

# Position Classification Standard for Actuary Series, GS-1510

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## **SERIES DEFINITION**

This series includes positions which involve the application of professional knowledge and experience in actuarial science (including mathematics, statistics, and business, financial, and economic principles) to programs or problems related to annuities, and to life, health, or property risks and contingencies.

This standard supersedes the standard for the Actuary Series, GS-1510, published in February 1949 under the code P-1510.

## **BACKGROUND INFORMATION**

### *ACTUARIAL SCIENCE*

Actuarial science centers around the application of mathematics, statistics, and finance to provide advanced plans that cover the contingencies of life, health, and property. In some social insurance programs it provides the blueprints for spreading risks, and for equitably apportioning costs among participants in relation to their contribution to risk. In other social insurance programs rates and benefits are established by legislation to meet a social need of the community.

Risk is calculated from data on past experience accumulated in a program, or obtained from related public and private programs, censuses, and demographic studies. Premium charges and trust funds are related to potential benefit payments, and are influenced, to a large extent, by economic and, demographic factors. For Federal programs premium charges, if any, and reserve funds are usually established by statute.

Actuarial work may be divided into two categories: that of a long-range nature (upward to 20 years or longer) i.e., life and retirement insurance or pension programs; and that of a short range nature, any shorter period but usually a very few (1 to 5) years, i.e., health, unemployment, crop, mortgage, and property insurance. In the long-range category the experience from which risk can be calculated is extensive both in length and breadth. The insured population follows a trend which is predictable over a long period. To a degree, the reserve requirements can be fixed more precisely. In determining risks in the short-range category less directly pertinent or readily adaptable experience data are available, and the insurance risk is generally dependent on more or less unpredictable catastrophes, or highly complex short-range, and sometimes local, economic developments. Because of the amount and usefulness of a background in, and understanding of, the highly specialized economic factors and business practices in each of these categories, actuaries tend to specialize in one or the other.

## *Government Programs*

Actuaries in the Federal service are concerned with providing facts to be used as the foundation for management decisions and actions in the administration of a number of Federal programs. These programs are concerned with:

1. life insurance and survivors annuities;
2. retirement annuities and pension plans;
3. health and disability insurance;
4. unemployment insurance;
5. insurance plans protecting mortgages, loans, savings, investments, crops, and property;
6. equipment life expectancy, failure, and replacement rates; and
7. estate, gift, and other tax regulations applicable to trusts, pension funds, insurance programs, gifts, etc.

There are some actuarial positions in the Government of the District of Columbia included in this series. Actuaries in these positions are concerned with the actuarial phases of the supervision of insurance companies licensed under public laws to do business in the District of Columbia.

## *Functions of Actuaries*

The actuary deals with the economic and social aspects of a rapidly changing world in which new discoveries in science and the practice of medicine compete with growing complexity in business and finance. He must evaluate his past projections against actual experience. These evaluations provide him with a more profound knowledge of the economic and social forces at work in his area of interest. Such findings are applied to future projections. Since most programs involve masses of data, studies are made of samples. The actuary must insure that his study sample is representative, and that he uses the statistical tools best suited to the problem.

The rapid advances in automatic data processing equipment have required the actuary to constantly reevaluate the need for data and identify new needs. After pinpointing the need, he has to determine where and how to collect the data, and what to do with it.

Because he has the basic data for projecting cost and workload, the actuary usually plays an active role in the agency's budget process. His projections of future program costs and workload form the basis for estimating staff needs and service costs.

The actuary is traditionally associated with the calculation and compilation of mortality, morbidity, and disability tables; retirement, withdrawal, and remarriage rates; joint and survivorship values; annuity and insurance values; and reserve and trust fund valuation.

On the other hand, he may perform many functions requiring an actuarial background, in which for weeks or months he is not required to write down an equation, prove a theorem, or perform any activity involving applied mathematics. The unique contribution of the actuary is that he brings to any field with which he is concerned a thorough familiarity with the mathematical considerations which underlie the activity.

The preliminary evaluation of proposed legislation for its cost, impact, and actuarial soundness represents a substantial workload for the Federal actuary. His findings must be furnished to laymen, together with supporting evidence for the findings, in nontechnical language.

It is the usual pattern, too, for the Federal actuary to work closely with attorneys in drafting proposed legislative changes, to insure proper interpretation and implementation of their actuarial recommendations. For the same reason the actuary works closely with the regulation writers on the implementation of proposals that are enacted into law.

The actuary presents the findings of his research, study, and analysis in professional journals, to expose them to the test of critical review by other qualified professionals. The criticism of ideas in this forum plays an invaluable and necessary role in the advancement of the profession and the professional actuary.

## EXCLUSIONS

Excluded from this series are positions which involve primarily the adjudication of claims through the application of retirement or insurance laws, regulations, and procedures. Work of this nature is most likely to occur in positions in the following series:

[Claims Assistance and Examining Series, GS-0998](#)

[Veterans Claims Examining Series, GS-0996](#)

Excluded are positions which involve nonprofessional technical support work in actuarial science or clerical processes related to problems of an actuarial nature. Such positions are classified to the [Statistical Assistant Series, GS-1531](#).

Excluded are positions whose paramount function is the study and analysis of nonactuarial factors and relationships pertaining to life, health, disability, and unemployment insurance plans; or to equipment mean life (mean time before failure), rate of failure, or reliability. Such work may be based in minor part on actuarial principles. Work of this nature is most likely to occur in positions in the following series:

[Social Science Aid and Technician Series, GS-0102](#)

[Social Insurance Administration Series, GS-0105](#)

[Economist Series, GS-0110](#)

[Accounting Series, GS-0510](#)

[Statistician Series, GS-1530](#)

## EVALUATION CRITERIA

Grade levels for actuary positions are determined by the *Nature of the Assignment and the Level of Responsibility*.

### *Nature of the Assignment*

Included under this factor are the following:

- Complexity of projects and problems;
- Qualifications (knowledge and competence) required;
- Originality, judgment, and interpretation involved.

At the lower levels assignments relate primarily to specific procedural steps or tasks which are limited in scope and for which methods and techniques are standardized. At the higher levels assignments typically involve a complete study of substantial complexity, breadth, and importance.

### *Level of Responsibility*

Included under this factor are the following:

- Supervision and guidance received;
- Extent of responsibility for technical decisions and recommendations;
- Nature and scope of contacts with others.

*Evaluation Notes*

The absence of criteria for positions above grade GS-13 does not preclude the classification of positions at higher grade levels when such action is indicated by an extension of the criteria in this standard.

Positions for which the supervisory duties and responsibilities are significant may be evaluated by reference to the [General Schedule Supervisory Guide](#).

## TITLES

The approved classification title for nonsupervisory positions is "Actuary." Positions which involve significant supervisory responsibility and require supervisory qualifications are to be identified by adding the prefix "Supervisory" to the basic title.

### **ACTUARY, GS-1510-05**

This is a basic trainee level. The work performed is closely supervised. Its purpose is to provide experience in actuarial office practices, facility in using sources of data, and an intimate acquaintance with the basic techniques applicable to the specific field of actuarial work. Occasionally, the supervisor may assign work beyond that ordinarily expected of employees in the entrance level in order to test their abilities, or prepare them for advancement. Work at this level requires primarily knowledge of mathematical and statistical theory and methods.

### **ACTUARY, GS-1510-07**

This is a developmental or advanced trainee level. Actuaries GS-7 assist higher-grade professionals by performing such tasks as:

- Conducting supplementary studies of limited scope related to broad studies of the population in an insured area;
- Following established procedures, making actuarial calculations to be used in an annual statement;
- Developing clerical procedures to be used in computation and compilations, and providing technical guidance and review to clerks working on a project;
- Deriving and applying routine actuarial formulas to obtain rates and values for various plans of insurance and annuities;

- Applying alternate mortality tables to compare an underwriter's risk listings with the reserve funds reported.

An actuary of higher grade gives specific instructions with new assignments, or guidance is available in the form of precedent studies and tables, as well as established professional techniques. At this level the actuary is expected to recognize significant and controlling aspects of assignments and the inadequacy of standard practices in a particular situation. Although supervision is less frequently given than at the GS-5 level, the work is checked in process. Work products are reviewed for reasonableness of results, and correctness of a selected sample of computations.

## **ACTUARY, GS-1510-09**

The work at this level involves the processing and analysis of a variety of actuarial factors. Standard actuarial methods and techniques are used. By contrast to positions at GS-7, the Actuary GS-9 selects, adapts, or refines these to fit the available data and the variations in the objectives of projects. The assignments are broader in scope and more difficult than assignments at the GS-7 level. The Actuary GS-9 applies a knowledge of the agency's program and operating procedures. Some examples of work at this level are:

- Analyzing beneficiary and benefit data to obtain actuarial relationships;
- Developing factors to be used in expanding items in a sample, by relating sample totals to related known data for a corresponding whole group (a universe): making arbitrary adjustments, where necessary, to preserve consistent relationships among the items being expanded;
- Reviewing, prior to publication, worksheets and final tables showing benefit data to assure conformance to established procedures and reasonableness of results;
- Performing regulatory actuarial examinations of life underwriters' financial statements and other official filings to determine valuation of reserves, gross and taxable premiums, and compliance with legal requirements for license renewal.

The Actuary GS-9 is in contact with other activities in the organization to obtain and supply data and information within an assigned subject-matter area.

The supervision received is somewhat diminished by comparison with the GS-7 level. With assignments, the supervisor outlines the scope and objective and the general course of action required. He indicates the assumptions, and discusses various considerations, the basic source data to be used, and alternative methods. The Actuary GS-9 develops the specific plan of procedure for approval by the supervisor. He is expected to recognize and to bring up for discussion problems or findings which warrant the supervisor's attention. The work is observed for progress and to allow the supervisor to coordinate it with related activities. The final product

is reviewed for compliance with instructions, and to insure that it is complete and correct as to course of action taken. The nature and scope of assignments at this level are such that some technical decisions are unreviewed.

## **ACTUARY, GS-1510-11**

The Actuary GS-11 deals with a variety of professional actuarial problems. He selects and adapts the actuarial and statistical tools or techniques to be used in preparing reports and/or recommendations. To resolve problems encountered at this level, the actuary must have a solid background of professional knowledge and experience and good knowledge of the statutory provisions and characteristics of the agency's program.

He must be able to evaluate the relative importance of factors or developments in the problems, and, in particular, those critical to the success of a project. Unlike the Actuary GS-9, he must be able to recognize limitations of guides or precedents and solve problems where pertinent guides or data are not available. The Actuary GS-11 plans studies and prepares reports on findings and methods used, drawing inferences and clearly delineating, as a frame-of-reference, conditions under which the findings of the study hold true.

The following are some examples of the varied work performed:

- Determines reserve factors to be used in the valuations of an insurance fund covering equity investment risks;
- Prepares cost estimates related to proposed legislation amending a retirement system;
- Makes special and recurring analyses of equipment item life and failure experience requiring adaptation of standard and complex actuarial and statistical techniques and development of procedures to provide measures of reliability, and to predict failure quantities;
- Plans and executes a variety of studies and analyses related to the preparation of periodic estimates of the future size and composition of a population eligible for an insurance benefit;
- Plans and conducts special recurring and nonrecurring studies of the mortality and disability experience under an insurance program;
- Conducts and formally reports on the actuarial phases of site examinations of life insurance companies unless unusual scope or complications are involved (such as merger or conversion to computerized system); analyzes funds for soundness and trends, including lapse ratios, unearned premiums, deficiency reserves, double indemnity provisions, supplemental contracts, and other elements.



The Actuary GS-11, unlike positions at GS-9, may be responsible for assigning, coordinating, and reviewing the work of one or two professional or nonprofessional assistants. This responsibility is usually on a project basis, and is a working rather than a full supervisory relationship. Contacts outside the organization are like those at GS-9.

The Actuary GS-11 is expected to proceed more independently than at GS-9 in gathering information on a project, and in using skill and ingenuity in working out solutions to problems. The supervisor assigns work and provides general instructions. The work is checked for adherence to completion schedules, coordinated with other work under way, and reviewed upon completion for technical adequacy, and for compliance with project requirements, office policies and standards. At this level, recommendations and decisions are an inherent part of the process of carrying assigned projects to completion.

## **ACTUARY, GS-1510-12**

This level differs from the 65-11 level in that it requires the application of the knowledges and skills of a specialist with extensive experience in a specific area of application of actuarial science. Projects are broader in scope, and require considerable advance planning. The Actuary GS-12 frequently is a team leader. He must be able to see the whole way through a project, and divide it into subsections so that others can carry portions to completion on schedule. Another type of assignment frequently found at this level and not at GS-11, requires the design, development, and application of new techniques and actuarial methods in a specialized area of actuarial work or for a specific field of application.

Typical examples of assignments and the work performed are the following:

- Plan and lay out the work to be performed in investigating such features, affecting the valuation of the assets and liabilities of an insurance program, as mortality, disability, withdrawal, retirement, remarriage;
- Formulate procedures used to compute actuarial values of individual insurance contracts;
- Plan and produce a variety of comprehensive actuarial studies directed toward the identification and estimation of program workload, to be used as the basis for budget and administrative planning;
- Conduct comprehensive study to determine raw data requirements for actuarial studies. Study ADP and computer programs to determine where and how to collect data. Prepare reports and recommendations, and the plans and procedures for the collection of data from these sources.

After receiving an assignment, usually given in broad terms, the Actuary GS-12 is responsible for subsequent planning and execution of the work. He reports progress to his supervisor in occasional conferences, and receives guidance on unusual technical problems. Completed

written work is reviewed for technical adequacy (overall concepts rather than details), clarity of expression, and conformance with agency policy. The Actuary GS-12 keeps his supervisor informed on matters of interest related to contacts with persons or groups in other organizational units or outside the agency.

The Actuary GS-12 initiates and maintains a variety of contacts with professional personnel and operating officials to arrange, plan, and coordinate solution of joint problems; to explain the application of actuarial science; or to interpret or verify actuarial findings.

## **ACTUARY, GS-1510-13**

In addition to possessing marked professional ability in actuarial science, the Actuary GS-13 is a specialist with a depth of knowledge and experience in program requirements, operations, and functional problems of an agency, or in the programs and methodology related to the application of actuarial science to a particular functional area.

The recommendations, conclusions, and findings of the Actuary GS-13 are accepted as authoritative, and frequently form the basis for major policy determinations and binding commitments for the organization he serves. Assignments are difficult because of the complexity or novelty of the project work involved.

Assignments often require the development of new techniques, formulas, and procedures to solve the complex actuarial problems which are assigned. Much more so than at GS-12 the Actuary GS-13 is in frequent consultation with other organizations within the agency and with other Government agencies on broad problems and programs of mutual interest. He participates in conferences with the public, their attorneys, actuarial consultants, representatives of the insurance industry or other industries on regulations, procedures, and problems of common interest. He must be tactful and diplomatic in order to represent his agency and bring his assignments to a successful conclusion.

Some examples of assignments are:

- Plans and develops a continuing program to provide work-load estimates used for appropriations requests for operational staffing requirements for a major program;
- Plans and develops new or nonrecurring actuarial studies designed to provide new actuarial methods and techniques to aid in the management of an insurance fund;
- Plans and conducts special actuarial studies of employee benefit programs, such as:
  - impact on tax revenues of limitations on the taxable wage base or on the maximum tax rate;
  - special evaluations of State retirement systems and other employee benefit plans.

- Acts as consultant to others, actuaries and nonactuaries, concerning study approaches and research techniques amenable to actuarial methods.

The Actuary GS-13 usually works under general supervision of a higher grade actuary who establishes work priorities and arranges staffing patterns commensurate with planned objectives of a program. The supervisor provides general instructions on the areas to be encompassed, results expected, major problems which are anticipated, and policy considerations. Completed work is reviewed primarily in term of results achieved and policy aspects.