



Office of Performance and Analysis

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Memorandum

Date: March 30, 2023

To: Matt Smith, County Manager
Joe Leko, Sheriff

cc: David McKnight, Director of Enterprise Finance and Information Services (EFIS)
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Patrol Division Shift Relief Factor Audit

Background and Purpose

The Office of Performance and Analysis (OPA) published the Sheriff's Office Patrol Division Staffing Study in January of 2020. Among other considerations, the study determined whether the current eighteen deputies staffing structure was adequate for the Patrol Division. OPA followed the Shift Relief Factor staffing model, using three years of payroll shift data (bid years 2016-2018). The Shift Relief Factor calculation included the analysis of flex time off, compensatory time used, other leave taken, and time spent training or otherwise occupied. The results of the study indicated the Sheriff's Office needed four additional deputies or 22 total deputies at that time.

In September of 2021 (bid year 2022) the Sheriff's Office added an additional deputy position, while utilizing the January 2020 study as a consideration. However, the Patrol Division continues to experience staffing challenges to maintain the two-deputy minimum staffing for each shift. Therefore, an audit of the Shift Relief Factor was sought to provide an up-to-date outlook on current staffing needs.

Methodology

The Shift Relief Factor model and subsequent calculations used in the 2020 Patrol Division Staffing Study were assumed to continue as sufficient mechanisms for determining staffing optimization. Therefore, the same model, methodology, and calculation was used to audit recent year data.

The Shift Relief Factor audit included four years of payroll shift data, from bid year 2019 through 2022. A bid year runs from September to August. For example, bid year 2019 is September 1, 2018 to August 31, 2019. Shift data was based on the eighteen assigned patrol deputies for bid years 2019 to 2021. While bid year 2022 used shift data for the nineteen assigned patrol deputies, as one additional position was added in September of 2021. The Shift Relief Factor calculation from the 2020 Patrol Division Staffing Study was utilized to obtain valid comparison analysis. The Shift Relief Factor was calculated in both the original study and audit, as follows:

Shift Relief Factor =

$$\frac{\text{Hours Required to Cover Shift Each Day for 1 Year}}{(\text{Hours Required to Cover Shift Each Day for 1 Year} - \text{Avg Hours Off Patrol per Deputy per Year})}$$

The number of hours required to cover one shift each day for one year was determined in the previous study to be 3,650 hours (10-hour shift x 365 days per year). The average number of hours off patrol (Avg Hours Off Patrol) considers the number of hours deputies are unavailable, either off duty or busy performing other activities, in which they're unable to perform standard patrol duties. Average Hours Off Patrol was calculated by combining the hours as categorized below:

- Regular Days Off (expressed in hours)
- Off Duty Hours
 - Comp Used
 - Flex Used
 - Leave
 - Holiday (No Work)
- Other Duty/Busy Hours
 - Training
 - Instructing
 - Occupied (Special Duty, Investigations, etc.)

Based on the above calculation, the Shift Relief Factor is positively correlated to Hours Off Patrol. In other words, if Off Duty Hours or Other Duty Hours increase then the Shift Relief Factor will increase. Significant influence on Off Duty Hours is noted as a possibility due to impacts of the COVID-19 pandemic, among others. If any given year were determined to be an outlier, it would be identified as such and may be removed from calculations to determine averages.

To determine the number of deputies needed to cover a single Patrol Division posting, the above calculation is used. In order to determine the appropriate range of deputies for the Sheriff's Office, the Shift Relief Factor must be multiplied by the number of postings within the Patrol Division. Currently, the Patrol Division is utilizing nine postings, each requiring two deputies to be staffed at all times. Thus, the optimal number of deputies required to fill these posts can be calculated by multiplying the Shift Relief Factor by nine.

Findings and Analysis

OPA staff analyzed Patrol Division payroll shift data for bid years 2019 through 2022. An analysis of the data found the Shift Relief Factor to range from 2.21 to 2.51 with a four-year average of 2.38 (see aggregate data in Appendix A). This number was then multiplied by the nine patrol deputy postings to

determine a total staffing number for the Patrol Division to be 21.39 deputies, down from the 23.16 of the original study. Each bid year in the audit had a resulting Shift Relief Factor that was lower than those of the original study (Appendix B); however, none of the years were identified as outliers.

It is worth noting that within the audit, the Shift Relief Factor, and subsequently the optimal number of deputies, was lower for bid years 2020, 2021 and 2022 compared to previous years. A decrease in these data points was likely due, in part, to two factors:

1. Bid years 2020 and 2021 saw fewer Off Duty and Other Duty opportunities during the COVID-19 pandemic, and
2. An additional deputy position was added at the start of bid year 2022 (9/1/2021)

The recent audit findings have highlighted several potential impacts of the COVID-19 pandemic related to the Patrol Division payroll shift data. One such finding is the increased utilization of Working from Home during the pandemic, specifically during bid years 2020 and 2021. It was observed that some of the hours reported as Regular hours - Working from Home may have otherwise been taken as Other Duty Hours or Off Duty Hours. Activities such as meetings or even mild illness, may have been otherwise categorized in payroll shift data if not for the ability to work some hours from home during the pandemic.

Another consideration is the additional deputy position added in bid year 2022. This Patrol Power Relief¹ position may have had a role in alleviating some of the compensatory hours worked and subsequently impacted the Shift Relief Factor, as was noted in the 2020 Patrol Division Staffing Study. While a three-year average of the Shift Relief Factor in the original study was calculated to be 2.57, resulting in an optimal number of deputies at 23, OPA staff made the following recommendation:

...we anticipate that the total number of comp hours worked, and which are redeemed for time off at a rate of 1.5 times the number of hours worked would decrease with the addition of new deputies [...] which would reduce the Shift Relief Factor and likely result in an optimal number closer to 22 deputies.

As with the original study, the audit of the Shift Relief Factor does not include overtime worked or compensatory time accrued. However, this data does provide additional insights into the workload and staffing needs of the Patrol Division. A significant reduction in overtime from the original study (Appendix B) to the recent audit (Appendix A) was observed in the aggregate data. Much of the same influences, regarding the COVID-19 pandemic and the additional deputy position, similarly affected the overtime hours as they did the Shift Relief Factor. It is anticipated that as staffing levels move closer toward the optimal number of deputies, the overtime and compensatory accrual hours would continue to decrease.

¹ Deputy position that rotates between teams and is assigned to patrol shifts for the purpose of providing extra support wherever needed. This includes situations where regular patrol deputies are absent due to Off Duty or Other Duty demands, among other scenarios.

Recommendation

As illustrated above, both internal and external factors played a role in the reduction of the Shift Relief Factor when compared to the original study. According to the audit data, the four-year average was 2.38, and the optimal number of deputies needed to cover the nine Patrol Division postings was calculated to be 21.39. However, a practical application of this data must be used to ensure the two-deputy staffing minimums for each shift are met. To achieve this, the ceiling² function would need to be applied to this calculation. As a result, the optimal number of Patrol Division staff is calculated to be 22 deputies, which aligns with the recommendation of 22 deputies from the January 2020 study.

² The least or closest integer greater than or equal to a given number.

Appendix A: Shift Relief Factor for Bid Years 2019-2022

| | Bid Year 2019 Sept '18-Aug '19 | Bid Year 2020 Sept '19-Aug '20 | Bid Year 2021 Sept '20-Aug '21 | Bid Year 2022 Sept '21-Aug '22 | Four Year Average | Average Hours per Deputy |
|---|--|--|--|--|----------------------------------|---|
| Hours Required to Cover 1 Shift Position Each Day for 1 Year | 3,650 | 3,650 | 3,650 | 3,650 | 3,650 | |
| Regular Shift Worked | 26,740 | 27,373 | 27,801 | 25,364 | 26,820 | 1,470 |
| Regular Days Off (expressed in hours) | 28,157 | 28,157 | 28,157 | 29,721 | 28,548 | 1,564 |
| Comp Used | 1,357 | 912 | 1,098 | 789 | 1,039 | 57 |
| Flex Used | 3,512 | 2,059 | 2,341 | 2,565 | 2,619 | 144 |
| Holiday-No Work | 528 | 472 | 642 | 640 | 571 | 31 |
| Leave/Light Duty | 40 | 218 | 80 | 1,109 | 362 | 20 |
| Off Duty Subtotal | 5,437 | 3,661 | 4,161 | 5,102 | 4,590 | 252 |
| Training | 3,697 | 2,868 | 3,491 | 4,473 | 3,632 | 199 |
| Instructing | 858 | 468 | 521 | 619 | 616 | 34 |
| Occupied | 1,331 | 840 | 1,822 | 612 | 1,151 | 63 |
| Other Duty (Busy) Subtotal | 5,887 | 4,175 | 5,834 | 5,703 | 5,399 | 296 |
| Total Paid Hours | 38,063 | 35,209 | 37,796 | 36,169 | 36,809 | 2,017 |
| Total Deputies | 18 | 18 | 18 | 19 | 18.25 | |
| Paid Hours Per Deputy | 2,115 | 1,956 | 2,100 | 1,904 | 2,019 | |
| Total Number of Hours Off Patrol (for Whole Unit) | 39,480 | 35,992 | 38,152 | 40,526 | 38,538 | |
| Average Number of Hours Off Patrol per Deputy (Including Regular Days Off) | 2,193 | 2,000 | 2,120 | 2,133 | 2,111 | |
| Shift Relief Factor | 2.51 | 2.21 | 2.38 | 2.41 | 2.38 | |
| Optimal Number of Deputies (SRF x 9 posts) | 22.55 | 19.90 | 21.46 | 21.65 | 21.39 | |
| Comp Accrual | 875 | 854 | 787 | 638 | 788 | 43 |
| Overtime | 1,719 | 1,675 | 1,398 | 1,374 | 1,541 | 84 |
| Work from Home (reported as Regular hours) | N/A | 1,248 | 1,392 | 20 | 886 | |

Appendix B: Shift Relief Factor for Bid Years 2016-2018

| Total Hours per Year | 2015-16 | 2016-17 | 2017-18 | Three Year Average | Average # of Hours per Deputy per Year |
|---|----------------|----------------|----------------|---------------------------|--|
| Regular Shift Worked | 26,701 | 25,954 | 25,798 | 26,151 | 1,452.82 |
| Regular Days Off (expressed in hours) | 28,157 | 28,157 | 28,157 | 28,157 | 1,564.29 |
| Comp Used | 1,399 | 2,031 | 2,090 | 1,840 | 102.21 |
| Flex Used | 2,781 | 2,972 | 2,775 | 2,842 | 157.90 |
| Holiday-No Work | 536 | 328 | 408 | 424 | 23.56 |
| Leave/Light Duty | 146 | - | - | 49 | 2.70 |
| Off Duty Subtotal | 4,862 | 5,330 | 5,272 | 5,155 | 286.4 |
| Training | 3,870 | 3,802 | 4,608 | 4,093 | 227.39 |
| Instructing | 578 | 612 | 753 | 648 | 35.97 |
| Occupied | 2,453 | 2,232 | 1,671 | 2,119 | 117.70 |
| Busy Subtotal | 6,901 | 6,645 | 7,032 | 6,859 | 381.1 |
| Total Paid Hours | 38,463 | 37,929 | 38,103 | 38,165 | 2,120 |
| Per Deputy (n = 18) | 2,137 | 2,107 | 2,117 | 2,120 | |
| Total Hours Off Patrol for Whole Patrol Unit | 39,919 | 40,132 | 40,461 | 40,171 | |
| Average # of Hours Off Patrol per Deputy | 2,218 | 2,230 | 2,248 | 2,232 | |
| Shift Relief Factor (SRF) | 2.55 | 2.57 | 2.60 | 2.57 | |
| SRF times 9 posts = optimal number of deputies | 22.94 | 23.13 | 23.43 | 23.16 | |
| Bid Year | 2015-16 | 2016-17 | 2017-18 | Three Year Average | Average Hours per Deputy |
| Comp Accrual | 969 | 1,268 | 1,364 | 1,200 | 67 |
| Overtime | 2,463 | 2,587 | 2,862 | 2,637 | 147 |