources, information systems, physical plant, training, and vehicles. Lerner et al. (2007) notes in his discussion that other authors have attempted to

calculate costs of providing EMS but no formal methodology has evolved. It is worth noting that this study recognized that some EMS agencies, such as fire departments, have other responsibilities. These fire departments, the author contends, have to factor in the cost of availability for multiple responsibilities including EMS, and the cost allocation of these joint resources is an area of debate. Allocating costs proportionately to the task is common, but arbitrary, and without a foundation in economic theory (Lerner et al., 2007).

The National Highway Traffic Safety Administration (NHTSA) identified the cost of providing EMS as consisting of the expense of preparedness and the combined cost of separate components (National Highway Traffic Safety Administration [NHTSA], 1996). The separate components identified by NHTSA were communication systems, vehicle/equipment acquisition and maintenance, personnel training and continuing education, first response and ambulance operations, medical direction, and licensing and regulation activities. There was no formula identified on how to allocate the costs across each of the listed components; the report dealt with EMS as a system in one geographic area that included first response EMS.

An auto dealership, Vancouver Ford, was contacted to determine how they allocate their direct and indirect costs with numerous departments providing separate services in the same physical location.

Monte Phillips, the General Manger, stated that their costs of doing business are about \$600,000 a month, made up of 40% employee costs, 30% operational costs, 20% rent and taxes, and 10% advertising costs (personal communication, October 23rd, 2011). According to Phillips, these costs are allocated to each department based on the level of net profit that department makes. The departments that incur costs at Vancouver Ford are new car sales, used car sales, service, parts and auto body repair. The allocated costs to each department respectively are 45%,

30%, 10%, 10% and 5%. These allocations are based on projections identified each quarter and vary slightly based on past income and predicted future revenues. It is very rare in the auto industry that employees are shared across departments Phillips stated, but when they are their time is allocated based on time in that department (personal Communication, October 23rd, 2011).

In order to allocate direct and indirect costs of providing EMS, three models were found in research conducted by a past Executive Fire Officer student. Laird (2001) found three separate models used to allocate EMS costs. The first was from the American Ambulance Association. In this model, the total cost of services was divided by the total time of transport-capable ambulances in use, expressed as unit hour utilization. This model, according to Laird (2001), proved inefficient in determining cost for his department because of the multiple services his agency provides.

The second model identified by Laird (2001) is one utilized by the International Association of Fire Fighters (IAFF). This model only takes into consideration the marginal costs of providing EMS. This model expresses the total time spent on EMS calls divided by the amount of time the unit is in service. This marginal cost allocation didn't take into consideration training costs, facility costs, vehicle acquisition and maintenance, information systems, medical oversight, and administration, along with the cost of personnel providing multiple services.

The final model identified by Laird (2001) was one developed by Alec Jensen and Jack Krakeel. This model, called the LJG Cost Allocation Model, takes into consideration the numerous activities a fire district provides when determining costs of such services. This model appears to determine if a service should be provided and what charges should be established in providing that service.

In 2010, Clark County EMS District #2 started evaluating the EMS transport services contract, which is due to expire in 2013. As part of this evaluation an EMS cost survey was performed to help identify how much is spent by the four fire districts providing first response EMS.

The purpose of this survey, as outlined in the summary report, was to establish a method to identify first response EMS costs incurred by fire agencies (Clark County EMS District #2 [CCEMSD2], 2011). The summary also identified the Applied Research Project completed by Laird, cited in this literature review. The model used by this committee was the one developed by Alec Jensen, the LJC Cost Allocation Model.

This model took into account six different cost categories: The General Information and Total Cost Category, Base Overhead EMS Cost Allocation, Active Response Costs, Active Training Costs, Active Prevention/Public Education Costs, and Readiness Costs. This model separated costs into one of three categories, EMS, fire and other for the 2010 budget year.

The General Information and Total Cost category listed the total number of employees, including volunteers. For the purpose of this survey a 3:1 ratio was given to volunteers, meaning it takes 3 volunteers to have the same availability as 1 career employee; no citation or reference was given for this ratio. Also listed in this category was the total number of responses and total budget, including: salaries and benefits, services, supply expenditures, and total capital/debit service. In this category, CCFD3 was listed as having a total budget of \$2,876, 905, of which \$2,311,852 was salaries and benefits (CCEMSD2, 2011).

The Base Overhead EMS Cost Allocation category included all direct or dedicated EMS costs. These sub-categories included the cost of a dedicated EMS officer/coordinator, medical

director, medical supplies, EMS equipment, EMS training/tuition/travel, and a dedicated EMS vehicle. The total for CCFD3 in this category was \$18,773 (CCEMSD2, 2011).

The category of Active Response Costs was calculated by multiplying the total response hours by the average salary and benefits per hour. For CCFD3, EMS response hours included the time spent responding to motor vehicle collisions (MVC) and rescue related calls; this total was listed as 376.2 hours. This total was then multiplied by the average number of personnel hours for an EMS call type. CCFD3 was listed with 4 hours in this category, resulting in a total response hours of 1504.8. The average salary and benefits was calculated by dividing the total salaries and benefits of all employees by the number of employees. This number was then divided by the estimated annual hours worked by one employee. For CCFD3 this number was calculated as \$31 per hour. When calculating the Active Response Costs for CCFD3 in the EMS category, the total is \$46,648.80. The calculation listed in the report was \$46,385.00 (CCEMSD2, 2011).

Active Training Costs and Active Prevention/Public Education Costs were calculated with the same concept as response, but utilized the respective total hours in training and prevention/public education hours. When calculating these costs as defined, the total Active Training Costs and total Active Prevention/Public Education costs regarding EMS for CCFD3 were \$13,113 and \$1,302 respectively. In the report, CCFD3s Active Training Costs were listed as \$13,038.85, and Active Prevention/Public Education Costs were \$1,294.64 (CCEMSD2, 2011).

The final category, Readiness Costs, was calculated by multiplying the total number of employees of CCFD3 by the average hours worked by one employee in a year, minus the previous activities of response, training and prevention/public education. Using this formula, the

remaining hours for CCFD3 are 49,764. In the report it is listed as 50,107.56. These hours were then multiplied by the percentage of total response hours in EMS. Using this calculation, the Total Readiness Costs for CCFD3 in EMS is \$848,476.20. The report lists CCFD3 readiness costs of \$858,940.90 (CCEMSD2, 2011).

The total costs of providing EMS based on this model, as listed in the department specific report from Clark County EMS District #2, was \$963,149 or 33% of the total CCFD3 budget for 2010. However, a summary report, provided by the same agency, stated a total cost of providing EMS in CCFD3 was \$831,769 (CCEMSD2, 2011).

In the process of conducting this literature review, it was found that very little peer-reviewed research has been conducted on the cost of providing EMS as determined by Lerner (2006). Some theories consider outcome and benefit while another theory identifies specific categories that should be used in determining costs. Regarding direct and indirect costs, the automotive industry directly ties per-department expenses to the profit of that department. Three formulas for allocating cost of providing EMS were identified. These formulas were used to determine costs for a transport service, regardless of its status as a for-profit EMS service or a public fire agency. One of the aforementioned formulas was used in an attempt to identify costs of providing first response EMS by four fire agencies in Clark County. This formula appeared to use a significant amount of averages and not actual numbers. Additionally, it had significant errors when applied to CCFD3's 2010 budget.

Procedures

First, a supervisor from the Washington State Assessor's Office was interviewed to identify what the State of Washington considers direct and indirect costs as it relates to the fire service. Second, state laws were searched to identify what accounting laws exist as they pertain

to budgeting and budgeting allocation. Once the acceptable practices of identifying direct and indirect costs were defined, Clark County Fire District 3's budget for 2010 was reviewed to appropriately allocate direct and indirect costs as they pertain to services provided. Finally, the indirect and direct costs were allocated across 10 different National Fire Incident Reporting System (NFIRS) categories and a formula was developed to determine total costs of providing services, including EMS.

An interview was conducted with Tina Watkins, Audit Manager for the Vancouver, WA office of the Washington State Auditor. Mrs. Watkins is a graduate of Portland State University with a Bachelor of Science in Business Administration with an emphasis in accounting. She has been with the Washington State Auditors office for 17 years. The interview was conducted to determine what the State of Washington considers indirect and direct costs as well as any associated laws pertaining to budgeting for public agencies.

In Washington State, fire districts are required to prepare budgets in accordance with the Budgeting, Accounting, and Reporting System (BARS) (Washington State Auditor, 2011). The BARS system is the accounting system approved by the Washington State Auditor as required in the *Revised Code of Washington (RCW) 43.09.200 Local government accounting – Uniform system of accounting* (1995). This RCW was reviewed via the Washington State website to determine if there were any cross-references to other RCWs or Washington Administrative Codes (WAC) pertaining to fire district budgeting. Next, a search of all RCWs and WACs was completed to find any other applicable law pertaining to fire district budgets and allocation of direct and indirect costs.

After identifying the acceptable practices of determining direct and indirect costs, the 2010 budget for Clark County Fire District 3 (CCFD3) was reviewed to determine which costs

were direct and which were indirect. The direct costs were allocated to one of 10 NFIRS categories (Fire, Explosions, MVC & Rescue, Hazardous Conditions, Service Calls, Good Intent, False Alarm, Severe Weather, and Special). In the category of MVC & Rescue, CCFD3 separates calls for Emergency Medical Services (EMS) that didn't have an MVC or Rescue component, thus resulting in a total of 10 categories.

The indirect costs were allocated to the 10 NFIRS categories by dividing the costs into three groups: administration and legislative, salaries and benefits of response personnel, and miscellaneous costs (to include supplies, equipment, vehicles, facilities, capital expenditures, and intergovernmental costs).

Administration and legislative costs include the salaries, benefits, supplies, and equipment for the chief, assistant chief, administrative assistant and the elected fire commissioners for the district. These positions are responsible for overseeing all aspects of the district, so the costs of these positions were divided equally across all 10 NFIRS categories.

Salaries and benefits of response personnel included all battalion chiefs, captains, firefighters and volunteers. These indirect costs were divided into three groups, time responding to a call, time preparing for a call, and time available for a call. Responding to a call is defined by the time an apparatus was dispatched to the time the apparatus was in service, multiplied by the number of response personnel. For example, if a fire engine responded to an EMS call that lasted .5 hours and was responded to by three personnel the total staffing hours utilized on that particular call was considered 1.5 hours.

The time preparing for a call includes the total number of hours conducting training, public education, prevention activities, and apparatus readiness, multiplied by the number of personnel conducting such activities. In this group, training time was broken down in one of two

ways. If the training was specific to one NFIRS category, it was fully allocated to that category and considered direct training. If it was related to more than one it was allocated equally across the applicable NFIRS categories, and titled indirect training. The public education, prevention, and apparatus readiness hours were allocated equally across all 10 categories.

The final group, time available for a call, is the total staffing hours remaining after subtracting the time responding to a call and time spent preparing for a call. The basis for allocation of this remaining time is the average staffing hours spent on each of the 10 NFIRS categories in 2010. This distribution was completed by taking the total staffing hours spent responding in each of the 10 NFIRS categories, and dividing it by the number of responses for 2010 in their respective categories. This formula obtains the average staffing time per NFIRS category. These averages were then calculated to determine the percentage of total response time for each of the 10 categories. Finally, this percentage was then multiplied by the total time available for a call, thus allocating all the time available for calls across each of the 10 NFIRS categories based on the average time it takes to run each particular call type.

The hours allocated across each of the 10 NFIRS categories were added together to obtain the total hours for each category. Then, the total budget for salaries and wages of response personnel was divided by the total number of staffing hours to determine a cost per staffing hour. This cost was then multiplied by the total hours allocated in each of the NFIRS categories resulting in full allocation of all salaries and benefits of response personnel.

For the miscellaneous costs, the 2010 budget was reviewed and those indirect costs were allocated according to their use in each of the 10 NFIRS categories. For example, if a certain line item was used for 5 of the 10 categories, that cost was allocated by 20% across those 5 categories.

Once all indirect costs were accounted for, the totals in each of the 10 NFIRS categories were tabulated to determine the total indirect cost for each category. Those indirect costs were combined with the direct costs and an overall total for each NFIRS category was obtained.

Based on the findings in this research, a formula was created to allow for calculations based on the procedures listed above.

For the purpose of this research, all response data was gathered via CCFD3s data management system, Firehouse. This system was used to obtain the number of calls in each NFIRS category, the staffing time for all response personnel, training time and time spent in public education activities. The data for apparatus readiness was based on the average time it takes for response personnel to complete daily, weekly, and monthly apparatus checks.

Limitations noted in this research consisted of data accuracy, the use of averages, and interpretation of generally accepted accounting principles. First, the data gathered pertaining to training time proved difficult because of the multiple Firehouse training codes used to categorize one type of training. Second, the apparatus readiness time was calculated based on average times. This was done because the data entered into Firehouse for apparatus readiness was not considered entirely accurate. Finally, the generally accepted accounting principles were used in calculating these costs, but within these rules there is allowable interpretation of certain expenditures. This interpretation could lead to some discrepancies during replication of this research.

Results

The interview with Tina Watkins provided a basis for identifying indirect and direct costs. In the interview, Mrs. Watkins stated that there is no state law that defines what costs are considered direct or indirect. However, she did provide the Revised Code of Washington (RCW)

43.09.200, which is the law pertaining to systems that are used for public budgeting (personal communication, November 2nd, 2011).

The RCW 43.09.200 *Local Government Accounting – Uniform System of Accounting* was accessed via the Washington State web site. It states:

The state auditor shall formulate, prescribe, and install a system of accounting and reporting for all local governments, which shall be uniform for every public institution, and every public office, and every public account of the same class.

The system shall exhibit true accounts and detailed statements of funds collected, received, and expended for account of the public for any purpose whatever, and by all public officers, employees, or other persons.

The accounts shall show the receipt, use, and disposition of all public property, and the income, if any, derived therefrom; all sources of public income, and the amounts due and received from each source; all receipts, vouchers, and other documents kept, or required to be kept, necessary to isolate and prove the validity of every transaction; all statements and reports made or required to be made, for the internal administration of the office to which they pertain; and all reports published or required to be published, for the information of the people regarding any and all details of the financial administration of public affairs.

There were two RCWs cited at the end that did not have relevance to fire districts or their accounting practices. A complete search was done of all RCWs and Washington Administrative Codes (WAC) for the State of Washington and no other laws were found to be relevant to cost allocation for fire districts.

The Budgeting, Accounting, and Reporting System (BARS) is the acceptable practice of recording budgets for fire districts. Mrs. Watkins stated that this system is based on generally accepted accounting principles (GAAP). According to GAAP, and Mrs. Watkins, direct costs are those costs that can be directly tied to a program or service and need to benefit that service. The indirect costs, according to Mrs. Watkins, are costs that benefit numerous programs and are shared by each of those programs. When asked about formulas and procedures to calculate indirect costs she provided no specific formula or guide other than it is usually based on budgeted numbers and not actual expenses. Mrs. Watkins followed up with an email after our conversation in regards to indirect cost allocation, stating:

If budgeted numbers are used, the district needs to regularly adjust the budget figures to actual expenses. The district can use other means than the budget to come up with these numbers, but ultimately they need to be based on actual costs and reasonably based on the benefit to the program (personal communication November 4th, 2011).

Mrs. Watkins also provided advice in regards to indirect costs, stating, “The district needs to define these types of costs themselves while using the guidelines described and GAAP” (personnel communication, November 4th, 2011). A reference offered by Mrs. Watkins was The BARS Manual, Part 3, Chapter 7.

Based on the recommendation from the interview, The BARS Manual, Part 3, Chapter 7 was reviewed for guidelines on direct and indirect cost allocation. This chapter addresses records management, internal controls, budget controls, allowable costs and source documentation for fire districts receiving federal grant money. No mention of direct and indirect costs was found (Washington State Auditor, 2011).

In the process of conducting the interview with Mrs. Watkins, and researching current state and federal laws, it was found that direct costs are tied to one cost center, service, or program. Conversely, indirect costs are tied to multiple cost centers, services or programs. The allocation categories of these indirect costs are defined by the agency based on budgeted amounts and should be reviewed on a regular basis to assure that they correspond with actual expenditures.

The CCFD3 2010 budget of \$3,630,851.15 has direct costs associated with only 3 of the 10 NFIRS categories EMS, MVC and Rescue, and Fire as shown in Table 1. The total amount of direct costs associated with the 2010 budget is \$27,048.39. This left an amount of \$3,590,232.76 to be allocated across three groups of indirect costs.

Administrative and Legislative Costs.

The first group of indirect costs, administrative and legislative, in the amount of \$231,006.26, was equally distributed across all 10 NFIRS categories resulting in \$23,100.63 allocated to each category.

Salaries and Benefits of Response Personnel Costs.

The second group of indirect costs, salaries and benefits for response personnel, in the amount of \$2,234,198.75, was allocated based on three categories: time responding to a call, time preparing for a call, and time available for a call.

Time Responding to a Call.

The total number of staff hours for 2010 was 77,557.7. Of those hours, 1,791 hours were spent responding to any one of the 10 NFIRS categories. EMS represented the majority of the time with 942.1 hours. The total staff time of 942.1 hours was divided by 570, the number of EMS calls for CCFD3 in 2010, this resulted in the average total staff time on a given EMS

response of 1.65 hours. The fire category accounted for a total staff time of 249.4 hours for 55 fire calls, resulting in an average total staff time of 4.53 hours for a fire response. The results for the remaining categories can be found in Table 2.

Time preparing for a call.

The preparing time, made up of direct and indirect training, public education, and apparatus readiness accounted for 6% of the total staff time. The greatest number of preparing time hours were in the Fire category accounting for 1,275.1 hours, while EMS was the second highest at 934.4 hours. The hourly allocation can be found in Table 3.

Time available for a call.

The final category, time availability for a call, was 71,033.4 hours or 91% of the total staff hours for 2010. The percentage of response staff hours for each NFIRS category found in Table 1 were multiplied by the remaining hours of 71,033.4. This resulted in an allocation of 6,425.7 hours allocated to EMS availability and 17,641.5 to fire. The remaining distribution can be found in Table 4.

All three time categories in the salaries and benefits of response personnel group were added together and are represented in Table 5. The total hours allocated to EMS was 8,302.2. The highest allocation went to the Fire category with a total allocation of 19,166 hours, while the lowest was Severe Weather and Special at 264.8 hours each.

The hourly staff cost, derived from dividing the total salaries and benefits of response personnel by the total staffing hours in 2010, was \$28.81. The allocation of staffing hours in each of the 10 NFIRS categories were multiplied by \$28.81, resulting in a total allocation of salaries and benefits of response personnel as shown in Table 6. EMS allocation was \$239,161 and Fire, the highest allocation, was \$552,114.80.

Miscellaneous Costs.

The final group of indirect costs was miscellaneous costs. This group accounted for all, services, supplies, equipment, vehicles, facilities, and intergovernmental expenses that can be attributed to more than one NFIRS category. These expenses were allocated proportionately across each applicable NFIRS category as shown in Appendix A. The expenses showed to vary slightly across each category. With MVC & Rescue accounting for \$133,373.13, the highest allocation, while Severe Weather and Special categories accounted for the least amount at \$100,952.70 each.

The indirect and direct costs within each NFIRS categories were added together, resulting in a total cost for each category. EMS represented a total cost of \$389,266.57 or 11% of the total 2010 budget for CCFD3. The highest cost, based on this formula, was Fire, representing \$698,820.89 or 19% of the total 2010 budget. The lowest costs categories were Severe Weather and Special representing 4% of the budget in each category. The costs of all categories can be found in Table 7.

All the results in this research were utilized to create a formula. The Total Cost Allocation Formula shows the distribution of all direct and indirect cost for all 10 NFIRS categories. The definitions of each entry for the formula are found in Appendix B and the formula in Appendix C.

Discussion

Fire-based EMS services are faced with financial challenges in the current economic climate and are being asked to do more for less (Evans, 2010). This challenge can be approached in two different ways. First, one can ignore the problem and continue doing business as usual, or, one can be proactive and have systems in place that allow for the best utilization of current

financial resources. As concluded by Lerner (2006), the care provided by out-of-hospital providers needs evaluation from a cost perspective. This Applied Research Project (ARP) is the first step in that evaluation and the initiation of proactivity in utilizing the public's money for public safety. The calculations and formula developed not only show how the public's money is utilized for EMS and non-EMS services, but it is an accurate tool for comparison of annual budgets. The process of developing the cost allocation formula also revealed some improvements that CCFD3 can implement in data collection for staff activities.

Identifying costs associated within a fire district providing first response EMS begins with determining what portions of the budget contribute to the EMS program. Lerner et al. (2007) identified 10 different categories that make up the cost of an EMS system, and NHTSA (1996) acknowledged nine components influencing the cost of an EMS system based on a geographic area. Lerner et al. (2007) admits that allocating costs proportionately to the task, as most fire agencies do, is arbitrary and without economic theory. Utilizing the actual 2010 budget for CCFD3, and systematically allocating the budgeted amounts across the 10 NFIRS categories eliminated this arbitrary allocation. The use of NFIRS categories provided a good foundation for comparison of not only CCFD3 budgets, but those of other fire districts as well.

The next step in allocation of costs was to define what costs are direct and what costs are indirect. The State of Washington had no specific guidelines in the allocation of direct and indirect costs. Based on the interview with Mrs. Watkins of the Washington State Auditors Office (personal communication November 4th, 2011), direct costs for CCFD3 were defined as those costs associated with only one of the 10 NFIRS categories. For the 2010 budget, this was a total of \$27,048.39. This small amount of direct costs only reinforced the need to have a reliable and accurate way to allocate the indirect costs, which totaled \$3,590,232.76.

If the private model identified by Monte Phillips, General Manager of Vancouver Ford (personal communications October 23rd, 2011) was utilized, the indirect costs, (not including salaries and benefits), would be allocated based on the percentage of services provided in each NFIRS category. This allocation would place the majority of the indirect costs in the category of EMS because it accounted for 52% of the total call volume for CCFD3 in 2010. This would be an arbitrary allocation as identified by Lerner et al. (2007), because even though EMS had the highest call volume, it only accounted for 9% of the time responding, while fire was 25%.

The definition of indirect costs given by Mrs. Watkins and supported by generally accepted accounting principles (GAAP) was the method of choice for indirect cost allocation. By categorizing the indirect costs as either administrative and legislative, salaries and benefits of response personnel, or miscellaneous costs, they could be defined as recommended by both Mrs. Watkins and GAAP. Each of these groups contain the expenses associated with the areas considered to influence the cost of providing EMS as identified by both Lerner et al. (2007) and NHTSA (1996).

Administrative and legislative costs, totaling \$231,006.30, were allocated equally across all 10 NFIRS categories totaling. The rationale for this allocation is that administrative and legislative positions are ultimately responsible for the overall operation of the fire district and their duties equally influence all of the 10 NFIRS categories. In comparison, the EMS cost survey completed by Clark County EMS District #2 appeared to combine the salaries and benefits of all employees, including administration, to utilize an average salary for allocation (CCEMSD2, 2011). This use of averages, on such a broad range of wages, minimizes the actual costs of salaries and benefits in the administration and legislative category.

Salaries and benefits of response personnel were easier to allocate once broken down into the three groups based on actual numbers for 2010. These groups (response time, preparing time, and available time) were based on the actual hours worked by both career personnel and volunteers. By combining the actual hours of career and volunteer personnel responding to calls, the monetary benefit of utilizing those volunteers is apparent in the final cost of response personnel. In comparison, Clark County EMS District #2 allocated the ratio of volunteer personnel to career personnel as 3:1 (CCEMSD2, 2011). This ratio is an average, stating that a volunteer, on average, contributes 33% of the time contributed by a career employee. It does not directly allocate the time contributed by a volunteer that may provide more or less than the 33%.

In 2010, CCFD3 had a total of 77,557.6 hours recorded by response personnel, of which 942.1 were utilized responding to 570 EMS calls. This number was the basis for allocating the salaries and benefits of response personnel involved in EMS related calls. The average staff hours utilized per EMS call was 1.65 hours. In comparison, Clark County EMS District #2 utilized an average number of personnel responding to an EMS call of 4, and then multiplied that number by an average time it takes to complete an EMS call, .55 hours (CCEMSD2, 2011). Utilizing the formula developed in this Applied Research Project, this equals an average of 2.2 staff hours per EMS call. Using averages, the model utilized by the EMS district does not take into account the fluctuating number of personnel responding to an EMS call. By utilizing the actual hours of response personnel, this averaging error is eliminated.

The preparing time for response personnel was calculated by using training and apparatus readiness time. The training time was further separated into direct or indirect training. In the EMS category for CCFD3 in 2010, direct training hours totaled 669.6, and indirect training totaled 168.6. This time was added to apparatus readiness time to compile a total preparing time.

The total preparing time for EMS was 934.4 staff hours. In comparison, the Clark County EMS District #2 cost survey allocated training time only by using one of two methods (CCEMSD2, 2011). The first option placed EMS, fire, and other training hours into their respective categories and multiplied the hours of training by the number personnel trained. The other option listed total training hours recorded by an electronic record keeping system that tracks personnel training hours. For CCFD3, the EMS district allocated a total of 423 hours to EMS training.

The hours available to respond, making up a total of 71,033.4 total staff hours, comprised the largest group to be allocated. By allocating these hours based on the percent of average hours utilized on each of the 10 NFIRS categories, they were distributed based on the need to the community. The EMS response hours of 1.65 or 9.06% of the average staff hours was multiplied by 71,033.4, thus allocating 6,425.7 available hours to EMS. In comparison, Clark County EMS District #2 allocated the available to respond hours or readiness costs, as they were labeled in the report, based on the percentage of response hours utilized on EMS calls (CCEMSD2, 2011). For CCFD3, the percentage of response time on EMS was 56%. This number was then multiplied by 50,107.56, the average hours remaining after subtracting the previous hours of training, public education, and response, allocating 28,060 hours to EMS readiness. By allocating the available to respond hours in this fashion, it hyperinflates the hours by allocating them based on call volume, and not on actual time spent on an EMS call.

All the hours allocated for response personnel were added together, based on the 10 NFIRS categories, and multiplied by the hourly cost of \$28.81 per staff hour. For EMS the total number of staff hours allocated was 8,302.2, resulting in a cost of \$239,160.97. In comparison, Clark County EMS District #2 allocated a total of 28901.2 hours and multiplied this by \$31 per staff hour, or a response staff cost of \$895,931 (CCEMSD2, 2011). The \$31 per staff hour used

by the EMS district was calculated based on the average salary of all employees, divided by the estimated hours of one response employee in a given year. This average employee cost, combined with the hyperinflated hours of availability, appears to have caused the distinct difference in response personnel cost.

The final group of indirect costs, miscellaneous, was allocated based on use in each of the 10 NFIRS categories. This process, although tedious, is necessary according to the requirements set forth by Mrs. Watkins and GAAP (personal communication November 4th, 2011). The definition of indirect cost requires that costs be distributed based on the impact of a particular set of services or products. Allocating these costs, line by line, in a budget is a sound process and based on acceptable practices. For CCFD3, the EMS miscellaneous costs were \$127,004.98, the second highest of the 10 NFIRS categories. In comparison, Clark County EMS District #2's method of allocation was not clearly defined. It appears they allocated the cost of supplies based on operations, training, and prevention, and then assigned a percentage of that cost to EMS, fire or other (CCEMSD2, 2011). This percentage varied from category to category. Fire operations accounted for 86% of operational supplies, while EMS was allocated 7%. Training supply costs for EMS were 40%, and fire 60%. The total supply costs allocated to EMS in the survey completed by the EMS district was \$24,716.66 (CCEMSD2, 2011). Without knowing how the allocation was defined, it is difficult to compare the results of the EMS cost survey performed by the EMS district and the cost allocation formula developed with this ARP.

Finally, all the EMS direct and indirect costs were combined for a total cost of \$389,266.57, or 11% of the total 2010 budget for CCFD3. In comparison, Clark County EMS District#2 had a total cost of providing EMS at \$963,149 on the detailed report given to CCFD3 or \$831,769 on the summary report provided (CCEMSD2, 2011). It is unclear why there are two

different totals. The EMS district did combine the category of MVC and rescue with EMS responses. For this ARP the two categories were separated; if they were combined the total would be \$841,649.95. This number, although very close to the lower cost presented by the EMS district, would be considered inaccurate because MVC & Rescue has numerous other components not considered part of the cost of EMS as defined by both NHTSA (1996) and Lerner et al. (2007).

From this Applied Research Project, a formula for allocating direct and indirect costs for a first response fire district providing EMS was created. In the process, the cost of providing all services based on 10 NFIRS codes was also created. This was an unintentional outcome, but was necessary to form an accurate allocation of costs for EMS. This new formula will provide valuable information for not only CCFD3, but also for fire districts with similar responsibilities. By implementing this formula the fire district can track expenses over time and make adjustments to better serve the community.

Recommendations

Based on the data collected in this research, and comparing it to the problem and purpose of this ARP, the recommendations are as follows:

Immediate (1-6 months):

- Meet with the creators of the Clark County EMS District #2 EMS Survey to correct any discrepancies in the data used to allow for a better comparison.
- Utilizing the fire district accounting program, Bars Integrated Accounting System (BIAS), develop a plan to allocate expenses to the appropriate NFIRS code to allow comparison over time with the budgeted amount.
- Meet with an auditor from the Washington State Auditors Office to validate

the accounting and processes developed in this research.

Short Term (6-12 months):

- Compare the actual expenses for 2010 with the budget to assure accuracy of data.
- Implement the plan of cost allocation with the district accounting software BIAS.
- Consolidate training codes to allow for more accurate capture of data across the 10 NFIRS codes.
- Develop a plan to accurately capture the apparatus readiness activities of response personnel in order to avoid using averages for this indirect cost.

Long Term (1-5 years)

- Enter the 2011 budget into the Total Cost Allocation formula, created with this research, to begin the comparison process.
- Implement plan for capturing apparatus readiness activities.
- Continue to utilize the Total Cost Allocation formula for every future budget, and comparing the results to the actual expenses incurred.

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Budget Categories by BARS Code		BUDGET AMOUNT	Direct and Indirect Allocation									
			100 - Fire	200 - Explosions	300 - MVC & Rescue	321 - EMS	400 - Hazardous conditions	500 - Service Calls	600 - Good Intent	700 - False Alarm	800 - Severe Weather	900 - Special
Training												
100	Salaries and Wages	\$ 200,813.33	Allocated as indirect cost based on response, preparing, and availability time									
200	Personal Benefits	\$ 52,827.87	Allocated as indirect cost based on response, preparing, and availability time									
300	Supplies											
313	Educational Supplies											
	Video projector	\$ 1,250.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00	\$ 125.00
	Five digital cameras	\$ 750.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00
	Flip charts	\$ 50.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00
	Chart and White board markers	\$ 15.00	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50	\$ 1.50
	Certificates	\$ 50.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00
	Book Binding materials	\$ 300.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00
	Student folders	\$ 25.00	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50
	Projector bulbs	\$ 30.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00
	5th Edition IFSTA Essentials	\$ 10,500.00	\$ 1,166.67	\$ 1,166.67	\$ 1,166.67		\$ 1,166.67	\$ 1,166.67	\$ 1,166.67	\$ 1,166.67	\$ 1,166.67	\$ 1,166.67
	Misc	\$ 500.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
	Training Room	\$ 200.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00
314	Maps, Books, Periodicals											
	First Responder/EMT books	\$ 400.00				\$ 400.00						
	Misc	\$ 250.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 40.00
315	Office Supplies	\$ 500.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 25.00	\$ 25.00
400	Services and Charges											
410	Guest Speaker	\$ 200.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00
430	Travel											
	Air Travel	\$ 1,200.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00	\$ 120.00
	Long Distance travel	\$ 750.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00
	IMT training	\$ 250.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00
	Conferences	\$ 750.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00
	Meals	\$ 250.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00
490	Misc.											
491	Association Dues, Membership	\$ 300.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00
496	Tuition and Registration											
	Spring IMT training	\$ 100.00	\$ 14.29	\$ 14.29	\$ 14.29	\$ 14.29	\$ 14.29				\$ 14.29	\$ 14.29
	Captain Step program	\$ 750.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00	\$ 75.00
	College Courses	\$ 10,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00
	Wildland training	\$ 250.00	\$ 250.00									
	IFSAC Eval	\$ 100.00	\$ 11.11	\$ 11.11	\$ 11.11		\$ 11.11	\$ 11.11	\$ 11.11	\$ 11.11	\$ 11.11	\$ 11.11
	CPR instructor	\$ 100.00				\$ 100.00						
	training and conferences	\$ 1,000.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
	Smoke Trailer	\$ 100.00	\$ 25.00	\$ 25.00			\$ 25.00	\$ 25.00				
	Tactics Simulator	\$ 100.00	\$ 33.33	\$ 33.33			\$ 33.33					

Appendix B

Total Cost Allocation Formula

Definitions

General Information Sheet

Total Budget – The approved budget for the year to be allocated

Total salaries, benefits, supplies, and equipment for administration and legislative employees – all of the costs associated with employees that are overseeing all functions of the fire district, and are not regularly responding to incidents.

Total salaries and benefits of response personnel – The salary and benefit costs associated with employees and volunteers who are regularly scheduled to respond on incidents, including battalion chiefs, captains, lieutenants, and firefighters.

Total staff hours of response personnel – The total number of hours scheduled for employees and volunteers assigned to response, including vacation time, sick time, and personal time.

Total response hours of response personnel – Total hours of employees and volunteers spent on all 10 NFIRS codes.

Total preparing hours of response personnel – Total hours of employees and volunteers spent on training and apparatus readiness, separated by NFIRS code.

Total available hours of response personnel – Total staff hours of employees and volunteers remaining after subtracting total response hours and total preparing hours.

Cost per staff hour – Equals total staff hours of response personnel divided by total salaries and benefits of response personnel.

Worksheet #1 – Response Time Allocation

1A – Staff Response Hours – Total staff hours spent responding to each of the 10 NFIRS categories.

1B – Number of Calls – Total number of responses per NFIRS category.

1C – Average Staff Hours per Call – Equals staff response hours in each NFIRS category divided by the number of calls for the respective NFIRS category.

1D – Percentage of Staff Hours per Call – Equals the average staff hours per call divided by the total average staff hours per call.

Worksheet #2 – Preparing Time Allocation

2A – Direct Training Hours – The total hours spent training by response personnel for a specific NFIRS category.

2B – Indirect Training Hours – The total hours spent by response personnel training that can be allocated equally across the applicable NFIRS category.

2C – Public Education & Prevention Hours – Total hours spent by response personnel providing public education and/or prevention in a specific NFIRS category.

2D – Apparatus Readiness Hours – Total hours spent by response personnel performing daily, weekly and/or monthly checks, to be allocated equally across all NFIRS categories.

2E – Total Preparing Hours - Total hours of employees and volunteers spent on training, public education/prevention and apparatus readiness, separated by NFIRS code.

Worksheet #3 – Available Time Allocation

3A – Total Response Hours – Total hours of employees and volunteers spent responding, separated by NFIRS category (found on Worksheet #1, column 1A).

3B – Total Preparing Hours – Total hours of employees and volunteers spent on training, public education/prevention and apparatus readiness, separated by NFIRS category (found on Worksheet #2, column 2E).

3C – Remaining Staff Hours – Total staff hours of employees and volunteers remaining after subtracting total response hours and total preparing hours.

3D – Percentage of Staff Hours per Call – Equals the average staff hours per call divided by the total average staff hours per call, separated by NFIRS category (found on Worksheet #1, column 1D).

3E – Total Available Hours – Equals remaining staff hours multiplied by the percentage of staff hours per call, separated by NFIRS category.

Worksheet #4 – Total Cost of Response Personnel

4A – Total Response Hours – Total hours of employees and volunteers spent responding, separated by NFIRS category (found on Worksheet #1, column 1A).

4B – Total Preparing Hours – Total hours of employees and volunteers spent on training and apparatus readiness, separated by NFIRS category (found on Worksheet #2, column 2E).

4C – Total Available Hours – Equals remaining staff hours multiplied by the percentage of staff hours per call, separated by NFIRS category (found on Worksheet #3, column 3E).

4E – Cost per Staff Hours – Equals total staff hours of response personnel divided by total salaries and benefits of response personnel.

4F – Total Response Staff Costs – Equals cost per staff hour multiplied by total hours (column 4D), separated by NFIRS category.

Total Cost Allocation Worksheet

5A – Administrative Costs (*indirect costs*) – The salaries, benefits, supplies and equipment for administrative and legislative employees, allocated equally across all 10 NFIRS categories.

5B – Response Personnel Costs (*indirect costs*) – The allocation of all employees and volunteers salaries and benefits providing response, separated by NFIRS category (found on Worksheet #4, column 1F).

5C – Miscellaneous Costs (*indirect costs*) – The costs of supplies, equipment, vehicles, facilities, capital expenditures, and intergovernmental costs not included in administration and response personnel categories and allocated equally across the applicable NFIRS category in which they are used.

5D – Direct Costs – The costs in the budget that can be directly tied to only one NFIRS category and that have not already been allocated in one of the indirect categories.

5E – Total – Equals the total administrative costs, response personnel costs, miscellaneous costs and direct costs, separated by NFIRS category.

5F – Percent of Budget – The totals from column 5E divided by the total budget being allocated.

Appendix C

Total Cost Allocation Worksheets

General Information

Fire District _____

Prepared By _____

Date _____

Budget Year _____

Total Budget

Total salaries, benefits, supplies and equipment of administrative and legislative employees

Total salaries and benefits of response personnel

Total staff hours of response personnel

Total response hours of response personnel

Total preparing hours of response personnel

Total available hours of response personnel

Cost per staff hour

Worksheet #1 - Response Time Allocation

	1A	1B	1C	1D
NFIRS Category	Staff Response Hours	Number of Calls	Average Staff Hours per Call	Percentage of Staff Hours per Call
Fire				
Explosions				
MVC & Rescue				
EMS				
Hazardous Conditions				
Service Calls				
Good Intent				
False Alarm				
Severe Weather				
Special				
TOTAL				

Worksheet #2 - Preparing Time Allocation

	2A	2B	2C	2D	2E
	Training				
NFIRS Category	Direct Training Hours	Indirect Training Hours	Pub Ed & Prevention Hours	Apparatus Readiness Hours	Total Preparing Hours
Fire					
Explosions					
MVC & Rescue					
EMS					
Hazardous Conditions					
Service Calls					
Good Intent					
False Alarm					
Severe Weather					
Special					
TOTAL					

Worksheet #3 - Available Time Allocation

	3A	3B	3C	3D	3E
NFIRS Category	Total Response Hours	Total Preparing Hours	Remaining staff Hours	Percentage of Staff Hours per Call	Total Available Hours
Fire					
Explosions					
MVC & Rescue					
EMS					
Hazardous Conditions					
Service Calls					
Good Intent					
False Alarm					
Severe Weather					
Special					
TOTAL					

Worksheet #4 - Total Cost of Response Personnel

	4A	4B	4C	4D	4E	4F
NFIRS Category	Total Response Hours	Total Preparing Hours	Total Available Hours	Total Hours	Cost Per Staff Hour	Total Response Staff Costs
Fire						
Explosions						
MVC & Rescue						
EMS						
Hazardous Conditions						
Service Calls						
Good Intent						
False Alarm						
Severe Weather						
Special						
TOTAL						

Total Cost Allocation Worksheet

	5A	5B	5C	5D	5E	5F
	Indirect Costs					
NFIRS Category	Adminstrative	Response Personnel Costs	Miscellaneous Costs	Direct Costs	Total	Percent of Budget
Fire						
Explosions						
MVC & Rescue						
EMS						
Hazardous Conditions						
Service Calls						
Good Intent						
False Alarm						
Severe Weather						
Special						
TOTAL						

Table 1

Total direct costs in 2010, by NFIRS category

Category	Direct costs
Fire	\$250.00
Explosions	-
MVC & Rescue	\$7,090.00
EMS	\$19,708.39
Hazardous Conditions	-
Service Calls	-
Good Intent	-
False Alarm	-
Severe Weather	-
Special	-
TOTAL	\$27,048.39

Table 2

Total response staff hours in 2010, by NFIRS category

Category	Response Hours	Number of Calls	Avg. Total Staff Hours Per Call	Percentage of Staff Hours
Fire	249.4	55	4.53	24.85%
Explosions	4.1	1	4.12	22.57%
MVC & Rescue	283.8	117	2.43	13.29%
EMS	942.1	570	1.65	9.06%
Hazardous Conditions	48.3	24	2.01	11.04%
Service Calls	133.8	81	1.65	9.05%
Good Intent	91.7	233	0.39	2.16%
False Alarm	37.8	26	1.46	7.98%
Severe Weather	-	-	-	-
Special	-	-	-	-
TOTAL	1791.0	1107	18.25	100.00%

Table 3

Total preparing hours in 2010, by NFIRS category

Category	Training		Apparatus Readiness	TOTAL
	Direct	Indirect		
Fire	1010.3	168.6	96.2	1275.1
Explosions	-	168.6	96.2	264.8
MVC & Rescue	260.3	168.6	96.2	525.1
EMS	669.6	168.6	96.2	934.4
Hazardous Conditions	145	168.6	96.2	409.8
Service Calls	-	168.6	96.2	264.8
Good Intent	-	168.6	96.2	264.8
False Alarm	-	168.6	96.2	264.8
Severe Weather	-	168.6	96.2	264.8
Special	-	168.6	96.2	264.8
TOTAL	2085.2	1686	962	4733.2

Table 4

Total available hours in 2010, by NFIRS category

Category	Percentage of Staff Hours	Allocation of Available Hours
Fire	24.85%	17641.5
Explosions	22.57%	16044.8
MVC & Rescue	13.29%	9463.3
EMS	9.06%	6425.7
Hazardous Conditions	11.04%	7827.7
Service Calls	9.05%	6425.7
Good Intent	2.16%	1518.8
False Alarm	7.98%	5685.8
Severe Weather	-	-
Special	-	-
TOTAL	100%	71033.4

Table 5

Total allocation of response personnel hours for 2010, by NFIRS category

Category	Time Responding	Time Preparing	Time Available	TOTAL
Fire	249.4	1275.1	17641.5	19166.0
Explosions	4.1	264.8	16044.8	16313.7
MVC & Rescue	283.8	525.1	9463.3	10272.2
EMS	942.1	934.4	6425.7	8302.2
Hazardous Conditions	48.3	409.8	7827.7	8285.8
Service Calls	133.8	264.8	6425.7	6824.3
Good Intent	91.7	264.8	1518.8	1875.3
False Alarm	37.8	264.8	5685.8	5988.4
Severe Weather	-	264.8	-	264.8
Special	-	264.8	-	264.8
TOTAL	1791.0	4733.2	71033.4	77557.6

Table 6

Total cost allocation of response personnel for 2010, by NFIRS category

Category	Total Staff Hour Allocation	Total Cost
Fire	19166.0	\$552,114.80
Explosions	16313.7	\$469,949.63
MVC & Rescue	10272.2	\$295,909.62
EMS	8302.2	\$239,160.97
Hazardous Conditions	8285.8	\$238,690.05
Service Calls	6824.3	\$196,587.22
Good Intent	1875.3	\$54,021.29
False Alarm	5988.4	\$172,508.66
Severe Weather	264.8	\$7,628.26
Special	264.8	\$7,628.26
TOTAL	77557.6	\$2,234,198.75

Table 7

Total costs to provide services for 2010, by NFIRS category

Category	Administrative Costs	Response Personnel Cost	Miscellaneous Costs	TOTAL	Percent of Budget
Fire	\$23,100.63	\$552,114.80	\$123,605.46	\$698,820.89	19%
Explosions	\$23,100.63	\$469,949.63	\$123,355.46	\$616,405.72	17%
MVC & Rescue	\$23,100.63	\$295,909.62	\$133,373.13	\$452,383.38	12%
EMS	\$23,100.63	\$239,160.97	\$127,004.98	\$389,266.57	11%
Hazardous Conditions	\$23,100.63	\$238,690.05	\$124,147.46	\$385,938.14	11%
Service Calls	\$23,100.63	\$196,587.22	\$106,222.51	\$325,910.35	9%
Good Intent	\$23,100.63	\$54,021.29	\$106,197.51	\$183,319.43	5%
False Alarm	\$23,100.63	\$172,508.66	\$119,834.22	\$315,443.51	9%
Severe Weather	\$23,100.63	\$7,628.26	\$100,952.70	\$131,681.59	4%
Special	\$23,100.63	\$7,628.26	\$100,952.70	\$131,681.59	4%
TOTAL	\$231,006.26	\$2,234,198.75	\$1,165,646.14	\$3,630,851.15	100%