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QA Inspections Via Condition Monitoring

Guidelines for Quality Assurance Inspection of Commercial Activities Contracts for Real Property Maintenance Activities

Guide #12: Custodial Services

by
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A Quality Assurance (QA) Program allows the Army to evaluate and document a contractor's work performance. It depends on a QA Surveillance Plan (QASP). The QASP, which is based on the contract Performance Work Statement, lists contractor activities and the surveillance approach, number of items to be inspected, and an Acceptable Quality Level (AQL) for each activity. This series of 12 guides will help the Contracting Officer's Representative/Quality Assurance Evaluator by defining and clarifying the inspection tasks required by the QASP, which will facilitate inspection uniformity and effectiveness.

This guide discusses QA monitoring of custodial services.

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FOREWORD

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CONTENTS

| | | Page |
|----------|--|-----------|
| | SF 298 | 1 |
| | FOREWORD | 2 |
| 1 | INTRODUCTION | 5 |
| | Background | |
| | Objective | |
| | Guide Series Organization | |
| 2 | GENERAL QA INSPECTION INFORMATION | 7 |
| | Inspection Organization and Planning | |
| | Quality Assurance Surveillance Methods | |
| | Increased Surveillance | |
| | Decreased Surveillance | |
| 3 | CUSTODIAL SERVICES QA INSPECTIONS | 10 |
| | Custodial Services | |
| | METRIC CONVERSION TABLE | 13 |
| | ACRONYMS | 14 |
| | REFERENCE | 14 |
| | APPENDIX A: Inspection Sampling Tables | 15 |
| | APPENDIX B: QAE Inspection Worksheets | |
| | Custodial Services | 17 |
| | DISTRIBUTION | |

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**GUIDELINES FOR QUALITY ASSURANCE INSPECTION OF COMMERCIAL ACTIVITIES
CONTRACTS FOR REAL PROPERTY MAINTENANCE ACTIVITIES
GUIDE #12: CUSTODIAL SERVICES**

1 INTRODUCTION

Background

A Quality Assurance (QA) program allows the Army to evaluate and document a contractor's performance. The Quality Assurance Evaluator (QAE) conducts skilled and carefully planned inspections aimed at verifying the satisfactory completion of contractor work. The inspections evaluate the quality, quantity, and timeliness of the services provided, not the contractor's methods used in performing the work. A good QA program promotes the best possible product within the terms of the standing contract.

A well organized QA program depends on a QA Surveillance Plan (QASP), which is prepared by the Government and contains the purpose and methods of the QA program. Although the QASP is not a part of the contract, it is based on the contract Performance Work Statement, which is part of the contract. The QASP lists contractor activities and the surveillance approach, approximate number of items to be surveyed, and an Acceptable Quality Level (AQL) for each activity.

The installation Director of Public Works (DPW), the Contracting Officer (KO), or the Contracting Officer's Representative (COR) often oversees the QASP. The COR/QAE needs an inspection guide to help define and clarify the inspection tasks required by the QASP, and to facilitate inspection uniformity and effectiveness. To meet this need, the U.S. Army Construction Engineering Research Laboratories (USACERL) developed this series of 12 inspection guides.

Objective

This guide series is intended to supplement any existing QASP and to provide QA guidance for evaluating Operations and Maintenance (O&M) work as performed by contractors on Army property. This custodial services guide contains recommended surveillance methods that can be amended by direction of the KO or QA management to fit the needs of a specific installation.

Guide Series Organization

This series includes the following guides by USACERL published in October 1993:

- #1: Water Systems (Special Report [SR] FF-94/01)
- #2: Wastewater Systems (SR FF-94/02)
- #3: Natural Gas Distribution Systems (SR FF-94/03)
- #4: Electrical Systems (SR FF-94/04)
- #5: Heating Systems (SR FF-94/05)
- #6: Ventilation, Air Conditioning, and Refrigeration Systems (SR FF-94/06)
- #7: Building Services (SR FF-94/07)
- #8: Grounds Maintenance (SR FF-94/08)
- #9: Surfaced Areas (SR FF-94/09)

#10: Refuse and Recyclable Handling (SR FF-94/10)

#11: Pest Control Services (SR FF-94/11)

#12: Custodial Services.

The QAE is expected to evaluate a contractor's performance by applying appropriate visual and instrumentation procedures along with necessary technical and interpretive skills. This guide covers QAE inspection of custodial services and is divided into sections that take the inspector through a step-by-step process of recommended performance indicators, inspection tasks, and surveillance methods.

General QA information, including detailed explanations of the available surveillance methods, is given in Chapter 2.

Chapter 3 provides performance indicators, inspection tasks, and recommended surveillance approaches for each subsystem.

Appendix A contains sampling inspection tables. Appendix B contains QAE Worksheets for each subsystem; they may be reproduced for field use.

2 GENERAL QA INSPECTION INFORMATION

Inspection Organization and Planning

According to custom and standard practice, the contractor submits copies of the previous month's O&M activities and regulatory agency reports to the COR and the QAE. The due dates of these reports control the start of inspection scheduling. If possible, the QAE's inspection should be conducted within 3 days after receiving the reports. Effective coordination will allow more efficient inspection of services. The COR/QAE should look for specific indicators of the contractor's performance and should evaluate that performance based on Detailed Inspection Tasks. The following chapter lists the Performance Indicators and Detailed Inspection Tasks for custodial services.

Quality Assurance Surveillance Methods

The QAE can use the following five surveillance methods to determine contractor performance:

1. Random Sampling
2. Planned Sampling
3. 100 Percent Inspection
4. Unscheduled Inspection
5. Customer Complaints.

Random Sampling

The methods are based on statistical criteria provided in Military Standard (MIL-STD)-105E, *Sampling Procedures and Tables for Inspection by Attributes* (10 May 1989) and are presented as recommendations. The methods used should be based on the unique needs of an individual system. Generally, all five methods are not used to evaluate an individual system.

Random sampling is recommended for situations where many work items are candidates for inspection. For instance, because it is impractical to inspect every roof on an installation with 500 buildings, only a select number of the buildings should be inspected. Likewise, in random sampling, only a portion of the total performed work is inspected. Acceptance of the work is based on the assumption that the inspected items are representative of the quality of the contractor's work. The random sampling technique spreads the selected samples evenly throughout the evaluation period. The following are steps to be used by the QAE in random sampling.

Tables A1 and A2 in Appendix A should be used to determine the number of samples to be inspected and the number of rejects allowed as a function of the number of inspected work items for AQLs of 4 and 10 percent, and the level of surveillance. The three levels of surveillance are: normal, increased (tightened), and reduced. Initially, this guide recommends normal surveillance for random sampling. However, under the direction of the KO, the level of surveillance can be changed depending on the contractor's performance.

As an example, assume that the contractor's total scheduled output (i.e., population size) for a particular work item is 125 units and that the normal surveillance level with an AQL of 4 percent has been selected. According to Table A1, 20 of the 125 units of work should be inspected, and the entire output of 125 units should be rejected if 3 or more of the 20 sample units are not acceptable.

The QA Worksheets in Appendix B provide room to record the population size, the number of samples, the maximum number of rejects, and the interval for each performance indicator.

The work planned by the contractor for each maintenance task should be listed by date to make it easier to predict the time when the work samples will be ready for inspection.

Planned Sampling

Evaluation by planned sampling inspects some, but not all, of the work activities and is appropriate when the number of work items is large. Some items are evaluated before scheduled completion because they are inaccessible after the work is completed. The COR/QAE subjectively selects key work items for inspection; the sample size is determined arbitrarily.

The COR/QAE will normally use planned sampling when the contractor's performance at selected locations or tasks is poor. With this type of evaluation, the contractor knows that work performed in these areas is more likely to be monitored. Planned sampling provides a systematic way of focusing on specific output and forming conclusions about the contractor's performance level.

100 Percent Inspection

Inspection at 100 percent requires total inspection of all items in a contract requirement. It is normally used to monitor infrequent work or critical contract work when the number of work items is small and in cases where nonperformance could seriously damage Army-furnished equipment or processes. It may also be used in areas where a contractor has had prior performance difficulties.

Unscheduled Inspection

Unscheduled inspections can be used for areas of poor past contractor performance, noncritical areas, areas of infrequent repairs, or as a follow-up check of previous inspections. If the QAE notices such an area, an unscheduled inspection can be conducted to evaluate contractor performance.

Customer Complaints

The customer complaint method is based on an informed and cooperative customer population, that is generally aware of local contract requirements. Customers are expected to monitor contractor services and, when performance is poor or nonexistent, to notify the COR/QAE. If investigation reveals that the complaint is valid, the COR/QAE documents the deficiency. Since this is a reactive QA inspection approach, this method of surveillance normally supplements planned inspection methods.

Increased Surveillance

For areas of poor past contractor performance, the QAE should consult with the KO to intensify the surveillance method. More than one option is usually available, and selection should be based on the initial method and the amount of work performed.

1. Random Sampling (Normal Surveillance) can be replaced by:
 - Random Sampling (Increased Surveillance)
 - Planned Sampling (for a large population size)

- 100 Percent Inspection (for a small population size)
 - Unscheduled Inspection (for any population size).
2. Planned Sampling can be replaced by:
- Random Sampling (Normal Surveillance)
 - 100 Percent Inspection (for a small population size)
 - Unscheduled Inspection (for any population size).
3. Unscheduled Inspections can be replaced by:
- 100 Percent Inspection (for a small population size)
 - Random Sampling (Normal Surveillance)
 - Planned Sampling.

Decreased Surveillance

For work areas in which the contractor maintains a consistently satisfactory performance for 3 to 6 months, the QAE should consult with the KO to decrease the intensity of the surveillance. More than one option is usually available and selection should be based on the initial method and the amount of work performed.

1. Random Sampling (Normal Surveillance) can be replaced by:
- Random Sampling (Reduced Surveillance)
 - Planned Sampling
 - Unscheduled Inspection (for any population size)
 - Customer Complaints.
2. Planned Sampling can be replaced by:
- Unscheduled Inspection (for any population size)
 - Customer Complaints.
3. 100 Percent Inspection can be replaced by:
- Random Sampling (Normal Surveillance)
 - Random Sampling (Reduced Surveillance)
 - Planned Sampling
 - Unscheduled Inspection (for any population size)
 - Customer Complaints.

3 CUSTODIAL SERVICES QA INSPECTIONS

Custodial Services

Performance Indicators and Detailed Inspection Tasks

The following numeric items are performed by the contractor. The related detailed inspection tasks are used by the QAE to verify the contractor's performance.

Verify that the contractor schedules and performs all custodial work needed to maintain and clean the specified areas. Document any discrepancies.

1. Trash removal services are performed.
 - a. All waste receptacles are less than half full.
 - b. Plastic liners are provided for each trash can.
 - c. Plastic liners are not torn or soiled.
2. Carpeted surfaces are vacuumed or swept as required.
 - a. Rugs and carpets are free of all removable visible litter and soil.
 - b. All tears, burns, and raveling are reported to the KO.
 - c. Shampooed carpets meet the criteria specified in the contract.
 - (1) Using the contractor's report of carpets shampooed during the past month, randomly select areas for inspection each month.
 - (2) Initially, use a visual inspection to check that the nap of the carpet has been raised and that the carpet has a clean appearance and a clean smell.
 - (3) If the effectiveness of the shampooing is questionable, inspect the areas in doubt using a steam rug cleaner to better determine contractor performance.
 - (a) Fill the steam cleaner with 1 gallon* of water and the proper cleaning solution.
 - (b) Shampoo the rug to be inspected until the water supply runs out.
 - (c) Collect and stir the wastewater to attain suspension of all particles.
 - (d) Allow a 1-cup sample of the water to settle overnight.
 - (e) The performance level is satisfactory if the level of sediment in the sample is less than 1/4-in. high.

*A metric conversion table is located on p 13.

- (f) The sampling process should not discolor the carpet by making that area cleaner than the rest of the surface.
 - (g) If discoloring occurs, consider the contractor's cleaning process unsatisfactory.
- 3. Hard floor surfaces are cleaned and waxed as required.
 - a. Mopping:
 - (1) Wood floors are not to be wet-mopped.
 - (2) Mopped areas have a uniformly clean surface.
 - (3) Hard floors are free of accumulated dust, litter, and debris.
 - (4) Hard floors are free of swirl marks, detergent residue, or evidence of soil, stains, film, or water.
 - (5) There are no splash marks on furniture, walls, baseboards, equipment, or other items.
 - b. Sweeping:

All swept floors are free of accumulated dust, litter, and debris.
 - c. Waxing:
 - (1) All waxed floors, including the floor underneath easily tilted or movable objects, have a uniform nonskid surface with a glossy appearance.
 - (2) Waxed floors are free of scuff marks, heel marks, stains, and discolorations.
 - (3) All waxed floors are free of built-up wax. They do not have a dull, hazy appearance.
 - (4) Baseboards, furniture, and equipment are free of floor maintenance solutions.
- 4. Dusting is done.
 - a. Unless specifically excepted, all desks, furniture, walls, blinds, radiators, and office equipment are virtually free of all dust, litter, lint, and soil.
 - b. Venetian blinds (inspect quarterly) are:
 - (1) Virtually free of all dust, stains, soil, and smudges.
 - (2) Properly replaced in the correct location.
 - (3) Show no evidence of staining on tapes and cords.

5. Spot cleaning is performed.

a. Mats and rugs:

- (1) Walk-off mats are provided at all exterior entranceways.**
- (2) Walk-off mats are clean (i.e., they are free of all removable debris and stains).**
- (3) All rug stains smaller than 2 sq ft have been cleaned and meet the requirements listed for carpeted surfaces.**
- (4) All washable surfaces are free of smudges, finger prints, marks, and streaks.**

b. Drinking fountains:

- (1) Fountains are free of streaks, stains, spots, smudges, scale, soil, and foreign matter.**
- (2) Fountains are disinfected. (Determine that a disinfecting cleaner is part of the custodian's supplies.)**

c. Vending machines:

- (1) The area surrounding vending machines is free of all removable litter, dust, soil, and debris.**
- (2) Empty bottles or containers are placed in the proper storage space.**

d. Upholstered furniture:

Upholstered furniture is vacuumed or damp-wiped as appropriate and is free of dust and streaks on all surfaces, including under and between cushions.

6. Glazing is cleaned.

- a. Interior window frames, sills, casings, and transparent surfaces are free of film, dirt, smudges, water, streaks, or any foreign matter.**
- b. Exterior window frames, sills, casings, and transparent surfaces are free of film, dirt, smudges, water, streaks, or any foreign matter. (Inspect semi-annually in April and October.)**
- c. Glass partitions, shelving, glass doors (interior and exterior), display cases, directory boards, draft shields on windows, mirrors, frames, sills, casings, and transparent surfaces are free of film, dirt, smudges, water, streaks, or any foreign matter.**

7. Restroom services are performed.

- a. Restroom supplies, including toilet tissue, paper hand towels, hand soap, and paper inserts for sanitary napkin disposal are provided in the quality required and in a quantity that will not be depleted before restocking.**

- b. Bowls, urinals, commodes, etc are free of streaks, stains, scum, urine deposits, and rust stains.
 - c. All walls, fixtures, and surfaces are disinfected. (Determine that a disinfecting cleaner is part of the custodian's supplies. A residual disinfectant odor should be apparent when entering the restroom.)
8. Sand, snow, and ice removal is done when appropriate.
- a. All sand, snow, and ice is removed to the bare pavement, with clear access to sidewalks, stairs, fire hydrants, building entrances and exits, and refuse containers. (Clear access means that anyone or anything that would normally be able to access that area can access it after sand, snow, and ice removal.)
 - b. Check that abrasives were removed at least 8 working hours after all ice or snow in the vicinity has melted. If the area appears to have been swept clean, consider the work satisfactory. However, if there are doubts about the contractor's performance, sweep a 10-sq-ft section of sidewalk or stairs for debris. Debris accumulation of less than one handful is acceptable.

Recommended Surveillance Approach

- Evaluate all performance indicators weekly, unless otherwise noted, using random sampling (normal surveillance, 10 percent AQL).

METRIC CONVERSION TABLE

1 in. = 2.54 cm
1 gal = 3.78 L
1 sq ft = 0.093 m²

ACRONYMS

| | |
|---------|--------------------------------------|
| AQL | Acceptable Quality Level |
| COR | Contracting Officer's Representative |
| DEH | Director of Engineering and Housing |
| KO | Contracting Officer |
| MIL-STD | Military Standard |
| O&M | Operations and Maintenance |
| QA | Quality Assurance |
| QAE | Quality Assurance Evaluator |
| QASP | QA Surveillance Plan |

REFERENCE

Military Standard 105E, *Sampling Procedures and Tables for Inspection by Attributes* (Department of Defense, 10 May 1989).

APPENDIX A: Inspection Sampling Tables

Table A1

Sample Sizes and Reject Levels (4% AQL)
(As developed from Tables I & II in MIL STD 105E)

| Population Size | Normal Surveillance | | Increased (Tightened) Surveillance | | Reduced Surveillance | | | | |
|-----------------|----------------------|--------------|------------------------------------|--------------|----------------------|--------------|---|----|---|
| | Class II Sample Size | Reject Level | Class III Sample Size | Reject Level | Class I Sample Size | Reject Level | | | |
| 08 to 50 | * | 25% | 1 | * | 40% | 1 | * | - | - |
| 51 to 90 | E | 13 | 2 | F | 20 | 2 | * | 3% | 1 |
| 91 to 150 | F | 20 | 3 | G | 32 | 3 | * | 3% | 1 |
| 151 to 280 | G | 32 | 4 | H | 50 | 4 | E | 5 | 2 |
| 281 to 500 | H | 50 | 6 | J | 80 | 6 | F | 8 | 3 |
| 501 to 1200 | J | 80 | 8 | K | 125 | 9 | G | 13 | 4 |
| 1201 to 3200 | K | 125 | 11 | L | 200 | 13 | H | 20 | 5 |

The Reject Level is the number of failed inspections requiring rejection of the Lot (population).
An asterisk (*) indicates that the sample level is outside the range of a 4% AQL for the selected class.

Table A2

Sample Sizes and Reject Levels (10% AQL)
(As developed from Tables I & II in MIL STD 105E)

| Population Size | Normal Surveillance | | Increased Tightened Surveillance | | Reduced Surveillance | | | | |
|-----------------|----------------------|--------------|----------------------------------|--------------|----------------------|--------------|---|----|---|
| | Class II Sample Size | Reject Level | Class III Sample Size | Reject Level | Class I Sample Size | Reject Level | | | |
| 06 to 15 | * | 33% | 1 | * | 50% | 1 | * | - | - |
| 16 to 25 | C | 5 | 2 | D | 8 | 2 | * | 8% | 1 |
| 26 to 50 | D | 3 | 3 | E | 13 | 3 | C | 2 | 2 |
| 51 to 90 | E | 13 | 4 | F | 20 | 4 | C | 2 | 2 |
| 91 to 150 | F | 20 | 6 | G | 32 | 6 | D | 3 | 3 |
| 151 to 280 | G | 32 | 8 | H | 50 | 9 | E | 5 | 4 |
| 281 to 500 | H | 50 | 11 | J | 80 | 13 | F | 8 | 5 |
| 501 to 1200 | J | 80 | 15 | K | 125 | 19 | G | 13 | 6 |
| 1201 to 3200 | K | 125 | 22 | L | 200 | 19 | H | 20 | 8 |

The Reject Level is the number of failed inspections that require rejection of the Lot (population).
An asterisk (*) indicates that the sample level is outside the range of a 10% AQL for the selected class.

Table A3

Random Numbers

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 6 | 1 | 6 | 9 | 3 | 5 | 5 | 1 | 1 | 3 | 1 | 2 | 5 | 5 | 1 | 7 | 8 | 7 | 5 | 6 | 6 | 8 | 4 | 4 | 9 | 4 | 6 | 2 | 8 | 9 | 3 | 5 | |
| 1 | 8 | 1 | 4 | 5 | 9 | 2 | 7 | 2 | 2 | 5 | 4 | 9 | 1 | 9 | 2 | 9 | 4 | 9 | 2 | 9 | 3 | 6 | 3 | 5 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 6 | 1 |
| 4 | 2 | 3 | 6 | 8 | 4 | 6 | 3 | 2 | 6 | 6 | 8 | 8 | 5 | 4 | 9 | 1 | 1 | 3 | 2 | 8 | 6 | 1 | 9 | 8 | 7 | 1 | 2 | 4 | 3 | 4 | 1 | 3 | |
| 2 | 7 | 2 | 4 | 8 | 8 | 8 | 3 | 5 | 3 | 3 | 2 | 6 | 3 | 9 | 3 | 2 | 7 | 7 | 1 | 8 | 3 | 5 | 9 | 6 | 8 | 1 | 5 | 9 | 3 | 2 | 4 | 6 | |
| 8 | 4 | 1 | 3 | 7 | 4 | 4 | 6 | 1 | 6 | 9 | 6 | 3 | 7 | 5 | 6 | 2 | 1 | 4 | 3 | 2 | 8 | 5 | 7 | 8 | 2 | 4 | 7 | 7 | 7 | 4 | 2 | 6 | |
| 2 | 6 | 4 | 8 | 1 | 5 | 4 | 9 | 7 | 1 | 7 | 3 | 3 | 7 | 2 | 1 | 7 | 4 | 4 | 7 | 7 | 8 | 2 | 7 | 5 | 7 | 6 | 5 | 6 | 6 | 2 | 5 | 8 | |
| 1 | 9 | 8 | 6 | 9 | 6 | 8 | 3 | 7 | 5 | 4 | 1 | 3 | 6 | 1 | 1 | 3 | 3 | 2 | 8 | 7 | 5 | 4 | 1 | 9 | 1 | 4 | 9 | 7 | 1 | 8 | 4 | 8 | |
| 1 | 4 | 3 | 7 | 5 | 6 | 5 | 5 | 9 | 9 | 4 | 6 | 4 | 6 | 2 | 3 | 4 | 5 | 8 | 9 | 9 | 9 | 8 | 3 | 2 | 3 | 2 | 7 | 7 | 5 | 9 | 9 | 8 | |
| 8 | 3 | 6 | 3 | 8 | 6 | 3 | 8 | 9 | 6 | 1 | 9 | 3 | 9 | 8 | 3 | 9 | 8 | 5 | 6 | 4 | 9 | 5 | 8 | 7 | 4 | 3 | 7 | 8 | 2 | 3 | 8 | 4 | |
| 1 | 5 | 2 | 5 | 8 | 3 | 7 | 5 | 2 | 3 | 7 | 9 | 4 | 4 | 4 | 4 | 8 | 3 | 1 | 2 | 6 | 7 | 2 | 9 | 9 | 7 | 8 | 4 | 2 | 3 | 4 | 1 | 4 | |
| 1 | 5 | 7 | 2 | 9 | 4 | 2 | 5 | 6 | 4 | 8 | 6 | 1 | 3 | 5 | 4 | 5 | 1 | 9 | 2 | 2 | 1 | 5 | 9 | 7 | 5 | 7 | 6 | 7 | 5 | 5 | 6 | 3 | |
| 6 | 9 | 2 | 7 | 1 | 9 | 7 | 7 | 5 | 4 | 3 | 6 | 6 | 3 | 6 | 3 | 4 | 4 | 6 | 6 | 8 | 3 | 8 | 1 | 4 | 7 | 9 | 1 | 4 | 7 | 2 | 7 | 7 | |
| 2 | 5 | 5 | 8 | 6 | 6 | 7 | 8 | 5 | 8 | 2 | 6 | 2 | 4 | 3 | 2 | 7 | 6 | 6 | 1 | 7 | 4 | 3 | 2 | 8 | 4 | 8 | 9 | 3 | 1 | 7 | 7 | 7 | |
| 6 | 1 | 1 | 9 | 1 | 9 | 2 | 9 | 9 | 9 | 1 | 2 | 8 | 6 | 4 | 7 | 3 | 7 | 5 | 4 | 7 | 1 | 8 | 1 | 3 | 4 | 2 | 1 | 5 | 9 | 2 | 5 | 7 | |
| 9 | 9 | 5 | 1 | 1 | 4 | 8 | 9 | 9 | 8 | 2 | 6 | 9 | 3 | 3 | 2 | 5 | 9 | 5 | 7 | 9 | 6 | 2 | 8 | 3 | 1 | 1 | 9 | 3 | 3 | 1 | 6 | 2 | |
| 9 | 6 | 1 | 8 | 8 | 7 | 7 | 8 | 3 | 2 | 2 | 5 | 2 | 6 | 3 | 6 | 6 | 4 | 5 | 2 | 2 | 8 | 1 | 3 | 3 | 2 | 3 | 3 | 6 | 9 | 3 | 9 | 4 | |
| 2 | 2 | 8 | 7 | 7 | 3 | 8 | 1 | 7 | 8 | 2 | 8 | 8 | 3 | 3 | 9 | 8 | 5 | 7 | 1 | 7 | 3 | 6 | 2 | 7 | 6 | 5 | 9 | 6 | 8 | 2 | 7 | 7 | |
| 3 | 9 | 6 | 7 | 1 | 1 | 4 | 7 | 3 | 6 | 9 | 2 | 7 | 4 | 8 | 8 | 3 | 2 | 5 | 8 | 4 | 2 | 2 | 9 | 1 | 4 | 8 | 4 | 6 | 5 | 3 | 6 | 4 | |
| 3 | 6 | 4 | 2 | 9 | 6 | 4 | 4 | 6 | 9 | 7 | 8 | 8 | 4 | 7 | 3 | 5 | 5 | 1 | 7 | 9 | 5 | 9 | 8 | 4 | 8 | 7 | 1 | 1 | 3 | 2 | 5 | 8 | |
| 7 | 6 | 5 | 6 | 3 | 1 | 9 | 7 | 8 | 9 | 8 | 1 | 7 | 6 | 8 | 8 | 9 | 3 | 5 | 8 | 3 | 1 | 9 | 4 | 6 | 7 | 4 | 2 | 7 | 4 | 7 | 9 | 8 | |
| 5 | 4 | 7 | 2 | 8 | 9 | 2 | 7 | 2 | 1 | 3 | 5 | 6 | 1 | 9 | 6 | 8 | 3 | 7 | 8 | 9 | 9 | 6 | 5 | 9 | 6 | 4 | 8 | 7 | 5 | 9 | 5 | 5 | |
| 2 | 2 | 6 | 5 | 1 | 1 | 3 | 3 | 7 | 6 | 1 | 7 | 4 | 4 | 4 | 9 | 5 | 2 | 5 | 9 | 1 | 7 | 2 | 5 | 4 | 9 | 9 | 4 | 9 | 9 | 8 | 8 | 2 | |
| 4 | 6 | 6 | 8 | 6 | 4 | 6 | 1 | 5 | 4 | 6 | 3 | 9 | 6 | 8 | 4 | 5 | 6 | 2 | 4 | 2 | 4 | 1 | 8 | 3 | 8 | 4 | 3 | 5 | 9 | 5 | 9 | 6 | |
| 4 | 5 | 7 | 4 | 1 | 8 | 8 | 2 | 3 | 5 | 6 | 3 | 5 | 3 | 2 | 1 | 8 | 2 | 9 | 2 | 5 | 6 | 5 | 1 | 9 | 9 | 4 | 8 | 4 | 4 | 4 | 4 | 5 | |
| 9 | 9 | 9 | 1 | 1 | 9 | 5 | 8 | 9 | 9 | 8 | 9 | 8 | 3 | 4 | 7 | 9 | 1 | 2 | 5 | 7 | 5 | 3 | 6 | 5 | 4 | 2 | 3 | 1 | 8 | 8 | 3 | 5 | |
| 2 | 2 | 7 | 4 | 6 | 8 | 2 | 2 | 5 | 9 | 4 | 4 | 2 | 3 | 7 | 9 | 5 | 7 | 7 | 8 | 8 | 1 | 3 | 1 | 4 | 3 | 1 | 1 | 6 | 1 | 2 | 5 | 8 | |
| 8 | 5 | 7 | 3 | 9 | 8 | 7 | 9 | 2 | 2 | 1 | 9 | 7 | 9 | 8 | 6 | 1 | 1 | 9 | 8 | 5 | 3 | 6 | 4 | 3 | 3 | 9 | 6 | 3 | 8 | 1 | 5 | 1 | |
| 7 | 9 | 4 | 2 | 3 | 8 | 6 | 1 | 7 | 6 | 7 | 5 | 3 | 4 | 3 | 5 | 2 | 1 | 4 | 7 | 6 | 9 | 1 | 8 | 9 | 2 | 4 | 4 | 3 | 7 | 4 | 8 | 1 | |
| 1 | 3 | 7 | 8 | 6 | 8 | 7 | 8 | 9 | 9 | 3 | 3 | 1 | 6 | 3 | 3 | 8 | 4 | 3 | 3 | 4 | 8 | 1 | 8 | 6 | 3 | 4 | 9 | 9 | 8 | 4 | 5 | 4 | |
| 5 | 4 | 7 | 4 | 9 | 3 | 7 | 3 | 1 | 9 | 2 | 3 | 8 | 7 | 3 | 8 | 9 | 2 | 5 | 1 | 5 | 9 | 4 | 2 | 4 | 9 | 1 | 9 | 9 | 8 | 1 | 7 | 9 | |
| 7 | 6 | 7 | 6 | 2 | 7 | 3 | 2 | 5 | 7 | 9 | 3 | 4 | 4 | 4 | 2 | 6 | 1 | 5 | 2 | 4 | 5 | 1 | 7 | 9 | 9 | 2 | 8 | 6 | 6 | 8 | 8 | 5 | |
| 8 | 4 | 6 | 5 | 9 | 2 | 1 | 3 | 5 | 5 | 1 | 7 | 8 | 6 | 1 | 7 | 9 | 8 | 3 | 6 | 6 | 9 | 1 | 7 | 9 | 2 | 2 | 9 | 6 | 7 | 1 | 5 | 3 | |
| 2 | 3 | 6 | 2 | 7 | 9 | 5 | 6 | 2 | 9 | 7 | 2 | 4 | 2 | 7 | 4 | 7 | 7 | 5 | 4 | 6 | 9 | 7 | 5 | 1 | 9 | 9 | 1 | 2 | 9 | 6 | 7 | 5 | |
| 6 | 2 | 2 | 4 | 5 | 8 | 2 | 9 | 4 | 9 | 5 | 6 | 2 | 6 | 3 | 6 | 2 | 6 | 6 | 2 | 1 | 3 | 9 | 6 | 8 | 4 | 6 | 1 | 4 | 2 | 5 | 7 | 4 | |
| 6 | 3 | 5 | 4 | 9 | 1 | 1 | 2 | 1 | 2 | 7 | 1 | 1 | 5 | 9 | 1 | 1 | 7 | 2 | 3 | 2 | 1 | 1 | 7 | 9 | 5 | 5 | 3 | 8 | 7 | 8 | 9 | 1 | |
| 2 | 4 | 7 | 6 | 7 | 9 | 3 | 2 | 2 | 2 | 2 | 8 | 1 | 3 | 4 | 2 | 9 | 8 | 7 | 6 | 9 | 5 | 7 | 8 | 6 | 5 | 8 | 5 | 3 | 6 | 8 | 6 | 2 | |
| 6 | 9 | 1 | 7 | 1 | 4 | 6 | 4 | 7 | 6 | 5 | 8 | 5 | 4 | 9 | 4 | 8 | 8 | 4 | 5 | 5 | 8 | 1 | 7 | 9 | 5 | 9 | 3 | 2 | 1 | 3 | 7 | 6 | |
| 4 | 8 | 4 | 1 | 9 | 8 | 6 | 4 | 7 | 4 | 4 | 1 | 5 | 9 | 2 | 4 | 3 | 3 | 6 | 7 | 4 | 8 | 9 | 2 | 1 | 5 | 4 | 3 | 7 | 2 | 5 | 1 | 2 | |
| 2 | 1 | 6 | 8 | 6 | 8 | 3 | 6 | 1 | 4 | 5 | 7 | 9 | 6 | 8 | 7 | 2 | 3 | 8 | 6 | 2 | 9 | 9 | 1 | 3 | 4 | 7 | 5 | 4 | 4 | 3 | 9 | 8 | |
| 9 | 8 | 5 | 4 | 5 | 6 | 1 | 4 | 3 | 6 | 2 | 9 | 6 | 1 | 9 | 8 | 1 | 8 | 8 | 9 | 9 | 9 | 5 | 1 | 7 | 4 | 9 | 2 | 1 | 9 | 1 | 6 | 6 | |
| 5 | 3 | 2 | 7 | 5 | 6 | 1 | 3 | 3 | 3 | 5 | 4 | 1 | 2 | 4 | 6 | 2 | 3 | 3 | 2 | 5 | 7 | 9 | 1 | 8 | 3 | 8 | 4 | 6 | 1 | 1 | 1 | 6 | |
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| 2 | 8 | 9 | 4 | 9 | 9 | 6 | 8 | 4 | 3 | 2 | 3 | 9 | 9 | 4 | 7 | 3 | 2 | 4 | 1 | 9 | 6 | 5 | 4 | 1 | 8 | 5 | 3 | 7 | 7 | 3 | 6 | 9 | |
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| 6 | 7 | 9 | 5 | 5 | 8 | 5 | 4 | 4 | 5 | 6 | 1 | 4 | 9 | 4 | 5 | 3 | 1 | 7 | 3 | 2 | 1 | 8 | 6 | 2 | 2 | 4 | 7 | 8 | 1 | 4 | 5 | 9 | |
| 5 | 3 | 7 | 8 | 6 | 6 | 4 | 1 | 1 | 4 | 4 | 2 | 5 | 1 | 1 | 4 | 8 | 9 | 4 | 2 | 8 | 9 | 9 | 7 | 2 | 4 | 7 | 8 | 4 | 1 | 8 | 1 | 1 | |
| 7 | 2 | 3 | 2 | 1 | 7 | 2 | 8 | 6 | 4 | 6 | 9 | 7 | 3 | 9 | 3 | 3 | 4 | 4 | 7 | 1 | 4 | 4 | 8 | 8 | 6 | 7 | 4 | 1 | 9 | 9 | 5 | 1 | |
| 8 | 4 | 3 | 4 | 9 | 2 | 7 | 2 | 6 | 3 | 7 | 9 | 8 | 3 | 1 | 9 | 9 | 5 | 8 | 7 | 1 | 2 | 9 | 9 | 6 | 6 | 8 | 8 | 8 | 7 | 8 | 4 | 8 | |

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