

# Position Classification Standard for Petroleum Engineering Series, GS-0881

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## SERIES DEFINITION

This series includes positions that require primarily the application of a professional knowledge of petroleum engineering. The work is concerned with exploration and development of oil and natural-gas fields; production, transportation, and storage of petroleum, natural gas, and helium; investigation, evaluation, and conservation of these resources; regulation of transportation and sale of natural gas; valuation of production and distribution facilities for tax, regulatory, and other purposes; and research on criteria, principles, methods, and equipment.

This standard supersedes the standard for the Petroleum Production and Natural-Gas Engineering Series, published in June 1947 under the code P-878. The series coverage has been expanded to include petroleum and natural-gas valuation engineering work formerly in the Valuation Engineering Series, GS-0897, which has been abolished.

## SERIES COVERAGE

Positions in this series are characterized by required knowledge of mathematics, geology, physics, chemistry, engineering science, and applied engineering subjects such as would be acquired by completion of a full 4-year petroleum engineering curriculum.

Some positions in this series require highly specialized knowledge of the principles and techniques of petroleum engineering, as in the conduct of reservoir studies to plan and control the development of oil fields and production of oil and gas. Other positions in this series require more generalized knowledge of engineering principles and techniques in combination with knowledge of the economics and practice of the petroleum and natural-gas industry, as in the regulation of the distribution and sale of natural gas. Thus, engineers who have education and training in related fields of engineering such as civil, mechanical, or chemical engineering may also be qualified to perform such work. The fact that a graduate mechanical or civil engineer may be recruited as a trainee does not of itself warrant classification of the position in other than the Petroleum Engineering Series.

## RELATED FIELDS

Positions that require primarily the application of professional training in geology and geophysics are excluded from this series and should be classified in the [Geology Series, GS-1350](#), or the [Geophysics Series, GS-1313](#). Normally, the work of the petroleum geologist and geophysicist is primarily concerned with basic exploratory and discovery phases of the work performed in the search for and development of new oil and gas fields, including the technical interpretation of data obtained from seismic readings, core samples, electric-logs, etc. However, the petroleum engineer also must be able to interpret data obtained from electric-logs, radioactivity-logs, as well as from core samples, to arrive at basic conclusions about oil and gas bearing strata, the porosity and permeability of reservoirs, their productive capability, and extent. The concern of the petroleum engineers with oil field development and production aspects and

the engineering qualifications required for such work serves to differentiate them from petroleum geologists.

Positions concerned primarily with the chemical separation or processing of refined products from petroleum or natural gas are classifiable in the [Chemistry Series, GS-1320](#), or the [Chemical Engineering Series, GS-0893](#).

Positions that require the application of knowledge of the oil and gas industry or utilities, including the processing, distribution, transportation, and marketing of petroleum and natural-gas, but which do not require a professional knowledge of engineering, are classifiable in the [Industrial Specialist Series, GS-1150](#), or the [Public Utilities Specialist Series, GS-1130](#).

Positions that involve the mining, retorting, and refining of oil shale are generally classifiable in the [Mining Engineering Series, GS-0880](#), or the [Chemical Engineering Series, GS-0893](#), whichever is appropriate. However, positions which involve the application of petroleum engineering techniques (e.g., underground combustion) to the extraction of shale oil are classifiable in the Petroleum Engineering Series.

Positions that require the application of nonprofessional technical knowledge of petroleum engineering are classifiable in the [Engineering Technician Series, GS-0802](#).

## PETROLEUM ENGINEERING FUNCTIONS

The work of most petroleum engineers in the Federal service generally involves one or more of the following different types of activities:

- (1) Research and development to improve methods, equipment, and techniques that would aid in the discovery, recovery, production, conservation, storage, and transportation of petroleum and natural gas, and in the management of these resources.
- (2) Investigations to develop technical information about oil and gas deposits and reserves, including that pertaining to their potential and overall values to industry and to the economy in general.
- (3) Valuation engineering work involving determinations of depletion of resources and depreciation of facilities to establish the fair worth of properties for regulatory taxation and other purposes.
- (4) Regulation of the transportation and sale of natural gas including the establishment of rate structures for production and service areas.
- (5) Development, operation, and maintenance of facilities for the production, distribution, and storage of helium and helium-bearing natural gas.
- (6) The discovery, preservation, conservation, management and utilization of petroleum and natural-gas resources on public, Indian, acquired, and offshore lands, including the

regulation of the production of petroleum and natural gas from such lands and determination of royalties.

- (7) The preservation and maintenance of petroleum and natural-gas resources in areas set aside as reserves.

## TITLES

Positions in this series may require specialized competence in working with petroleum, with natural gas, or with helium. However, many positions involve combinations of these. Also, petroleum engineers are professionally prepared and trained to handle both types of operations. (Petroleum and natural gas more often than not are found together, and the same or similar methods are used to develop oil and gas fields and produce petroleum and natural gas.)

Moreover, petroleum engineering is the accepted title for the academic curricula covering both oil and gas. Accordingly, the basic title, Petroleum Engineer, is used for positions concerned with any one or with a combination of these resources.

Some petroleum engineer positions are clearly research positions; others are clearly nonresearch. However, many nonresearch positions involve field surveys to collect data, reservoir studies, and other types of investigations which resemble certain aspects of research and require similar qualifications. Also, many positions involve combinations of research and nonresearch functions. We are not therefore establishing separate titles for research and nonresearch positions.

Accordingly, in the interest of a simplified title structure which satisfies personnel management purposes, the authorized titles are Petroleum Engineer and Supervisory Petroleum Engineer. The latter title applies to those positions which require supervisory qualifications.

## EVALUATION NOTES

1. The illustrative examples of work included under Nature of Work factor should not be considered as grade controlling in themselves. Assignments described at one grade level may be performed at higher or lower levels, but with differences in such factors as supervisory controls, originality, decision-making authority, etc.
2. The [General Schedule Supervisory Guide](#) contains criteria for evaluation of supervisory positions.
3. The [Research Grade-Evaluation Guide](#) contains criteria for evaluation of research positions.
4. The [Valuation Engineering Grade-Evaluation Guide](#) contains criteria for evaluation of positions in this series which involve primarily determining the fair market value of oil and gas facilities, services and resources.

5. This standard does not include criteria for evaluation of positions above the GS-12 level, but this, of course, does not preclude the classification of nonsupervisory positions in this series above that grade. Generally, for positions that clearly exceed GS-12, the guides specified above will be particularly helpful. Standards for related engineering series (e.g., [Chemical Engineering Series, GS-0893](#), and [Civil Engineering Series, GS-0810](#)) and the [General Grade-Level Standard for Nonsupervisory Professional Engineering Positions, GS-0800](#), also contain criteria which may be used.

## **GRADE DESCRIPTION LEVELS**

### **PETROLEUM ENGINEER, GS-0881-05**

#### *Nature of work*

The basic purpose of assignments is to orient the employee in the application of academic theory and basic principles of engineering and geology to petroleum engineering tasks and to ascertain his skills and aptitudes. Work tasks may be similar to those assigned to nonprofessional employees, but such tasks are primarily to equip the trainee to perform more difficult and responsible petroleum engineering duties.

GS-5 petroleum engineers perform tasks such as applying basic formulas to routine calculations; preparing graphs, curves, and tables for other engineers; recording factual data in tests and observation studies; and searching technical reports to obtain information.

#### *Controls over the work*

Technical manuals, directives, and criteria are detailed and are directly applicable.

The GS-5 engineer receives specific instructions as to what is required and guidance as to reports to be used, measurements to be taken, and probable results. Work is checked in progress and upon completion is reviewed for accuracy and validity. Decisions are limited to a simple choice of known techniques to be applied and are not significant.

## **PETROLEUM ENGINEER, GS-0881-07**

### *Nature of work*

Using prescribed methods, GS-7 petroleum engineers perform work on specific and limited work assignments or projects that normally form minor phases of a broader assignment which is the responsibility of a higher grade engineer. Assignments are typically screened to eliminate or provide instructions on difficult or unusual problems. Familiarity with and use of a number of standard engineering principles, methods, and practices are necessary in order to adapt practices and techniques to specific situations, to adjust and correlate data, to recognize discrepancies and deviations in results, and to follow an operation through a series of related detailed steps or processes in carrying out the work assignments. GS-7 petroleum engineers make tentative and preliminary selections and adaptations of engineering alternatives and, after approval by the supervisor, carry out the sequence of detailed operations.

### *Controls over the work*

Although guides are detailed and directly applicable as described at the preceding level, the GS-7 employee must select the most appropriate guides. He must use some resourcefulness in planning the details to accomplish assignments.

Supervisory control on new assignments is the same as at the preceding level. Detailed calculations, findings, and recommendations on repetitive assignments may be only spot checked to determine accuracy. Reports, designs, and specifications are reviewed for technical accuracy of conclusions, clarity, and format of presentation.

## **PETROLEUM ENGINEER, GS-0881-09**

The work at the GS-9 level differs from the GS-7 level in the required integration of a variety of tasks and data into a completed study or report for which the GS-9 engineer has responsibility. The GS-9 engineer works more independently than at GS-7 and has more responsibility for selecting methods and arriving at conclusions.

### *Nature of work*

Assignments require a good knowledge of standard guides, precedents, methods and techniques of petroleum engineering applicable to the subject area. Assignments are usually of limited scope and complexity and are similar to those previously performed by the organization. Problems requiring difficult choices of alternatives or significant deviations from standard practice are not the normal pattern at this level.

The work typically involves frequent contacts with operators, utilities, and State officials to obtain information from records or to arrange for tests (usually after initial contacts by others).

The GS-9 engineer also provides information concerning reservoir conditions or standard interpretation of regulations.

The following are typical GS-9 assignments:

1. Reviews a variety of applications of oil and gas operators on leased lands (e.g., to designate unit areas, to extend time to drill additional exploratory wells, and to terminate unit agreements) for correctness and adequacy of data submitted, and for compliance with requirements. Advises applicants of needed revisions and prepares comments and recommendations for review by supervisor.
2. Inspects discovery, development, and production operations on leased land to prevent waste or damage to formations containing oil, gas, or other deposits in accordance with provisions of the operating regulations. Determines adequacy and appropriateness of drilling, well-casing, well-spacing, production, and other operations. Submits to his superiors information and recommendations for safeguarding and protecting the surface property and the underlying mineral-bearing formations. Performs production potential tests on oil and gas wells to determine the daily permissible flow in accordance with allowable schedules.
3. Reviews applications for certificates for approval of construction, acquisition, extension, or abandonment of natural-gas facilities for correctness, completeness, and adequacy of data, for compliance with guidelines, and for reasonableness of engineering criteria. Prepares analyses and recommendations concerning features such as feasibility, markets, gas supplies, adequacy of facilities, and economic impact. Prepares exhibits and assists legal staff in preparation of briefs and arguments on engineering aspects.

#### *Controls over the work*

Supervision over the work is general. Assignments are given in terms of specific objectives with instructions as to possible complex problems and the means of their solution. The Petroleum Engineer GS-9 is expected independently to select methods and guides, to apply them with minor adaptation, and to report on findings. Completed work is reviewed for soundness of technical engineering judgment and compliance with instructions.

### **PETROLEUM ENGINEER, GS-0881-11**

The work at the GS-11 level differs from that at GS-9 in (1) greater scope and complexity of assignments, (2) increased requirements for planning, adapting methods, and interpreting results, (3) greater freedom from supervision, and (4) more difficult person-to-person relationships.

*Nature of work*

The work requires a thorough knowledge of petroleum engineering guides, precedents, methods, and techniques. Assignments typically involve a variety of difficult problems requiring analysis and evaluation of alternatives, substantial modification of standard practice, and negotiation and coordination. Petroleum Engineers GS-11 are required to be fully qualified to plan and carry out assignments requiring application of sound judgment and specialized knowledge of all conventional aspects of their area of assignment.

Contacts frequently involve providing guidance to lessees and company representatives on technical and regulatory problems, coordinating operations, securing cooperation of oil and gas companies, and testifying on engineering findings.

The following are typical GS-11 assignments:

1. Plans and conducts engineering surveys and investigations designed to improve petroleum production by increasing oil recovery. Assembles, analyzes, and interprets data concerning oil and gas fields with respect to (a) attitude and characteristics of producing formations, (b) pressure, temperature, composition, and phase relations of the fluids, (c) methods of drilling and operating wells, and (d) behavior of fluids under producing conditions. The purpose is to determine how the development and operation of the fields can be improved to increase the recovery of oil and gas by employing accepted and modern engineering techniques. Visits representatives of oil companies and State regulatory offices to obtain engineering data and technical information, and, where necessary, makes engineering and production tests in collaboration with company engineers. Predicts reservoir performance, and prepares reports recommending changes in practice to effect increased recovery.
2. Independently plans and conducts studies of development, drilling, completion, and producing practices on leased public or Indian owned oil and gas lands. Conducts reservoir studies with the aid of geophysical and geological data, electric-logs, core analyses, and individual well information to ascertain the type of geological structure and the characteristics of the reservoir; determines the number of wells completed in a reservoir and the adequacy of well-spacing and completion programs to properly drain the reservoir without undue waste of reservoir energy. Determines the adequacy of and compliance with requirements of proposed development and production plans. Furnishes technical advice and assistance to lessees in determining whether well locations, drilling or production methods, repairing and completing wells, etc., meet requirements. In the event of accidental escape of oil, gas or salt water, directs the suspension of operations on leases to alleviate hazardous conditions or to prevent waste to property damage.
3. Prepares analyses, reports, and recommendations on problems involved in certificate or rule-making proceedings in connection with regulation of the transportation or sale of natural gas. Evaluates engineering proposals for effectiveness, accuracy, reasonableness, and conformance to requirements. Prepares exhibits and testifies on engineering and

related regulatory issues. Reviews testimony and presentations of other witnesses, and advises legal staff in cross examination and preparation of briefs and arguments.

*Controls over the work*

Assignments are given with only general instructions as to objectives and possible problems. GS-11 engineers are responsible for independently developing approaches and solutions to problems. They consult supervisors only as necessary on controversial or policy questions. Completed work is reviewed for overall technical adequacy and conformance with objectives. In dealing with company representatives, utilities, and the public, Petroleum Engineers GS-11 make commitments on routine matters covered by precedents and accepted engineering practice.

## **PETROLEUM ENGINEER, GS-0881-12**

The GS-12 level is characterized by a combination of factors such as the following:

- (1) Recognition of the GS-12 engineer as a highly skilled professional equipped by training and experience to deal fully with diversified, advanced engineering problems in his area of specialization;
- (2) Assignments of such scope and magnitude as to require one or more engineering assistants to perform the more routine duties;
- (3) Numerous important complex problems which require originality in planning and organizing the work, in making novel adaptations of methods, or in devising new approaches;
- (4) Required highly developed skill in promotion of improved practice, in negotiation of agreements, or in presenting testimony as an expert witness on complex engineering issues; and
- (5) A high degree of reliance is placed on recommendations and conclusions on matters of considerable importance to the success of affected agency programs.