Job Family Position Classification Standard for Technical Work in the Physical Sciences Group, GS-1300

Series Covered by This Standard:

Physical Science Technician	GS-1311
Hydrologic Technician	GS-1316
Meteorological Technician	GS-1341
Cartographic Technician	GS-1371
Geodetic Technician	GS-1374

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August 2002

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INTRODUCTION

This job family standard provides series definitions and titling instructions for one-grade interval technical positions in the Physical Sciences Group, GS-1300. It also provides grading criteria for nonsupervisory positions in this job family.

COVERAGE

This job family standard covers the following occupational series:

Series	
Physical Science Technician	**GS-1311**
Hydrologic Technician	**GS-1316**
Meteorological Technician	**GS-1341**
Cartographic Technician	**GS-1371**
Geodetic Technician	**GS-1374**

MODIFICATIONS TO AND CANCELLATIONS OF OTHER EXISTING OCCUPATIONAL SERIES AND STANDARDS

Issuance of this job family standard renames, modifies, or cancels occupational series, classification standards, and guidance as described in the following table.

Previous Series, Guidance or Group		Action Taken
Physical Science Technician	**GS-1311**	• Cancels this classification standard, last revised in April 1976 and the supplemental guidance issued in December 1979.
Hydrologic Technician	**GS-1316**	• Cancels this classification standard, last revised in April 1971.
Meteorological Technician	**GS-1341**	• Cancels this classification standard, last revised in June 1971.
Cartographic Technician	**GS-1371**	• Cancels this classification standard, last revised in March 1982.
Geodetic Technician	**GS-1374**	• Cancels this classification standard, last revised in February 1963.

GENERAL SERIES, TITLING, AND OCCUPATIONAL GUIDANCE

This section provides information on series definitions, titling instructions, and occupational guidance for nonsupervisory one-grade interval technical positions in the Physical Sciences Group, GS-1300. It also provides information on titling instructions for supervisors, leaders, agency-established parenthetical titles, and organizational titles in this job family.

GENERAL TITLING PROVISIONS

Supervisors and Leaders

- Add the prefix "Supervisory" to the title of positions classified using the **General Schedule Supervisory Guide**.
- Add the prefix "Lead" to the title of positions classified using the **General Schedule Leader Grade Evaluation Guide**.

Parenthetical Titles

- None prescribed.
- Agencies may supplement the basic titles authorized in this standard with agency-established parenthetical titles if necessary for recruitment or other human resources purposes.

Organizational Titles

- Use the official position titles as outlined below for human resources management, budget, and fiscal purposes. This does not preclude continued use of organizational or functional titles for internal administration, public convenience, program management, or similar purposes.

GENERAL SERIES DETERMINATION GUIDELINES

Determining the correct series is usually apparent from reviewing the duties and responsibilities assigned to the position. In most instances, the series definition and the general occupational information that job family standards include will reflect the primary work of the position, the highest level of work performed, and the paramount knowledge required. Normally, users will have little trouble making the decision by comparing the characteristics of the position in question to the series definitions and occupational information in job family standards. However, in other instances determining the correct series may not be as obvious.

Related Series in This Job Family. When the work of a position falls into more than one series within this job family it is sometimes difficult to determine the correct series. If it is unclear whether a particular series predominates, apply the following guidelines in the order listed to determine the correct series:

- ***Paramount knowledge required.*** Although there may be several different kinds of work in the position, most positions will have a paramount knowledge requirement. The paramount knowledge is the most important type of subject matter knowledge or experience required to do the work.
- ***Reason for existence.*** The primary purpose of the position or management's intent in establishing the position is a positive indicator for determining the appropriate series.
- ***Organizational mission and/or function.*** Positions generally align with the mission and function of the organization to which they are assigned. The organization's function is often mirrored in the organizational title and may influence the appropriate series.
- ***Recruitment source.*** Supervisors and managers can help by identifying the occupational series that provide the best qualified applicants to do the work. This is closely related to the paramount knowledge required.

For further guidance, refer to **The Classifier's Handbook.**

INFORMATION BY SERIES IN NUMBER ORDER	
Physical Science Technician, GS-1311	• Series Definition • Titling • Occupational Information
Hydrologic Technician, GS-1316	• Series Definition • Titling • Occupational Information
Meteorological Technician, GS-1341	• Series Definition • Titling • Occupational Information
Cartographic Technician, GS-1371	• Series Definition • Titling • Occupational Information
Geodetic Technician, GS-1374	• Series Definition • Titling • Occupational Information

PHYSICAL SCIENCE TECHNICIAN, GS-1311

Qualification Standards

Definition

This series covers one-grade interval technical positions that supervise, lead, or perform nonprofessional work in the physical sciences that is not specifically included in other technical series in the Physical Sciences Group. Physical science technicians perform technical work in such fields as astronomy, chemistry, geology, physics, geophysics, health physics, metallurgy, and oceanography for which a specific technician series has not been established. Work in this series does not require full professional knowledge equivalent to that represented by completion of a bachelor's degree in a physical science field.

Titling

The basic title for all positions in this series is ***Physical Science Technician***.

Occupational Information

General Occupational Information

Physical science technicians gather data on such phenomena as ocean currents, earthquakes, floods, climatic changes, geomagnetic patterns, and solar occurrences. They support scientists and engineers in the laboratory and in the field by collecting data and by helping refine and test methods and equipment for scientific studies, operational programs, and basic and applied research. Experienced technicians may devise novel approaches to problems and situations.

Physical science technicians use many types of equipment and instruments to collect, prepare, and/or analyze samples of rocks, ice cores, soil, minerals, meteorites, air, water, etc. They record observations and gather data personally, via operatives in the field, and from remote locations via automated systems. They monitor information obtained in real time or periodically via automated systems.

Technicians sometimes install, monitor, and ensure that equipment, power sources, and data transmission/recording systems are functional. They test equipment and review data for conformance with expected results and/or the presence of anomalies.

In laboratories physical science technicians conduct analyses to determine qualitative and/or quantitative information regarding the physical and chemical properties of samples and data.

Other physical science technicians collect field samples and data such as paleontology specimens; naturally or induced seismic data; rock, clay, or soil samples; and data describing characteristics of the earth or the heavens. They compile and reduce data for use in reports and to support further scientific work.

Analytical instrumentation has become increasingly more sophisticated in terms of measurement sensitivity and selectivity. Physical science technicians often have many options to choose from in selecting and applying the appropriate tools for assignments.

Some physical science technicians work in the health physics field. They detect, contain, and control exposure to hazardous substances and document the impact of such exposure; e.g., they carry out industrial radiological control work in the fields of industrial hygiene, medicine, and the health sciences. They perform radiological control work in support of engineering and maintenance of nuclear reactors, propulsion systems, and power plants.

Other technicians working in health physics gather information on the effect of non-radiological materials on worker safety in engineering, trades, and crafts environments. These are the technicians who monitor for polyvinylchloride, asbestos, mercury, and other dangerous substances. In these situations, the technicians must be aware of and take precautions against possible harm to individuals and/or the environment. Under certain emergency or test conditions, positions at higher levels include authority to:

- assess abnormal work situations and stop work to ensure safety; and
- take immediate, independent action to contain, control, and minimize exposure.

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HYDROLOGIC TECHNICIAN, GS-1316

Qualification Standards

Definition

This series covers one-grade interval technical positions that supervise, lead, or perform nonprofessional work that requires practical knowledge of the methods, procedures, and instrumentation used in hydrologic studies. Hydrologic technicians gather information on the quantity, quality, availability, movement, and distribution of ground water and surface water. They also evaluate water samples and data, prepare reports, and carry out related duties that support professional work in hydrology. Work in this series does not require full professional knowledge equivalent to that represented by completion of a bachelor's degree in hydrology.

Titling

The basic title for all positions in this series is ***Hydrologic Technician***.

Occupational Information

General Occupational Information

Hydrologic technicians primarily perform work in the following functions. They:

- gather hydrologic data concerning the quantity, quality, availability, movement, and distribution of surface and ground water;
- measure surface water discharge and/or ground water levels;
- install, adjust, inspect, and service crest stage indicators, well recorders, and other instruments in connection with other technical work to collect and ensure reliable data concerning surface and ground water;
- compute and process data used to track and forecast river stages, calculate sediment loads, and determine levels of pollution;
- develop climatological and hydrologic data for current or proposed engineering projects; and
- calculate water surface profiles resulting from routing hypothetical floods through controlled river systems and reservoirs.

Hydrologic technicians gather hydrologic data and perform tests and calculations in the field, in the laboratory, and in the office. In the field, hydrologic technicians perform approximate computations to ensure that they obtain good statistical data. When they find deviations, they determine the cause and correct methods or repair instrumentation whenever possible. They observe and record conditions and circumstances that may affect the data and perform inspection and maintenance of data collection devices. Some data collection devices are in remote locations. The technician must exercise ingenuity and initiative in order to obtain valid data. This may require:

- clearing away debris and rocks in a section of a stream in order to obtain accurate measurements during low flows;
- participating in the design and installation of test wells using knowledge of seasonal fluctuations in water levels and influence of nearby wetlands on water quality;
- constructing shelters to protect equipment;
- installing or maintaining solar collectors and/or batteries needed to gather or communicate relevant data; and
- removing sediment from behind weirs used to measure stream flow to prevent deposits from affecting data reliability.

In the office, processing data requires more than inserting measurements into a formula and doing a simple mathematical calculation to arrive at an answer. The technician must take into account the field environment and conditions that may have influenced the data collection. The technician interprets field notes, selects data, takes into account distortions such as heavy debris buildup, and discards unreliable data.

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METEOROLOGICAL TECHNICIAN, GS-1341

Qualification Standards

Definition

This series covers one-grade interval technical positions that supervise, lead, or perform nonprofessional work in weather forecasting, observation, documentation, research, or other areas of meteorology. Meteorological technicians observe and analyze weather elements or predict the effects of weather in the atmosphere and on the earth's surface. This requires practical knowledge of meteorological equipment, principles, and methods, as well as skill in collecting data, making observations, forecasting weather, and verifying data. Work in this series does not require full professional knowledge equivalent to that represented by completion of a bachelor's degree in meteorology.

Titling

The basic title for this occupation is ***Meteorological Technician***.

Occupational Information

General Occupational Information

Meteorological technicians perform technical work in weather forecasting, climatology, and research support. Their work is primarily concerned with observing and analyzing weather elements or predicting weather's effect in the atmosphere and on the earth as it relates to practical concerns such as flight conditions, water craft safety, and potentially hazardous weather.

Many meteorological technicians provide weather observation and forecasting services to the public, as well as to civilian government and military organizations. These services typically require knowledge of forecasting and weather analysis procedures. Services include providing aviation briefings, severe weather warnings, local weather advisories and forecasts, and other meteorological support. Meteorological technicians make observations through several types of instrumentation, such as radar, satellite and other sensory and telemetry devices and instruments. Quality control of forecasting and meteorological data requires knowledge of micrometeorology, particularly the effect of the local environment on atmospheric parameters. Meteorological technicians acquire senior-level knowledge through study, training, and years of on-site observation of the nuances of localized weather phenomena in relation to the larger meso scale features.

Meteorological technicians perform many different types of assignments. In addition to typical forecasting, which has become increasingly automated, they perform a variety of support duties in meteorological research. Some meteorological technicians participate with senior professional program officials to establish, operate, and improve data acquisition programs, systems, and instrumentation. Others collect, analyze, interpret, and archive climatological or other historical weather data. They record meteorological data on maps, charts, and in databases. Certain other meteorological technicians specialize in verifying and correcting meteorological data and records in order to ensure their quality, accuracy, and utility.

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CARTOGRAPHIC TECHNICIAN, GS-1371

Qualification Standards

Definition

This series covers one-grade interval technical positions that supervise, lead, or perform nonprofessional work that requires a practical knowledge of the processes, practices, methods, and techniques involved in constructing new or revised maps, charts, and related cartographic products. Cartographic technicians supervise or perform precompilation tasks such as reviewing source materials, extending basic geodetic control networks, and providing input for plotting map projections and collars. In addition, they perform drafting, digitizing, integrating, and editing/reviewing in connection with cartographic products, and may carry out stereoscopic photogrammetric and/or monoscopic compilation. Work within this series does not require full professional knowledge equivalent to that represented by completion of a bachelor's degree in cartography or a related science.

Titling

The basic title for this occupation is ***Cartographic Technician***.

Occupational Information

General Occupational Information

The major change in the cartographic field is the use of advanced information/computer technology. Prior to the conversion to digital data and computers, hard copy originals were mostly generated by hand from aerial photographs and ground survey data. Cartographic line work was scribed on large sheets of translucent vinyl. All cartographic information was shown graphically on film separations or plates. Cartographic data was collected by means of analog or mechanical instrumentation and compiled or revised by hand, using such techniques as inking or scribing.

The skills needed to carry out hand scribing were hand-eye coordination, dexterity, and a degree of artistic ability. In the past, cartographic technicians also applied mechanical skill and mathematical ability to use stereoanalog-mapping instrumentation and aerotriangulation. Computer applications have replaced outdated methods. New technology enables cartographic technicians to shift from stereoanalog mapping instruments to digital methods conducted at computer workstations. This change requires the technician to know how to access and organize computer files, and to structure digital data. Skill in drafting and scribing is seldom required. Cartographic technicians use computers to convert digital data into maps and other graphic forms. Digital data is stored in large databases, on digital tapes, and/or on computers. Cartographic technicians compile new and revised digital data at computer workstations to produce cartographic products using software designed specifically for that purpose. In addition to knowing how to portray information on topographic maps, today's cartographic technician must also know how to combine soft-copy and digital methods.

Digital based mapping allows greater accuracy of image interpretation. Using multi-temporal digital satellite imagery, cartographic technicians can compare images to identify changes over time such as crop-land pasture, summer fallow, and permanent pasture. Using various data layers it is possible to even identify crop-specific land areas.

Advances in the capability of computers to process and hold larger amounts of data will continue to expand the ways to present and transmit data. Cartography is moving away from standard products and toward developing user-defined products. The types of cartographic products are evolving through the use of computers, advanced software, and techniques associated with the Geographic Information System (GIS), the Global Positioning System (GPS), and advances in remote sensing technology.

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GEODETIC TECHNICIAN, GS-1374

Qualification Standards

Definition

This series covers one-grade interval technical positions that supervise, lead, or perform nonprofessional work that involves analyzing, evaluating, processing, computing, and selecting geodetic survey data. These positions require a practical knowledge of the principles and techniques of geodesy particularly as they relate to the identity, reliability, and usefulness of geodetic control data. Work in this series does not require professional knowledge equivalent to that represented by completion of a bachelor's degree in geodesy.

Titling

The basic title for this occupation is ***Geodetic Technician***.

Occupational Information

General Occupational Information

Geodetic technicians collect and process data that they obtain by measuring distances, elevations, areas, angles, and other characteristics and phenomena of the earth's surface. They use data to develop the geometric description of areas of the earth used in cartography, engineering, and navigation. The work requires an understanding of mathematical methods and survey processes.

Geodetic technicians categorize coordinates by the level of accuracy referred to as the "order" of a point. Orders are often subdivided further by a "class" designation. Geodetic technicians assign an order and a class to the data coordinates for a station (a defined reference point) based on the accuracy of measurements of the reference or control point.

Geodetic technicians must make precise measurements in order to establish control networks that relate to identifiable control points. The combination of survey design, instrumentation, adjustment procedures, observation techniques, and data reduction methods is known as a measurement system. When a technician submits a survey for inclusion into the national network, the survey measurements are processed using quality control procedures that lead to their classification of accuracy and storage in the National Geodetic Survey database.

The rapidly growing use of the Global Positioning System (GPS) for geodetic surveying has changed the field of geodetic measuring. GPS satellite surveying is based on observations of the radio signals of the NAVSTAR Global Positioning System. The GPS observations are processed to determine station positions in Cartesian coordinates (X, Y, Z) which can be converted to geodetic coordinates (latitude, longitude, and height-above-reference ellipsoid). While GPS is rapidly becoming one of the primary tools, GPS does not work under certain environments such as in buildings, under trees, in steep canyons, and near tall buildings. Under these types of conditions, traditional, line-of-sight technology must be used.

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IMPACT OF AUTOMATION

Automation and computer technology greatly affect the way physical science products and services are developed and delivered. Technicians use computers to perform a wide variety of tasks. They initiate and track projects, obtain up-to-date data, and generate reports. They input, store, and retrieve data in multiple formats. They use the Web to search for information pertaining to assignments.

Although technicians use computers to perform basic work processes, knowledge of the rules and processes in performing the work remains the paramount subject matter knowledge required. The kind of automation tools involved, and the skill required to use them, generally replace or supplement work methods and techniques previously performed through manual or machine enhanced processes. These positions may require knowledge of the applications of information technology (IT) to the assignment area and skill in the use of IT software and hardware systems, but the positions are not directly involved in developing, delivering, or supporting IT systems, applications, and services. In many cases, a technician with knowledge and skill in the use of IT systems may be regarded as the IT "expert" in the immediate organization and relied on by coworkers for guidance and assistance in applying the IT systems to an assignment. Although technicians in this job family use computers to facilitate their work, the use of automation does not change the primary purpose of their work. Proper classification of positions within this and other technical occupations is based on the most relevant type of knowledge required to perform the primary duties of the position–in this instance, those duties directly related to physical science, hydrology, meteorology, cartography, or geodesy.

Illustrations of how IT has impacted work process in this JFS are the products and information recorded and presented using Geographic Information System (GIS) technology. Current applications of GIS are wide ranging and are applicable to many different scientific and engineering disciplines, as well as to law enforcement, medical research, and governmental activities for efforts such as:

- controlling urban sprawl;
- planning infrastructure and transportation systems;
- enhancing economic development;
- gauging the status and demographic trends in species of flora and fauna;
- depicting subsurface geologic formations and mineral deposits;
- defining the location and the three-dimensional boundaries of archeological sites; and
- mapping visible natural and man-made surface features, as well as invisible phenomena such as geomagnetic patterns and naturally occurring radioactivity.

The knowledge of the procedures, content, and retrieval methods applicable to GIS is secondary to the principal knowledge essential to the work of occupations covered in this JFS.

CROSSWALK TO THE STANDARD OCCUPATIONAL CLASSIFICATION

The Office of Management and Budget requires all Federal agencies that collect occupational data to use the Standard Occupational Classification (SOC) codes for statistical data reporting purposes. The Bureau of Labor Statistics will use SOC codes for National Compensation Survey and other statistical reporting. The Office of Personnel Management (OPM) and agencies will develop and maintain the "crosswalk" between the Federal occupational series and the SOC codes to serve this need. These SOC codes and this requirement have no effect on the administration of any Federal human resources management systems. The information contained in this table is for information only and has no direct impact on the classification of positions covered by this job family standard. The SOC codes shown here generally apply only to nonsupervisory positions in these occupations. As changes occur to the SOC codes, OPM will update this table. More information about SOC is available at **http://stats.bls.gov/soc**.

Federal Occupational Series and Position Titles and Their Related Standard Occupational Classification System Codes

Occupational Series	Standard Occupational Classification Code Based on Occupational Series		Position Title	Standard Occupational Classification Code Based on Position Title	
Physical Science Technician, GS-1311	19-4099	Life, Physical, and Social Science Technicians, All Other	Physical Science Technician	19-4099	Life, Physical, and Social Science Technicians, All Other
Hydrologic Technician, GS-1316	19-4099	Life, Physical, and Social Science Technicians, All Other	Hydrologic Technician	19-4099	Life, Physical, and Social Science Technicians, All Other
Meteorological Technician, GS-1341	19-4099	Life, Physical, and Social Science Technicians, All Other	Meteorological Technician	19-4099	Life, Physical, and Social Science Technicians, All Other
Cartographic Technician, GS-1371	17-3031	Surveying and Mapping Technicians	Cartographic Technician	17-3031	Surveying and Mapping Technicians
Geodetic Technician, GS-1374	17-3031	Surveying and Mapping Technicians	Geodetic Technician	17-3031	Surveying and Mapping Technicians

EXCLUSIONS

Although some positions may include work requiring technical physical science, hydrology, meteorology, cartography, or geodetic knowledge and skills, classification to a series in the Physical Sciences Group, GS-1300, may not be appropriate. To select the appropriate series, you must determine the paramount knowledge; i.e., the most important subject-matter knowledge required to perform the primary duties of the position. To determine the paramount knowledge, you must also consider the primary purpose for the position's existence, the most important qualification(s) required, recruitment sources, career progression, and the background knowledge required. The following table provides examples of situations where the work may involve the application of related knowledge and skills, but not to the extent that it may warrant classification to a series in this job family.

NOTE: In the table below, job family standard is abbreviated as JFS.

If….	**See This Standard or Series Definition:**
1. Work involves applying professional knowledge in one or more two-grade interval professional physical science fields.	GS-1300P, JFS for Professional Physical Science Work
2. Work involves applying technical, one-grade interval knowledge in a biological or agricultural science to support conservation, production, research, operations, or program administration.	GS-0404, Biological Science Technician GS-0421, Plant Protection Technician GS-0455, Range Technician GS-0458, Soil Conservation Technician GS-0462, Forestry Technician
3. Work involves applying one-grade interval technical knowledge of clinical laboratory testing, test-result confirmation, or medical research data collection and development.	GS-0645, Medical Technician GS-0646, Pathology Technician GS-0647, Diagnostic Radiologic Technologist GS-0648, Therapeutic Radiologic Technologist GS-0704, Animal Health Technician
4. Work involves applying one-grade interval technical knowledge of land surveying to determine distances, elevations, angles, and land boundaries.	GS-0817, Surveying Technician

(continued)

EXCLUSIONS (continued)

If….	See This Standard or Series Definition:
5. Work involves applying one-grade interval technical and practical knowledge of the methods and practices of one or more areas of engineering, when such knowledge is paramount. Note: Do not exclude positions that entail duties such as participating in designing test wells or installing data sensors and communications devices if those duties are incidental to the primary physical science responsibilities.	GS-0802, Engineering Technician GS-0856, Electronics Technician
6. Work involves applying one-grade interval technical knowledge to carry out statistical or mathematical support functions or to collect and interpret numerical data.	GS-1521, Mathematics Technician GS-1531, Statistical Assistant
7. Work involves applying two-grade interval administrative knowledge of information technology (IT) principles, concepts, and methods to develop, deliver, and support IT systems and services used in collecting or analyzing physical science data and/or samples when such duties are primary.	JFS for Administrative Work in the Information Technology Group, GS-2200
8. Work involves applying Federal Wage System knowledge of the methods used to install, upgrade, adjust, and/or repair equipment including navigational, sensing, communication, telemetry, systems control, and measuring equipment when work is not performed in conjunction with the primary duties of collecting and analyzing physical science data or samples.	2602, Electronic Measurement Equipment Mechanic 2604, Electronics Mechanic 2610, Electronic Integrated Systems Mechanic
9. Work involves applying Federal Wage System knowledge of setting up, operating, and adjusting nondestructive test equipment and evaluating or interpreting test results in a maintenance or production facility.	3705, Nondestructive Testing
10. Work involves applying Federal Wage System knowledge of the methods used to adjust or repair medical equipment when work is not performed in conjunction with the primary duties of collecting, recording, and/or analyzing physical science data or samples.	4805, Medical Equipment Repairing 2604, Electronics Mechanic
11. Work involves applying Federal Wage System knowledge in order to operate a wastewater treatment plant, water treatment plant, or fuel distribution facility that requires limited physical science testing in conjunction with the primary operational duties.	5408, Wastewater Treatment Plant Operating 5409, Water Treatment Plant Operating 5413, Fuel Distribution System Operating

HOW TO USE THESE GRADING CRITERIA

Evaluate positions on a factor-by-factor basis using the factor level descriptions (FLDs) provided in this standard. Compare each factor in the position description to the appropriate FLDs and illustrations. If the factor information in the position description fully matches an FLD for the series, you may assign the level without reviewing the illustrations. FLDs are progressive or cumulative in nature. For example, each FLD for Factor 1 – Knowledge Required by the Position encompasses the knowledge and skills identified at the previous level. Use only designated point values. Record the results of your analysis on the Position Evaluation Summary form on the next page. Convert total points for all factors to grade levels using the grade conversion table that follows the FLDs.

The grading criteria in this standard provide occupation-specific illustrations as a frame of reference for applying factor level concepts. Do not rely solely on the illustrations in evaluating positions, because they reflect a limited range of actual work examples. Use the illustrations to gain insights into the meaning of the grading criteria in the FLDs. Consider each illustration in its entirety and in conjunction with the FLDs in your analysis, and do not merely use a selected portion of an illustration taken out of context as evidence of a match. The level of work described in some illustrations may be higher than the threshold for a particular factor level. If the factor information in the position description you are evaluating fails to fully match a relevant illustration, but does fully match the FLD, you may still assign the level.

The FLDs in this standard cover nonsupervisory positions at grades GS-4 through GS-12 (even though technician work at the GS-12 grade level is rare). Evaluate supervisory and leader positions by applying the appropriate guide.

Normally, you will evaluate technician positions only against standards for technician work. The qualifications required for technician work are so different from those required for professional work that the distinctions have a marked impact on grade level. Cross-reference to a professional position classification standard is only appropriate in those rare cases where (1) the technician applies analytical and theoretical knowledge approaching that used to carry out work in a professional field; ***and*** (2) the nature of the technician's duties is comparable to that of professional positions covered by the referenced standard in terms of function, outcomes, and responsibility. If you determine that it is necessary to cross-reference a professional standard to evaluate a technician position above the grading criteria in this standard, you must consider the professional standard in its entirety. Do not apply individual factors out of context.

You will find more complete instructions for evaluating positions in the following OPM publications: **Introduction to the Position Classification Standards** and The **Classifier's Handbook**.

POSITION EVALUATION SUMMARY

Organization _____

Position # _____

Evaluation Factors Standards Used	Factor Level Used (FL#, etc.)	Points Assigned	Comments
1. Knowledge Required by the Position			
2. Supervisory Controls			
3. Guidelines			
4. Complexity			
5. Scope and Effect			
6/7. Personal Contacts and Purpose of Contacts			
8. Physical Demands			
9. Work Environment			
SUMMARY **Total Points**			
Grade Conversion			

Additional Remarks:

Title, Series, and Grade Assigned:

_____

Date: _____

Agencies may copy for local use.

FACTOR LEVEL DESCRIPTIONS

FACTOR 1 – KNOWLEDGE REQUIRED BY THE POSITION

Factor 1 measures the nature and extent of information or facts that an employee must understand to do acceptable work (e.g., steps, procedures, practices, rules, policies, theories, principles, and concepts) and the nature and extent of the skills necessary to apply that knowledge. You should only select a factor level under this factor when the knowledge described is required and applied.

NOTE: In the tables below, factor level description is abbreviated as FLD.
Factor 1 illustrations are located in Appendix F1.

Level 1-3 — 350 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Knowledge of, and skill in applying:

- standardized rules, procedures, or operations that require a considerable level of training and experience; and
- routine laboratory or field procedures, technical principles, and practices

sufficient to:

- make operational adjustments to a variety of instruments and equipment; and
- apply procedures to:
  - collect samples and/or routine information; and
  - carry out standardized tests and/or operations.

Level 1-4 — 550 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- adjust instrumentation or equipment when this requires considering the functioning characteristics of equipment;
- carry out data collection and analyses to include recognizing unusual or unexpected results;
- interpret results or note observations, in contrast to merely reading instruments or gauges; and
- select, extract, collect, and compile information from various sources when this requires taking into account the applicability of information, as well as the characteristics and quality of the sources.

Level 1-5 — 750 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Knowledge of, and skill in applying, principles, procedures, requirements, and work techniques of basic operations and various analytical or metallurgical instrumentation sufficient to carry out most of the following:

- conduct, monitor, coordinate, and control various phases of projects or operations;
- operate instrumentation and peripheral microcomputers;
- identify and correct operational malfunctions;
- adapt procedures when unexpected observations occur;
- assess and overcome unanticipated situations and conditions;
- ensure compliance with rules or regulatory requirements;
- recommend improved procedures;
- identify and correct deficiencies; and
- determine the adequacy of control procedures.

Level 1-6 — 950 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Knowledge of, and skill in applying, the principles, procedures, requirements, and work techniques of the full range of advanced operations, instrumentation, and practices sufficient to:

- compile data from multiple sources and analyze results of field data, laboratory data, and/or literature search;
- recognize and resolve deviations in data;
- generate, assemble, and edit data through various test platforms by:
  – interpreting a variety of computer- or instrument-generated data;
  – using complex chemical analyses; or
  – refining and applying algebraic, geometric, trigonometric, or statistical algorithms or models;
- organize information and interpret results; and
- prepare data and results for inclusion in scientific briefings, study papers, research manuscripts, or project reports.

Level 1-7 — 1250 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Comprehensive, intensive, practical knowledge of, and extensive experience and skill in applying, the scientific principles of geophysics, hydrology, geology, chemistry, physics, and/or other physical science disciplines, together with related emerging practices and methods, sufficient to:

- analyze and evaluate highly complex scientific specimens and data; and
- develop new methods, approaches, or procedures.

Note: While technicians at this level often apply theoretical knowledge drawn from professional scientific disciplines, such as geology, paleontology, physics, and chemistry, the paramount requirement in technician work is comprehensive, practical knowledge of relevant scientific principles, together with expertise in refining and developing analytical techniques, methods, and approaches.

FACTOR 2 – SUPERVISORY CONTROLS

This factor covers the nature and extent of direct or indirect controls exercised by the supervisor or another individual over the work performed, the employee's responsibility, and the review of completed work. The supervisor determines what information the employee needs to perform the assignments; e.g., instructions, priorities, deadlines, objectives, and boundaries. The employee's responsibility depends on the extent to which the supervisor expects the employee to develop the sequence and timing of the various aspects of the work, to modify or recommend modification of instructions, and to participate in establishing priorities and defining objectives. The degree of review of competed work depends upon the nature and extent of the review; e.g., close and detailed review of each phase of the assignment; detailed review of the competed assignment; spot check of finished work for accuracy; or review only for adherence to policy. The primary components of this factor are: **How Work Is Assigned, Employee Responsibility,** and **How Work Is Reviewed**.

NOTE: In the tables below, factor level description is abbreviated as FLD.

Level 2-1 — 25 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

How Work Is Assigned – The supervisor or designated employee:

- makes specific assignments; and
- provides clear, detailed oral and/or written instructions for all tasks.

Employee Responsibility – The employee:

- performs the work as instructed; and
- consults with supervisor or designated employee on matters not clearly understood or not specifically covered in the original instructions, guides, or texts.

How Work Is Reviewed – The supervisor or designated employee closely controls, observes, and reviews work at various stages and upon completion for accuracy, thoroughness, and adherence to instructions.

Level 2-2 — 125 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

How Work Is Assigned – The supervisor or designated authority provides:

- general information regarding what should be done;
- quality and quantity expected;
- priorities and deadlines; and
- specific instructions on new, difficult, or unusual assignments.

Employee Responsibility – The employee:

- works independently on recurring assignments;
- makes needed adjustments to accommodate minor deviations; and
- refers unfamiliar situations and problems to the supervisor or designated employee.

How Work Is Reviewed – The supervisor or designated employee reviews finished work for technical accuracy, thoroughness, and methods used.

Level 2-3 — 275 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

How Work Is Assigned – The supervisor:

- defines objectives, priorities, and deadlines; and
- only helps the employee with unprecedented problems or situations.

Employee Responsibility – The employee independently:

- plans the steps needed to accomplish assignments and carries out assignments;
- selects among alternative procedures to produce desired results; and
- solves common technical or procedural problems in accordance with experience, training, or accepted practices.

How Work Is Reviewed – The supervisor or designated employee:

- reviews completed work for technical soundness without reviewing the methods used; and
- validates findings based on theoretical considerations.

Level 2-4 — 450 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

How Work Is Assigned – The supervisor makes assignments by outlining the overall objectives and the resources available. The employee and supervisor, in consultation, discuss time frames, possible approaches, and scope of assignments including possible stages.

Employee Responsibility – By applying physical science concepts and methods, together with knowledge of program characteristics and requirements, the employee:

- independently plans and carries out the assignments;
- guides less experienced coworkers;
- resolves most of the problems and conflicts that arise;
- coordinates the work with others;
- interprets policy and regulatory requirements;
- develops changes to plans and/or procedures;
- provides recommendations for more significant improvements in order to meet project objectives; and
- keeps the supervisor informed of progress and potential controversies such as major barriers to completing projects due to equipment problems, the need for additional resources, etc.

How Work Is Reviewed – The supervisor reviews completed work for soundness of overall approach, effectiveness in meeting requirements or expected results, and feasibility of recommendations.

FACTOR 3 – GUIDELINES

This factor covers the nature of guidelines and the judgment employees need to apply them. Individual assignments may vary in the specificity, applicability, and availability of guidelines; thus the judgment employees use similarly varies. The existence of detailed plans and instructions may make innovation in planning and conducting work unnecessary or undesirable. However, in the absence of guidance provided by prior agency experience with the task at hand or when objectives are broadly stated, the employee may use considerable judgment in developing an approach or planning the work. Here are examples of guidelines used in technical work in the Physical Sciences Group, GS-1300:

- industry and international standards;
- agency policies and operational procedures;
- legislation and regulations covering program operations;
- equipment user manuals;
- agency-developed handbooks, manuals, and instructions;
- basic textbooks covering the concepts and practices of the assigned physical science discipline;
- records serving as models or establishing precedents; and
- administrative requirements.

Do not confuse guidelines with the knowledge described under Factor 1 – Knowledge Required by the Position. Guidelines either provide reference data or impose certain constraints on applications. For example, in some of the functional areas covered by this standard, there may be several generally accepted methods of accomplishing work, perhaps set forth in an agency operating manual. However, in a particular facility, the policy may be to use only one of those methods; or the policy may state specifically under what conditions the facility may use each method. The primary components of this factor are: **Guidelines Used** and **Judgment Needed**.

NOTE: In the tables below, factor level description is abbreviated as FLD.

Level 3-2 — 125 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

Guidelines Used – The employee uses written technical, procedural guidelines that are clear, straightforward, require little interpretation, and allow for only minor deviations. Such guidelines include:

- technical manuals;
- equipment/instrument handbooks;
- diagrams and drawings;
- standard operating procedures; and
- Federal or agency regulations.

Judgment Needed – The employee uses judgment to:

- select the most appropriate guidelines to apply; and
- make minor adaptation to adjust for specific conditions such as sample size, unexpected field conditions, and changes in equipment or instrumentation.

Level 3-3 — 275 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

Guidelines Used – The employee uses guidelines that have gaps in specificity and are not applicable to all work situations. These guidelines consist of:

- standard instructions;
- agency or local policies and regulation;
- manufacturer handbooks and catalogs; and
- precedents and standard practices in the area of the assignment, discipline, or field.

Judgment Needed – The employee selects the most appropriate guideline and decides how to complete the work. Guidelines often have gaps or lack specificity. The employee uses judgment to:

- explore situations where guidelines are vague by initiating discussions or literature searches;
- adapt guidelines;
- modify approaches to accommodate variable combinations of conditions; and
- recommend minor changes to improve work processes or quality of results.

Level 3-4 — 450 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

Guidelines Used – The employee uses operating policies that are generalized. Precedents and guidelines are scarce or of limited use in dealing with the more complex or unusual assignments. Guidelines include such references as:

- scientific publications;
- articles and information from professional journals;
- established test parameters and required measurements;
- laboratory notes pertaining to new processes; and
- literature on emerging procedures, experimental equipment, or new technology.

Judgment Needed – The employee uses initiative and judgment to:

- deviate from traditional methods in carrying out assignments and solving problems; and
- develop new methods or criteria, such as those required to accommodate novel variables or to complete prototype projects.

FACTOR 4 – COMPLEXITY

This factor covers the nature, number, variety, and intricacy of tasks, steps, processes, or methods in the work performed; the difficulty in identifying what needs to be done; and the difficulty and originality involved in performing the work. The primary components of this factor are**: Nature of Assignment, What Needs To Be Done,** and **Difficulty and Originality Involved**.

NOTE: In the tables below, factor level description is abbreviated as FLD.
Factor 4 illustrations are located in Appendix F4.

Level 4-2 — 75 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Nature of Assignment – Work consists of related steps, processes, and methods such as performing and recording instrument readings, analyses, and tests that can usually be accomplished by applying established methods and procedures.

What Needs To Be Done – The employee chooses from several standard data collection processes to:

- collect samples, such as samples of soil, surface water, ground water, and rocks;
- prepare samples for analyses;
- conduct recurring analyses and/or tests; and
- record instrumentation readings or results of analyses manually or in automated data systems.

Difficulty and Originality Involved – The employee:

- determines and plans the sequence of standardized tests; and
- may refer samples to a higher-grade employee for further analysis.

Level 4-3 — 150 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Nature of Assignment – Work consists of a number of different and unrelated processes that are precise and exacting. The employee coordinates and plans the phases of assignments and selects the method or approach that will best accomplish the task.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- adjust or deviate from standard work methods based on situations and conditions at a field site; and
- perform data reduction and analysis using mathematical computations, plot charts, and other technical methods.

Difficulty and Originality Involved – The employee follows well-established work methods but typically uses independent judgment to adjust the methods and resolve problems.

Level 4-4 — 225 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Nature of Assignment – Work consists of a variety of complex assignments that require ingenuity and technical skill to adapt established procedures, methods, and techniques for use in new applications or situations.

What Needs To Be Done – The employee selects appropriate instrumentation to obtain valid results based on field conditions and instrument responses during their operation. The employee decides what needs to be done by assessing:

- unusual circumstances;
- variations in approach; and
- incomplete or conflicting data.

Difficulty and Originality Involved – The employee determines the appropriate methods concerning such things as:

- developing work plans;
- interpreting considerable data; and/or
- refining methods and techniques.

FACTOR 5 – SCOPE AND EFFECT

This factor covers the relationships between the nature of work; i.e., the purpose, breadth and depth of the assignment and the effect of work products or services both within and outside the organization. Effect measures such things as whether the work output facilitates the work of others, provides timely services of a personal nature, or impacts on the adequacy of research conclusions. The concept of effect alone does not provide sufficient information to properly understand and evaluate the impact of the position. The scope of the work completes the picture allowing consistent evaluations. Only consider the effect of properly performed work. The primary components of this factor are: **Scope of the Work** and **the Effect of the Work.**

NOTE: In the tables below, factor level description is abbreviated as FLD.
Factor 5 illustrations are located in Appendix F5.

Level 5-2 — 75 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Scope of the Work – Work involves executing specific tasks and procedures. Tasks typically comprise a complete segment of an assignment or a project of broader scope.

Effect of the Work – Work affects the accuracy and reliability of further processes, services, or plans.

Level 5-3 — 150 Points

Series

Physical Science Technician	**GS-1311**	Illustration(s)	**Cartographic Technician**	**GS-1371**	Illustration(s)
Hydrologic Technician	**GS-1316**	Illustration(s)	**Geodetic Technician**	**GS-1374**	Illustration(s)
Meteorological Technician	**GS-1341**	Illustration(s)			

FLD

Scope of the Work – Work involves using established criteria, including newly developed procedures, to collect, analyze, compile, and interpret data to resolve conventional problems, questions, or situations.

Effect of the Work – Work directly affects:

- the consistent quality and accuracy of data;
- the reliability of the analyses and interpretation of field and laboratory data for evaluations and theoretical projections; and/or
- the work of scientists, engineers, or other higher-grade employees who rely on data for studies, research, or publication.

FACTOR 6 – PERSONAL CONTACTS AND FACTOR 7 – PURPOSE OF CONTACTS

These factors include face-to-face and remote dialogue – e.g., telephone, email, and videoconferences – with persons not in the supervisory chain. (NOTE: Personal contacts with supervisors are under Factor 2 – Supervisory Controls.) The levels of these factors consider/take into account what is required to make the initial contact, the difficulty of communicating with those contacted, the setting in which the contact takes place, and the nature of the discourse. The setting describes how well the employee and those contacted recognize their relative roles and authorities. The nature of the discourse defines the reason for the communication and the context or environment in which the communication takes place. For example, the reason for a communication may be to exchange factual information or to negotiate. The communication may take place in an environment of significant controversy and/or with people of differing viewpoints, goals, and objectives.

Above the lowest levels, credit points under Factors 6 and 7 only for contacts that are essential for successful performance of the work and that have a demonstrable impact on the difficulty and responsibility of the work performed. Factors 6 and 7 are inter-dependent. Accordingly, use the same personal contacts for selection of both the Factor 6 and the Factor 7 levels.

Determine the appropriate level for Personal Contacts and the corresponding level for Purpose of Contacts. Obtain the point value for these factors from the intersection of the two levels as shown on the **Point Assignment Chart** at the end of this section.

PERSONAL CONTACTS	
Physical Science Technician GS-1311 **Hydrologic Technician GS-1316** **Meteorological Technician GS-1341** **Cartographic Technician GS-1371** **Geodetic Technician GS-1374**	
Level 1	Other employees at the immediate worksite or related units within the agency involved in data collection and analysis. Contacts at this level are routine and recurring.
Level 2	Employees in the same agency, both inside and outside the immediate organization, or related offices and units. Contacts with others outside the immediate organizational unit and the general public are in moderately structured settings. Examples: • representatives of other Federal and state agencies using data; • landowners who have agreed to have data collection platforms on their property; • local users of weather forecasts; • employees of private or university laboratories; • questions from the general public through email, letters and phone inquiries; or • pilots, plane crews, harbormasters, or captains of U.S. and NATO ships requesting weather forecasts and advisories.
Level 3	Contacts are with individuals and groups from outside the employing office where contacts are neither routine or recurring. The role and authority of each party must be established and developed during the course of each contact. Examples: • contractors; • attorneys; and • representatives of public action groups.

PURPOSE OF CONTACTS	
Physical Science Technician GS-1311 **Hydrologic Technician GS-1316** **Meteorological Technician GS-1341** **Cartographic Technician GS-1371** **Geodetic Technician GS-1374**	
Level A	To acquire or exchange information or facts needed to complete an assignment. The information may range from basic procedures to general policy. Contacts at this level are directly related to recurring functions.
Level B	To plan, arrange, or coordinate assignments by influencing others who are basically cooperative. Employees arrange for interviews and meetings to discuss matters such as: the significance of guidelines; the appropriateness of recommendations and the necessity for additional facts; and the preferred course of action, including preferred methods of data gathering. They resolve problems related to assignment of responsibility, coordinate the technical support of subject-matter experts, and, in general, resolve questions and clarify problems. For example: • Contact customers and the public to: – explain methods or procedures used in various studies, – interpret data, or – obtain permission for access to private property. • Meet with test directors and project managers, contractors, engineers, and personnel from countries involved in testing to coordinate parameters of tests, type of measurement required, and type of equipment to collect data. • Direct field data collection and coordinate work of the crew. Obtain verbal or written permits to install survey markers on private or public property, explaining the research and usage conditions. Interpret data while in the field and resolve operating problems such as inaccurate, incomplete or irrelevant data. Discuss and resolve technical requirements of equipment with manufacturers and their service personnel for purchases and maintenance. • Coordinate and synchronize work efforts on projects through the photo, print plant, and/or graphic departments. Advise and discuss requirements to create desired special effects. Advise customers on production problems when necessary and adjust workloads to complete on time.
Level C	To influence, persuade, or control persons or groups. Employee must be skilled in dealing with fearful, skeptical, or uncooperative people to obtain desired results. For example, the technician must often persuade, influence, or gain compliance from others in performing such tasks as: • implementing safety requirements; • issuing “stop work” orders which affect production schedules; • calming and directing fearful personnel during incidents; • persuading trades and crafts workers that a safer procedure is preferable, and • gaining voluntary cooperation in a situation where the change may require resolution of work schedule conflicts.

POINT ASSIGNMENT CHART				
Physical Science Technician GS-1311 Hydrologic Technician GS-1316 Meteorological Technician GS-1341			Cartographic Technician GS-1371 Geodetic Technician GS-1374	
		Purpose of Contacts		
	Level	A	B	C
Personal Contacts	1	30	60	130*
	2	45	75	145
	3	80	110	180

⇐ BACK

*THIS COMBINATION IS UNLIKELY.

FACTOR 8 – PHYSICAL DEMANDS

NOTE: Laws and regulations governing pay for irregular or intermittent duty involving unusual physical hardship or hazard are in *section 5545(d), of title 5, United States Code, and Subpart I of part 550 of title 5, Code of Federal Regulations.*

NOTE: In the table below, factor level description is abbreviated as FLD.

Level 8-1 — 5 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

The work is mainly sedentary, but may require some walking and carrying of light items in offices, laboratories, and other work areas. Employees may also carry light items such as briefcases, notebooks, and work papers, or drive a motor vehicle. The work does not require any special physical effort or ability.

Level 8-2 — 20 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

The work requires some physical exertion such as:

- long periods of standing;
- walking over rough, uneven, or rocky surfaces;
- recurring bending, crouching, stooping, stretching, reaching, or similar activity; or
- recurring lifting of moderately heavy items weighing less than 23 kilograms (under 50 pounds) such as lifting and carrying stream gauging weights, data collection and monitoring devices, or sample trays.

Level 8-3 — 50 Points

Series

Physical Science Technician	**GS-1311**	**Geodetic Technician**	**GS-1374**
Hydrologic Technician	**GS-1316**		

FLD

The work regularly requires considerable dexterity, agility, and strenuous physical exertion such as that needed to:

- climb, or work from, tall ladders or scaffolding;
- work in areas where footing is treacherous such as on slippery river banks, in steep or rocky terrain, and in fast-moving water;
- lift heavy objects weighing 23 kilograms (over 50 pounds) or more;
- crouch or crawl in constricted areas; and
- defend oneself or others against physical attack.

FACTOR 9 – WORK ENVIRONMENT

NOTE: Laws and regulations governing pay for irregular or intermittent duty involving unusual physical hardship or hazard are in *section 5545(d), of title 5, United States Code, and Subpart I of part 550 of title 5, Code of Federal Regulations.*

NOTE: In the table below, factor level description is abbreviated as FLD.

Level 9-1 — 5 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

The work area is usually an office setting that is adequately lighted, heated, and ventilated. The work area:

- normally involves everyday risks or discomforts that require normal safety precautions typical of offices; or
- may occasionally involve exposure to uncomfortable conditions in facilities such as factories, construction sites, or supply yards.

Level 9-2 — 20 Points

Series

Physical Science Technician	**GS-1311**	**Cartographic Technician**	**GS-1371**
Hydrologic Technician	**GS-1316**	**Geodetic Technician**	**GS-1374**
Meteorological Technician	**GS-1341**		

FLD

The work area may include exposure to environments such as:

- a laboratory involving moderate risks or discomforts from regular and recurring exposure to irritant chemicals that requires:
  - special safety precautions;
  - protective clothing; and
  - other gear as the situation warrants;
- an area involving exposure to moderate risks or discomforts such as high levels of noise and vibration, dust, grease, uncovered moving parts of machinery, engine exhaust, or irritant fumes that requires:
  - protective clothing and gear; and
  - special safety precautions; or
- an outdoor environment involving moderate discomforts such as exposure to rain, cold/hot weather, and icy streams and rivers that may require special safety precautions and gear, such as life jackets, safety boots, waders, and reflective rainwear.

Level 9-3 — 50 Points

Series

Physical Science Technician	**GS-1311**	**Geodetic Technician**	**GS-1374**
Hydrologic Technician	**GS-1316**		

FLD

The work environment involves high risks with exposure to potentially dangerous situations or unusual conditions that cannot be controlled such as:

- working at great heights under extreme weather conditions; or
- exposure to radioactive or carcinogenic material.

GRADE CONVERSION TABLE

Convert total points on all evaluation factors to General Schedule grades using the following table. The shaded area reflects grade levels commonly attained in this job family.

Point Range	GS Grade
190-250	1
255-450	2
455-650	3
655-850	4
855-1100	5
1105-1350	6
1355-1600	7
1605-1850	8
1855-2100	9
2105-2350	10
2355-2750	11
2755-3150	12
3155-3600	13
3605-4050	14
4055-up	15

APPENDICES

APPENDIX F1 – FACTOR 1 ILLUSTRATIONS

Level 1-3: Physical Science Technician, GS-1311

Knowledge of, and skill in applying, standardized rules, procedures, and operations of basic laboratory or field equipment that require considerable training and experience sufficient to:

- operate such equipment as microbalances, metallographs, grinders, polishers, pH meters, cut-off saws, microscopes, cameras, hardness testers, flash-point testers, and distillation equipment to prepare standards, reagents, and samples for analyses;
- analyze samples by using scientific measurement instruments for recurring metallurgical, instrumental, and wet chemical procedures;
- perform basic standardization checks and make simple operational adjustments to instruments; and
- use manual or automated systems to record results of analysis and document procedures applied.

⇐ BACK

Knowledge of, and skill in applying, standardized procedures and operations to conduct geologic field surveys that require considerable training and experience sufficient to assist scientists in field phases of geologic data collection projects by:

- measuring stratigraphic units;
- making and recording limited field observations of geologic structure;
- identifying basic rock types, plant occurrences, and vegetation; and
- recording basic field data on base maps.

⇐ BACK

Knowledge of, and skill in applying, standardized rules, procedures, and operations that require considerable training and experience sufficient to:

- select and operate radiation detection and monitoring equipment for a variety of facilities such as a shipyard that overhauls and refuels nuclear submarines;
- maintain surveillance over contaminated tool, equipment and storage areas;
- monitor requirements for controlling radiation in storage, decontamination, and control points of activity;
- detect obvious radiation deficiencies, post areas, and ensure protective gear is used; and
- take multiple readings from a variety of standard radioactivity counters.

⇐ BACK

Knowledge of, and skill in applying, standardized rules, procedures, and operations of basic techniques and equipment that require considerable training and experience sufficient to perform one or more of the following tasks:

- cut and polish various types of rock, ore, and mineral samples and prepare double thin sections;
- crush, grind, and sieve samples in preparation for mineralogical analysis;
- operate simple laboratory equipment (e.g., ovens, centrifuges, or waterbaths);
- pack, unpack, label, and store samples and perform other laboratory housekeeping chores; and/or
- perform routine tasks to assist in field collection and description of rock, ore, and mineral samples.

⇐ BACK

Level 1-3: Hydrologic Technician, GS-1316

Knowledge of, and skill in applying, standardized water measurement and sampling methods that require considerable training and experience sufficient to:

- collect hydrologic data of discharge, ground water level, and water quality;
- operate, maintain, and service simple hydrologic recording and measuring instruments;
- make routine measurements of steam discharge using established methods;
- compute the figures obtained to determine stream discharge measurements;
- collect water and sediment samples using established methods and appropriate procedures for preserving the physical, chemical, or biological integrity of samples; and
- assist higher-level technicians in construction of gage houses, water-level recorder shelters, and stream-gauging structures such as cableways.

⇐ BACK

Level 1-3: Meteorological Technician, GS-1341

Knowledge of, and skill in applying, standardized meteorological procedures and recognizing various basic atmospheric conditions that require considerable training and experience. Typical methods and conditions deal with information such as:

- wind speed and direction;
- cloud cover;
- precipitation type and amount;
- visibility;
- temperature;
- dew point;
- barometric pressure; and
- rate of change of pressure

sufficient to:

- conduct a basic weather watch to obtain, record, and disseminate meteorological data;
- plot data and transcribe onto climatological maps and forms;
- monitor instruments and equipment; and
- perform routine operator maintenance.

⇐ BACK

Level 1-3: Cartographic Technician, GS-1371

Knowledge of, and skill in applying, standard cartographic techniques and operations that require considerable training and experience sufficient to:

- prepare basic manual and digital maps and graphics in final form or for inclusion in a digital cartographic database;
- plot control points; and
- use appropriate lettering standards for titles, geographic names, descriptive notations, etc., on maps and charts with little congestion.

May also require knowledge, and skill in applying, darkroom and equipment-operating procedures to operate equipment; check film type for quality of copy, exposure, and developing times; and select and use chemicals for various types of films sufficient to:

- prepare base maps, illustrations, and graphic displays for reports and other publications in different media such as drafting paper, film, or digital;
- assist cartographers in conceptualization, design, and layout for presentation of scientific and technical data; and
- work from rough drafts and materials to prepare copies of maps and graphs for reports.

⇐ BACK

Level 1-3: Geodetic Technician, GS-1374

Knowledge of, and skill in applying, standardized geodetic rules, equipment, and procedures that require considerable training and experience sufficient to:

- operate basic field equipment while serving as an instrument person on surveys of the third and fourth orders of accuracy to measure distances between known points;
- conduct surveys using an established network of survey control points;
- compute distances and angles using readily mastered mathematic, algebraic, and geometric formulas; and
- run traverse lines and level circuits to collect field survey data by using:
  - electronic total station with data collectors;
  - Electronic Distance Measurement equipment (EDM);
  - Global Positioning System equipment (GPS); and
  - transits, theodolites, and other measuring instruments.

⇐ BACK

Level 1-4: Physical Science Technician, GS-1311

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- prepare laboratory samples for analysis by grinding, filtration, centrifugation, thin-section cutting and polishing, blending, and splitting;
- select appropriate test procedures for a number of different sample types and matrices;
- apply various metallurgical, instrumental, and wet chemistry analysis procedures;
- collect data and prepare it in the proper format;
- set-up, adjust, and maintain instrumentation to ensure proper functioning;
- operate analytical instruments, such as gas chromatographs, spectrophotometers, and mass spectrometers, to carry out recurring quantitative or qualitative analyses; and
- maintain detailed laboratory records such as:
  - computer database observation records;
  - graphical representations; and
  - spreadsheets showing calculations from laboratory data.

⇐ BACK

(continued)

Level 1-4: Physical Science Technician, GS-1311 (continued)

Knowledge of, and skill in applying, standard procedures and taxonomic reference material requiring extended training or experience sufficient to:

- extract fossils and microfossils, such as spores and pollen, from a variety of rock and sediment types using chemical methods and physical devices, such as shaker tables and sieves;
- keep samples free from contamination;
- sort fossils into basic morphological groups, using equipment such as scanning electron microscopes and composite microscopes;
- prepare laboratory records to report factual, technical information; and
- perform basic measurements, and geometric and statistical calculations.

⇐ BACK

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to conduct routine laboratory tests and chemical analyses on metallic and non-metallic samples, such as:

- cut, prepare, and weigh samples for chemical, and physical analyses, including liquid density, pH level, and elemental radicals;
- perform physical and mechanical tests for tensile strength, yield strength, hardness, and percent elongation on metal for heat treat process control; and
- conduct lap shear, peel, and/or weld tests.

⇐ BACK

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to test and evaluate petroleum, oil, and lubricant (POL) product specimens by performing a variety of spectrographic and ferrographic analyses of aircraft and ground equipment component oil samples. Performs the following steps:

- determines type and extent of testing required;
- conducts physical analyses of used lubricating oils to determine wearmetal concentrations, fuel dilution, viscosity, additive depletion, and moisture;
- sets up, operates, maintains, and calibrates (i.e., makes operational adjustments) to test equipment;
- makes adjustments, and reruns standards to ensure reliability of results; and
- notifies the supported activities of abnormal test results and requests additional samples to substantiate/negate initial findings.

⇐ BACK

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- support laboratory and instrumentation analysis projects;
- test, calibrate (i.e., make operational adjustments), and maintain instruments and equipment such as:
  - dust sampling equipment;
  - sound level meters;
  - gas detecting instruments;
  - air measuring instruments;
  - gas analyzing equipment; and
  - emergency medical equipment; and
- arrange the type of instrumentation and laboratory testing that will be required for radiological studies and decisions.

⇐ BACK

(continued)

Level 1-4: Physical Science Technician, GS-1311 (continued)

Knowledge of, and skill in applying, standard radiological survey and control procedures requiring extended training or experience sufficient to:

- implement radiation control requirements involving handling, processing, transferring, and transporting contaminated waste;
- plan ways to control possible incidents by identifying location of safety and emergency equipment, and potential radiation sources such as drain water, ventilation, and sewage systems;
- monitor ongoing decontamination operations and procedures;
- interpret work plans to detect deviations from approved radiation control procedures;
- calculate maximum potential doses received by individuals in case of an accident; and
- control potentially exposed personnel and activities in the event of radiation leak.

⇐ BACK

Knowledge of, and skill in applying, standard procedures requiring extended training or experience in a laboratory environment sufficient to test and formulate chemical reagents and solutions necessary to perform required tests in water and wastewater plant laboratories. Tests include:

- daily chemical and bacteriological analysis of water used for human consumption, heating, industrial usage, and recreation to determine if the water is within the established acceptable standards mandated by the Environmental Protection Agency (EPA);
- weekly bacteriological analysis to maintain the water within the EPA standards for total and fecal coliform;
- chemical analyses such as:
  - pH level;
  - phenolphthalcin and total alkalinity;
  - hardness such as calcium carbonate;
  - fluorides;
  - total residual chlorine;
  - total iron;
  - dissolved oxygen;
  - nitrogen;
  - phosphates; and
  - corrosion/scale formint tests; and
- physical analysis of water supplies such as:
  - turbidity;
  - color and odor;
  - nonfilterable residue; and
  - suspended solids.

⇐ BACK

(continued)

Level 1-4: Physical Science Technician, GS-1311 (continued)

Knowledge of, and skill in applying, standard procedures requiring extended training or experience under field conditions sufficient to:

- participate in geologic mapping or data logging activity by gathering and plotting data such as:
  - surface features;
  - seismic signatures;
  - soil and rock types and characteristics;
  - subsurface features such as bedrock contours, fractures and joints, faults and cracks; and
  - potential borrow areas;
- install, monitor, and/or operate instruments such as:
  - seismometers;
  - piezometers;
  - inclinometers;
  - potentiometers;
  - thermistors;
  - magnetometers; and
  - global positioning system devises; and
- select sites and collect samples of geologic material (e.g., rock cores, ice cores, soil, and sediments), document location of collection; conduct physical and/or chemical analyses in situ; and/or label and preserve samples for subsequent laboratory analyses such as:
  - friability, porosity, and density;
  - trapped gases;
  - physical and chemical composition;
  - acidity;
  - salinity;
  - radioactivity; and
  - moisture content.

⇐ BACK

Level 1-4: Hydrologic Technician, GS-1316

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- take water measurements and collect samples from a variety of surface and ground water sites (test wells);
- operate, maintain, and service a variety of hydrologic recording and measuring instruments;
- preserve the physical, chemical, or biological integrity of samples;
- conduct analyses and computations of discharge, ground water level, and water quality for study and/or publication; and
- measure the width, depth, and velocity of streams by wading or from bridges or cableways using:
  - tag lines;
  - wading rods; and
  - current meters or other instruments depending on the depth of the stream.

⇐ BACK

(continued)

Level 1-4: Hydrologic Technician, GS-1316 (continued)

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- compute measurements to determine stream discharge;
- install and adjust water-stage recorders and periodically remove from gauging stations for maintenance and adjustment;
- check survey notes and determine and apply datum corrections to the gage height record;
- compute variables such as ice coefficients or periods of missing data;
- plot and analyze differences in hydrographs and make necessary changes to correct inconsistencies; and
- plot graphs and prepare daily gauge-height and discharge forms and charts.

⇐ BACK

Level 1-4: Meteorological Technician, GS-1341

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- measure and record readings from standardized instrumentation such as temperature, wind direction and speed, visibility, and precipitation;
- interpret weather patterns of the various meteorological systems taking into consideration terrain and marine influences in assigned area; and
- assist higher-grade technicians in developing forecasts.

⇐ BACK

Level 1-4: Cartographic Technician, GS-1371

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- color-code, attribute tag, and digitize map data for all types of topographic, hydrographic, and transportation features shown on a variety of topographic map series;
- use digital equipment and systems in order to assign cartographic attribute codes and prepare digital cartographic data;
- compute traverse and inverse to determine starting-point and stopping-point coordinates for lines and text from known coordinates; and
- compute points of origin and chart corners so that data is properly oriented on final maps.

⇐ BACK

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- process digital cartographic data using computer-assisted systems for entry into a digital cartographic database;
- assign attribute codes from graphic source materials by raster or vector scanning methods using interactive computer systems; and
- manually digitize additional data directly from the graphic map source.

⇐ BACK

Knowledge of, and skill in applying, standard procedures requiring extended training or experience sufficient to:

- prepare land descriptions from available data for deeds, condemnation assemblies, and other real-estate activities;
- prepare or make revisions to preliminary civil or military project maps and real-estate planning maps;
- revise maps to show changes in boundaries, areas, and ownership during various stages of preliminary and final acquisition; and
- determine accretion and erosion of topographic features using general land office plats and aerial photographs.

⇐ BACK

Level 1-4: Geodetic Technician, GS-1374

Knowledge of, and skill in applying, standard procedures of geodetic principles, methods, and techniques requiring extended training or experience sufficient to:

- work with survey data of high order to establish new vertical and horizontal control points from existing networks or establish ties to old survey points;
- write descriptions of triangulations and Global Positioning System (GPS) stations, and recovery notes of previously established stations;
- provide compass directions between reference points and station monuments;
- maintain description cards of all Electronic Distance Measuring (EDM) master points in assigned areas; and
- perform survey variance factor ratio computations to check for systematic error and to ensure that surveys meet the requested order using mathematical formulas, especially trigonometry as it relates to surveying.

⇐ BACK

Level 1-5: Physical Science Technician, GS-1311

Knowledge of, and skill in applying, a wide range of technical principles, procedures, and requirements, and specialized, complicated techniques sufficient to:

- conduct, monitor, and coordinate various phases of projects or operations;
- determine the appropriate analytical techniques;
- evaluate the reliability of the results obtained; and
- carry out limited projects such as age-dating a set of geologic samples, determining the elemental constituents of a meteorite, or determining the potential yield of selected oil shale samples.

⇐ BACK

Knowledge of, and skill in applying, principles, procedures, and requirements, specialized, complicated techniques sufficient to:

- take immediate control and implement the best course of action until a senior radiological control official arrives;
- determine the cause of a variety of accidents with radiation and non-radiation complications; and
- complete major projects of the agency radiation health program involving dosimetry intercomparison studies to provide statistical analysis concerning:
  - the number of radiation workers monitored; and
  - the measurement of radiation energy spectra.

⇐ BACK

(continued)

Level 1-5: Physical Science Technician, GS-1311 (continued)

Knowledge of, and skill in applying, a wide range of radiological principles, procedures, requirements, operational techniques, and related analytical instrumentation sufficient to:

- make operational adjustments to, and use, dosimetry monitoring laboratory and field instruments such as:
  - multi-channel analyzers;
  - liquid scintillation devices;
  - Geiger-Mueller devices; and
  - ionization chambers;
- diagnose instrument malfunction in order to prevent erroneous results; and
- recommend procedures and techniques to analyze non-typical isotopes for samples in other than routine surveillance.

⇐ BACK

Knowledge of, and skill in applying, a wide range of radiological principles, procedures, requirements, operational techniques, and related analytical instrumentation sufficient to:

- monitor complicated operations, such as phases of refueling and main coolant valve replacement in a submarine's nuclear propulsion system;
- recommend improved procedures;
- ensure compliance with radiological safety requirements;
- issue "stop-work orders;" and
- direct and control the activities of all local personnel during serious incidents.

⇐ BACK

Level 1-5: Hydrologic Technician, GS-1316

Knowledge of, and skill in applying, principles, procedures, requirements, and work techniques of basic operations and apparatus of various analytical instruments sufficient to:

- collect, compute, and analyze hydrologic data using hydrologic data measuring instruments and perform standard field data collection and office computation procedures; computations include:
  - applying datum corrections;
  - plotting and analyzing hydrographs; and
  - reconstructing inconsistent or missing data;
- compile, reduce, and make routine and occasionally nonroutine interpretations of field data; and
- transfer the data to maps or digital format for storage and use in publications.

⇐ BACK

Knowledge of, and skill in applying, principles, procedures, requirements, and work techniques of basic operations and apparatus of various analytical instruments sufficient to:

- measure stream discharge or ground water and record the measurements on prescribed forms for use in computations; and
- make notes on various hydrologic or environmental conditions that may have a bearing on the stage-discharge relationship or evapotranspiration losses, seepage losses, and pumping tests.

⇐ BACK

(continued)

Level 1-5: Hydrologic Technician, GS-1316 (continued)

Knowledge of, and skill in applying, principles, procedures, and requirements sufficient to use complicated apparatus and analytical instruments to:

- install, inspect, and service crest-stage indicators and other instruments for the collection of hydrologic data;
- gather and develop field data to include:
  - gauge data;
  - water-surface profiles for indirect determinations of flood discharges; and
  - plots, drafts, sketches, and field notes from surveys;
- review gauge-height charts and discharge measurements to verify accuracy of computations using a variety of algorithms;
- plot and analyze differences in hydrographs by comparing records, and make necessary changes to correct inconsistencies in data; and
- participate in planning and conducting water quality surveys for turbidity, chemical, biological, and bacteriological parameters.

⇐ BACK

Knowledge of, and skill in applying, principles, procedures, and requirements sufficient to use complicated apparatus and analytical instruments to:

- operate and maintain observation wells for ground water data collection;
- participate in the drilling and installation of wells;
- install and make adjustments to water-level recorders and other peripheral equipment;
- program and maintain satellite data relay instruments;
- compile an inventory of wells showing their diameter and depth, and prepare field sketches showing the general locations;
- collect samples of ground water to conduct aquifer tests;
- measure and record fluctuation of ground water levels;
- prepare the information for publication and distribution to the public over media such as Web sites and annual reports;
- perform the routine phases of statistical analyses of ground water data collected in the field using computerized programs; and
- prepare material for publication to include maps, tables, and other illustrative material.

⇐ BACK

Level 1-5: Meteorological Technician, GS-1341

Knowledge of, and skill in applying, principles and procedures of various meteorological models and forecasting techniques sufficient to:

- record meteorological events obtained by instrumentation located on- and off-site;
- interpret readings of meteorological phenomena provided by radar and instrumentation; and
- observe and record atmospheric characteristics such as:
  - temperature;
  - air movement;
  - visibility;
  - pressure;
  - air density; and
  - cloud types.

⇐ BACK

(continued)

Level 1-5: Meteorological Technician, GS-1341 (continued)

Knowledge of, and skill in applying, principles and procedures of various meteorological models and forecasting techniques sufficient to:

- provide surface weather observations for an air base;
- conduct a basic weather watch to measure, record, and disseminate meteorological data;
- transcribe the data onto climatological forms and disseminate it through various means, including the automated weather network; and
- provide local and transient aircrews with:
  - flight weather briefings;
  - meteorological conditions at expected take-off times;
  - flight weather briefing displays; and
  - weather advisories, weather warnings, significant precipitation reports, and winds aloft.

⇐ BACK

Knowledge of, and skill in applying, principles and procedures of various meteorological models and forecasting techniques sufficient to:

- provide meteorological and oceanographic forecasts for naval operations;
- analyze and interpret:
  - meteorological and oceanographic charts;
  - satellite imagery;
  - balloon-borne instrumentation; and
  - computerized ground systems;
- prepare meteorological and oceanographic forecasts for:
  - 3 days out and outlooks to 5 days or greater;
  - severe weather warnings; and
  - advisories for naval operating areas; and
- prepare and present charts and briefings on meteorological conditions.

⇐ BACK

Level 1-5: Cartographic Technician, GS-1371

Knowledge of, and skill in applying, cartographic principles, map design and production methods, and specialized, complicated techniques sufficient to:

- prepare maps, graphs, and illustrations as part of a block or segment of a project which involves entire, multi-stage maps of moderate difficulty or a portion of a larger more diversified project using conventional methods, procedures, or techniques;
- establish controls and edit guides, horizontal and vertical controls, geodetic and plane coordinates, and other geodetic controls used in mapping;
- use traditional cartographic tools and methods such as technical pens and scribing tools for work on plastic sheets, and the lettering and placement of type and symbols;
- use cartographic software, computer assisted drafting (CAD), file transfer protocols, and data archiving; and
- perform both automated and manual digitizing, and convert the raw data into Geographic Information System (GIS) databases.

⇐ BACK

(continued)

Level 1-5: Cartographic Technician, GS-1371 (continued)

Knowledge of, and skill in applying, cartographic principles, technical map design and production methods, and specialized, complicated techniques sufficient to draft hydrographic and topographic maps and charts using field survey data that include:

- water features such as rivers, harbors, inlets, reservoirs, lakes, canals, and wetlands;
- constructed and structural features such as roads, dams, pipelines, transmission lines, horizontal and vertical control points;
- topographic features that comprise the configuration, depression, and elevation of the terrain; and
- all other natural planimetric features that form the land surface.

⇐ BACK

Knowledge of, and skill in applying, cartographic principles, technical map design and production methods, and specialized, complicated techniques sufficient to:

- produce plotted maps by using a variety of computer software packages:
- obtain information from a variety of sources such as field surveys and archived maps that have data available in digital format;
- prepare data for plotting by editing, verifying, and digitally formatting the data; and
- compute skews and chart rotations.

⇐ BACK

Knowledge of, and skill in applying, cartographic principles, technical map design and production methods, and specialized, complicated techniques sufficient to:

- process digital cartographic data and graphic products for inclusion in a digital cartographic database;
- edit previously digitized and tagged map data using an interactive graphic editing system;
- interpret error codes and inconsistencies for correction;
- review the graphic data to the original map source for accuracy; and
- prepare completed topological structuring files for archival processing and submission for entry into a national digital cartographic database.

⇐ BACK

Knowledge of, and skill in applying, cartographic principles, technical map design and production methods, and specialized, complicated techniques sufficient to plot and update maps for public works projects, to include mapping such information as:

- boundaries;
- a variety of constructed and structural features such as dams, bridges, tunnels, and power plants;
- easements;
- utilities;
- land use; and
- contours and elevations of rough terrain.

⇐ BACK

(continued)

Level 1-5: Cartographic Technician, GS-1371 (continued)

Knowledge of, and skill in applying, cartographic principles, map design and production methods, and specialized, complicated techniques sufficient to prepare planimetric and topographic materials using a full range of cartographic techniques such as:

- hand written or Global Positioning System (GPS) notes prepared by field crews;
- plane table sheets;
- fathometer charts;
- lead line soundings;
- aerial photographs;
- photogrammetric manuscripts;
- legal land descriptions; and
- existing maps.

⇐ BACK

Level 1-5: Geodetic Technician, GS-1374

Knowledge of, and skill in applying, geodetic principles, methods, and techniques, and a general knowledge of astronomy sufficient to:

- obtain survey data of high order related to basic horizontal and vertical control nets;
- operate instruments to obtain trilateration measurements of control points;
- work with clear status and obscure status control data;
- establish new vertical and horizontal control points from an existing network;
- establish ties to old survey points;
- record control points in record books or electronic modules; and
- perform computations from observation and measurement data obtained by using arithmetic, geometric, algebraic, and trigonometric equations.

⇐ BACK

Knowledge of, and skill in applying, geodetic principles, methods, and techniques, and a general knowledge of astronomy sufficient to:

- use various field surveying instruments to determine precise field locations;
- reduce data in the field to obtain measurements needed to develop a unique control network;
- deviate from standard procedures to obtain the desired results as needed; and
- perform computations of level data or horizontal and vertical control networks by using tables and arithmetic, geometric, algebraic, and trigonometric formulas.

⇐ BACK

Knowledge of, and skill in applying, geodetic principles, methods, and techniques, and a general knowledge of astronomy sufficient to:

- support civil engineering projects by conducting:
  - surveys of a precise nature where temperature and/or meteorological corrections are applied to field data to obtain final results using traversing, triangulation, and trilateration; and
  - first-order level measurements using Electronic Distance Measurement (EDM) or Global Positioning System (GPS) equipment; and
- perform engineering-related surveys such as ensuring the proper alignment of microwave tower sites.

⇐ BACK

Level 1-6: Physical Science Technician, GS-1311

Knowledge of, and skill in applying, the principles, procedures, specialized techniques of the full range of advanced operations, methods, and practices sufficient to:

- plan and carry out conventional projects;
- perform chemical analysis/testing, data validation and reduction, and reporting; and
- adapt or customize standard methods.

⇐ BACK

Knowledge of, and skill in applying, the radiological control principles, theories, procedures, specialized techniques of the full range of advanced operations and practices sufficient to:

- operate gamma cell irradiators that are licensed by the Nuclear Regulatory Commission (NRC);
- perform mathematical computations to determine kill curves for biological and toxic agents;
- take immediate independent control as a senior radiological control technician;
- determine the cause of a wide variety of complex radiological control problems and incidents;
- solve local radiological control problems; and
- participate in planning and designing aspects of research projects to support professional staff engaged in studies such as those concerning the effects of ionizing radiation on biological systems.

⇐ BACK

Knowledge of, and skill in applying, the technical principles and procedures, and specialized techniques of the full range of advanced analytical chemistry operations sufficient to:

- perform extraction and isolation to analyze pure components by various chromatographic techniques and spectral methods such as infrared and mass spectroscopy;
- prepare derivatives of compounds;
- prepare samples and perform chemical separations using conventional techniques taking into consideration geology and isotope principles and concepts;
- modify conventional techniques and methods to identify and evaluate compounds; and
- use computer programs to analyze experimental data and prepare analytical reports.

⇐ BACK

Knowledge of, and skill in applying the full range of radiological control principles, methods, and complicated technological equipment sufficient to:

- monitor radiological safety procedures as applied in various trades such as pipefitting, shipfitting, welding, rigging, and wiring radioactive items;
- plan and recommend more efficient and safe radiation-related work procedures for operations, or evaluate and provide recommendations on proposed regulations;
- adapt segments of training programs to changing, local needs or when significant regulatory or technical changes are imposed by policy or regulation;
- review portions of local radiological control practices, plans, or procedures to determine if actions taken by control technicians or other personnel were deficient; and
- recommend additional training or changes to radiological control procedures to correct deficiencies.

⇐ BACK

Level 1-6: Hydrologic Technician, GS-1316

Knowledge of, and skill in applying, the full range of hydrology collection and measurement techniques and methods for compiling and analyzing results of field and/or laboratory work sufficient to:

- plan, coordinate, and execute data collection activities for ground and surface water, and water quality studies;
- recognize and resolve significant deviations in collected data;
- repair and adjust a wide variety of equipment;
- install instrument shelters; and
- extract information from multiple instruments for analysis.

⇐ BACK

Knowledge of, and skill in applying, the full range of hydrology collection and measurement techniques and methods for compiling and analyzing results of field and/or laboratory work sufficient to:

- plan and carry out the data collection of ground water levels using:
  - data recorders;
  - vented and unvented submersible pressure transducers; and
  - other types of specialized instrumentation;
- perform statistical and technical analyses of hydrologic data from a variety of gauging stations;
- prepare reports such as:
  - monthly and yearly hydrologic reports;
  - water supply papers;
  - water resources investigations that contain research projects; and
  - other special studies; and
- prepare study results for publication to include maps that portray water and/or drainage boundaries, discharge tables, and other illustrative materials.

⇐ BACK

Knowledge of, and skill in applying, the full range of hydrology collection and measurement techniques and methods for compiling and analyzing results of field and/or laboratory work sufficient to:

- select sites for gauging stations, artificial controls, cableways, and water quality monitors taking into consideration the physical properties of the site, weather, backwater discharges, etc.;
- recommend emplacement and abandonment of wells based on study requirements; and
- apply hydrologic engineering methods and techniques to:
  - participate in the design and installation of test wells based on such factors as local knowledge of seasonal fluctuation in the water table and influence of nearby wetlands on water quality; and
  - prepare plans and specifications for instrument platforms based on consideration of physical and hydrologic characteristics of sites.

⇐ BACK

Level 1-6: Meteorological Technician, GS-1341

Knowledge of, and skill in applying, the full range of procedures in weather forecasting, observation, research, climatology, or others areas of meteorology sufficient to:

- decode, plot, and systematically record data related to the physical characteristics of the atmosphere on charts, diagrams, cross sections, etc.;
- analyze, interpret, adjust, and verify atmospheric and other meteorological data;
- prepare written material such as technical reports and forecasts; and
- give oral briefings of forecasts and weather advisories.

⇐ BACK

(continued)

Level 1-6: Meteorological Technician, GS-1341 (continued)

Knowledge of, and skill in applying, the full range of procedures in weather forecasting, observation, research, climatology, or others areas of meteorology sufficient to:

- determine how local weather conditions and observations from various sources affect plans for military aircraft operations and related activities;
- provide weather briefings for local, transient, and other supported aircrews;
- estimate the extent of forecast changes and decide if action is needed to protect life and property; and
- support DoD customers by planning and carrying out projects that involve:
  - analyzing climatic regimes, geography, terrain, weather system characteristics, centralized weather products, and indigenous surface and upper air reports to forecast weather conditions for takeoff, enroute, destinations, and refueling tracks, for locations worldwide;
  - considering aircraft operating threshold and hazards applicable to aircraft and aerial delivery systems in briefing aircrews on possible weather impact enroute and at the destination;
  - identifying and monitoring significant weather developments that present potential hazardous impact to critical flight operations;
  - assessing the impact of weather conditions terminal aerodromes, assault strips, landing zones, extraction zones, etc.; and
  - participating with senior staff in making go/no go decisions for impending air and ground operations.

⇐ BACK

Level 1-6: Cartographic Technician, GS-1371

Knowledge of, and skill in applying, the full range of cartographic principles and concepts applicable to technical duties concerned with topographic, orthophoto, hydrographic, land use, land cover, and digital maps to participate in surveys/field data collection sufficient to:

- plan, lay out, and complete projects and solve technical problems of digital data collection techniques and procedures;
- review and edit:
  - map content;
  - map symbolization;
  - map accuracy standards;
  - special map products;
  - map materials; and
- encode map data or build digital files that can be manipulated to produce accurate maps of various scales.

⇐ BACK

(continued)

Level 1-6: Cartographic Technician, GS-1371 (continued)

Knowledge of, and skill in applying, the full range of cartographic principles and concepts applicable to technical duties concerned with topographic, orthophoto, hydrographic, land use, land cover, and digital maps sufficient to:

- prepare detailed preliminary and final maps and revisions of small, medium, or large-scale maps or charts that include:
  - all types of irregular terrain;
  - dense cultural features and buildings;
  - vegetation covers;
  - mountain ranges and valleys; and
  - highways and railroads;
- determine the extent and type of revisions needed;
- establish supplemental control;
- compile data from aerial photographs and a variety of other sources; and
- compile names, symbols, terms, and expressions using cartographic glossaries and language manuals.

⇐ BACK

Knowledge of, and skill in applying, the full range of cartographic principles and concepts applicable to technical duties concerned with topographic, orthophoto, hydrographic, land use, land cover, and digital maps sufficient to:

- complete difficult phases of compilation in the construction, revision, and maintenance of maps and charts; and
- select, adjust, and position planimetric detail from various source maps of different scale that involve:
  - using photo revision techniques to compile maps and charts;
  - selecting and adjusting data for digital data reduction;
  - compiling and adjusting contours by extraction and interpolation from other sources; and
  - performing simultaneous compilation and color-separation.

⇐ BACK

Knowledge of, and skill in applying, the full range of cartographic principles and concepts of:

- digital data collection and instrumentation;
- map content;
- map symbolization;
- map accuracy standards;
- special map products, by-products, and map materials; and
- geographic, state grid, Universal Traverse Mercator and General Land Office coordinate systems.

sufficient to:

- lay out and monitor difficult digital projects requiring the selection and position of map information from various scales and adjusting data to compile manuscripts of specified scale;
- review or edit complex manuscripts for proper encoding of map data and building digital files that can be manipulated to produce maps of various scales;
- execute standard methods in processing extremely dense features requiring resolution of symbol interference; and
- evaluate geodetic consistency necessary to transform graphic and digital data into various forms or output that conform to geometric requirements for the selected projection.

⇐ BACK

(continued)

Level 1-6: Cartographic Technician, GS-1371 (continued)

Knowledge of, and skill in applying, the full range of cartographic principles and concepts applicable to technical duties concerned with topographic, orthophoto, land use, land cover, and digital maps sufficient to:

- prepare detailed instructions for converting maps prepared by contractors or other agencies; and
- proof sets of completed map or chart manuscripts for accuracy that involve:
  - reviewing compiled marginal information;
  - performing edit checks to locate errors;
  - verifying the accuracy of line weights and gauge; and
  - making necessary adjustments in culture features and controls.

⇐ BACK

Level 1-6: Geodetic Technician, GS-1374

Knowledge of, and skill in applying, the full range of geodetic principles and concepts to plan, coordinate, organize, and execute conventional geodetic survey projects sufficient to:

- lead geodetic survey parties;
- review data while in the field to ensure the level of accuracy required;
- use Global Positioning System equipment (GPS) and Electronic Distance Measuring equipment (EDM), in concert with conventional traverse, precise levels, and industrial survey measurements;
- adjust and transform field data into usable coordinates for data reduction; and
- provide data in final form for entry onto maps, radar charts, and other requested applications.

⇐ BACK

Knowledge of, and skill in applying, the full range of geodetic principles and concepts to plan, coordinate, organize, and execute complete geodetic survey projects sufficient to:

- establish an extensive system of monuments and control points based on various data and grid systems using geodetic concepts and protocols;
- convert data where the origins are suspect, inaccurate, or vague; and
- analyze and evaluate old surveys and previous datums to determine if they are credible.

⇐ BACK

Knowledge of, and skill in applying, the full range of geodetic principles and concepts to plan, coordinate, organize, and execute complete geodetic survey projects sufficient to:

- measure, validate, and analyze geodetic deformation data using principles, practices, and concepts of geology and geophysics;
- operate specialized equipment including:
  - geodimeters;
  - levels;
  - Global Positioning System equipment (GPS);
  - theodolites; and
  - other distance measuring instruments and mechanical devices;
- perform field repair to instrumentation; and
- verify data reduction and data acquisition to analyze accuracy of measurements for reports.

⇐ BACK

Level 1-7: Physical Science Technician, GS-1311

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods, laboratory procedures, and theoretical concepts, principles, and practices of physical science and related disciplines sufficient to:

- develop or modify analytical methods in a research laboratory for the qualitative and quantitative determination of chemicals in various matrices in:
  - formulations;
  - raw materials;
  - tissue;
  - vegetation; and
  - soil and water samples.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods, laboratory procedures, and theoretical concepts, principles, and practices of physical science and related disciplines sufficient to:

- investigate and perform a variety of complex sample extraction techniques using laboratory grade instruments such as capillary and megabore gas chromatography;
- operate and adjust sensitive instrumentation for optimal detection of trace elements; and
- train other technicians on new or experimental methods developed by the employee to validate or institute the procedures for ongoing implementation.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods, laboratory procedures, and theoretical concepts, principles, and practices of physical science and related disciplines sufficient to:

- perform sophisticated tests in researching the potential health hazards and environmental pollution such as those caused by certain pesticides, cleaning solvents; and other chemical compounds;
- isolate compounds from various matrices;
- conduct various physical separation processes and chemical reactions; and
- operate instruments such as:
  - gas-liquid chromatographs;
  - liquid chromatographs; and
  - mass fragmentation detectors.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods, laboratory procedures, and theoretical concepts, principles, and practices of physical science and related disciplines sufficient to:

- conduct tests on a variety of materials and formulations being manufactured for use in weapons, ammunition, and other explosive or pyrotechnic devices;
- design, modify, adapt, or change test equipment components and fixtures depending on samples, safety, and other factors;
- direct the preparation of fabricated fixtures;
- evaluate measurements obtained with modified equipment to determine if redesign is necessary to compensate for equipment limitations or unexpected characteristics; and
- record test data and report results in test reports.

⇐ BACK

(continued)

Level 1-7: Physical Science Technician, GS-1311 (continued)

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods, field and laboratory procedures, and theoretical concepts, principles, and practices of physical science and related disciplines sufficient to:

- operate, maintain, and repair instruments and equipment in the field and laboratory, including borehole probes and data recording systems, in connection with tectonic and other geophysical analyses;
- operate computer-interfaced instrumentation to measure resistivity, conductivity, and other geophysical features by using:
  - natural gamma;
  - continuous acoustic sensors;
  - gamma-gamma density sensors;
  - neutron porosity; and
  - geophysical probes and data phones;
- modify procedures depending on geologic conditions, probe response, and problems related to terrain, presence of water, and borehole conditions; and
- comply with Federal regulations and certifications for safe practices in transporting and handling radioactive materials used in the tests.

⇐ BACK

Level 1-7: Hydrologic Technician, GS-1316

Comprehensive, practical knowledge of, and extensive experience and skill in applying, concepts and methods of hydrology, data collection, and statistical analysis and interpretation of data sufficient to:

- modify established procedures to solve hydrologic problems in all aspects of collection and analysis;
- use ingenuity and originality in operating available equipment or integrating non-standard instrumentation to adapt or devise new methods, techniques, or instrumentation platforms to work in the physical environment;
- plan complex instrument arrays; and
- act as a project manager for hydrologic studies in conjunction with other State, local and private cooperatives to include:
  - estimating and obtaining funding, taking into consideration costs, facilities, and basic contract specifications;
  - obtaining bids for services such as construction of sites;
  - employing skilled and unskilled labor for construction or rehabilitation of structures;
  - providing oversight of construction sites;
  - monitoring construction contract specifications; and
  - tracking the program costs and expenditures.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, concepts and methods of hydrology, data collection, and statistical analysis and interpretation of data sufficient to:

- plan, oversee, and monitor the operation of a sediment laboratory to measure:
  - water samples for high-volume sediment concentration;
  - specialized analysis for sand and size breaks;
  - air elutriation; and
  - dry-sieve analysis for sediment particle materials; and
- plan and direct the processing, compilation, analysis, and preparation of sediment data for water-data reports.

⇐ BACK

(continued)

Level 1-7: Hydrologic Technician, GS-1316 (continued)

Comprehensive, practical knowledge of, and extensive experience and skill in applying, concepts and methods of hydrology, data collection, and statistical analysis and interpretation of data sufficient to:

- plan, schedule, and coordinate the collection, compilation, and evaluation of data in a water resources district;
- calculate hydraulic formulas, such as slope-area, contracted-opening, and flow-over dam when current meters cannot measure peak flows;
- calculate water measurements and reconstruct missing data for publication;
- compute discharge records for gauging stations, including:
  - computing and tabulating mean daily or subdivided gauge heights by using established geometric, algebraic, and trigonometric equations;
  - plotting discharge measurements; and
  - determining state-of-discharge relation; and
- prepare data in final format for publication, including:
  - computing rating tables;
  - calculating mean daily, monthly, and annual discharges by using mathematic formulas;
  - estimating missing periods of data; and
  - writing the annual station analysis.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, concepts and methods of hydrology, data collection, and statistical analysis and interpretation of data sufficient to participate with hydrologists in planning, organizing, and conducting field data collection parties by:

- searching for information, maps, and geologic/geographic data concerning the area of study;
- determining the number and nature of instruments required;
- estimating the crew members; transportation, and timeframes required; and
- serving as the technical consultant in selecting the designs, deciding suitable locations, and guiding installation methods for gauging stations and observation wells.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, concepts and methods of hydrology, data collection, and statistical analysis and interpretation of data sufficient to:

- make complex computations by using arithmetic, geometric, algebraic, and trigonometric equations;
- prepare final records of discharge for publication;
- conduct technical studies of surface water data collection problems;
- devise new methods to solve problems in collecting, analyzing, or computing data; and
- critically review computations prepared by less experienced employees.

⇐ BACK

Level 1-7: Meteorological Technician, GS-1341

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods and theoretical concepts, principles, and practices of meteorology and related disciplines sufficient to:

- support a research and development (R&D) installation by monitoring and forecasting weather for project personnel to schedule testing for narrow parameters; e.g., the test requires 2mm-sized droplets at a constant rate for 2 hours;
- provide real-time atmospheric data that is programmed directly from sensors to system computers;
- forecast weather for scheduled test dates to determine if meteorological parameters meet those required for the specific test; and
- use specialized or reconfigured instrumentation and adapt standard interpretation techniques and mesoscale modeling to obtain precise meteorological measurements such as:
  - specific wavelengths of the energy spectrum;
  - the amount of incoming solar radiation (short wavelength); or
  - optical rain rate measuring the droplet size/distribution/fall rate.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods and theoretical concepts, principles, and practices of meteorology and related disciplines sufficient to:

- perform complex data analysis for microscale forecasts requiring a high level of detail and fidelity that is not required for standard forecasting;
- factor in unique localized weather phenomena; and
- evaluate the output of various computer models and adapt standard models as needed.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods and theoretical concepts, principles, and practices of meteorology and related disciplines sufficient to:

- measure atmospheric conditions for field testing night vision systems and electro-optical systems using infrared imaging in different spectral bands; e.g., ultraviolet regions and millimeter wave measurements;
- use special measuring instrumentation such as transmissometer and scintillometer to measure the index of refraction or the optical turbulence that is critical for laser testing; and
- set up parameters, continuously monitor, and recalibrate (i.e., make operational adjustments) sensitive data collection instruments.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and in applying analytical methods and theoretical concepts, principles, and practices of meteorology and related disciplines sufficient to prepare medium- and long-range forecasts for special purposes such as energy conservation, civil engineering, or public works projects considering:

- meteorological theory;
- weather patterns;
- geographic influences such as large land areas that have be deforested;
- temperature anomalies; and
- micro and macro forecasting methods.

⇐ BACK

(continued)

Level 1-7: Meteorological Technician, GS-1341 (continued)

Comprehensive, practical knowledge of, and extensive experience and skill in applying, analytical methods and theoretical concepts, principles, and practices of meteorology and related disciplines sufficient to:

- prepare long-range temperature and sensible weather (rain, cloud cover, snow) forecasts based on research and historical data;
- prepare climatological studies using archival and current weather data; and
- reconcile current weather conditions to the forecasted meteorological information to refine local templates and programs.

⇐ BACK

Level 1-7: Cartographic Technician, GS-1371

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of cartography sufficient to:

- coordinate, lay out, and compose unusually difficult and complex maps, requiring the adaptation of existing procedures or technologies, including graphic and digital products and photogrammetric processes;
- compile unusual natural and cultural features that require departure from standardized procedures;
- perform finishing edits of maps or charts that involve unusually difficult and complex features;
- perform aerotriangulation to adjust established horizontal and vertical control extensions for projects having minimal ground control;
- test new cartographic methods or participate in acceptance testing of computer systems and software to process digital cartographic data;
- assess the validity of horizontal and vertical control for input into aerotriangulation operations applying knowledge of cartographic surveying and photogrammetry theories, principles, and methodology; and
- coordinate and obtain data from outside sources required for mapping and digital projects.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of cartography sufficient to design, set up, and implement new procedures or techniques to assist cartographers by developing, evaluating, and recommending solutions to:

- resolve analog and digital cartographic problems affecting production; and
- ensure the availability of geospatial data.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of cartography sufficient to:

- provide technical support in developing new and complex data standards; and
- assist in:
  - geographic analysis;
  - image data acquisition and manipulation;
  - data management; and
  - data visualization.

⇐ BACK

(continued)

Level 1-7: Cartographic Technician, GS-1371 (continued)

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of cartography sufficient to lay out, coordinate, and compile extremely difficult projects; i.e., those involving wide geographic areas when source data are not available, or including features that are very difficult to depict such as:

- vertical faces;
- snowfields;
- sand dunes; and
- large bodies of water.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of cartography sufficient to:

- collect data, edit, correct, and modify complex 2- or 3-dimensional digital cartographic/geographic data for production or research using various graphic/image scanning and interactive editing systems;
- evaluate the data to establish relative accuracy and scale; and
- review source materials and ensure that data are complete, edge checked, accurate, and in accordance with digital cartographic and graphic standards.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of cartography sufficient to:

- manage digital contract or cooperative mapping projects to ensure contract or agreement compliance, and that acceptable digital and graphic products are produced;
- monitor ongoing projects and maintain the required contract or agreement records;
- assemble or direct the assembly of Government-furnished materials (GFM); and
- identify and resolve potential problems.

⇐ BACK

Level 1-7: Geodetic Technician, GS-1374

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of geodesy sufficient to provide geodetic services in support of research, test, and evaluation projects, that involve modifying standard practices and adapting equipment or techniques to solve a variety of problems, such as:

- using Global Positioning System (GPS) in new applications;
- adapting precedents or making significant departures from previous approaches in obtaining required order of survey accuracy; and
- applying non-standard equations using mathematics such as plane and spherical trigonometry, geometry, and calculus as they pertain to least squares probability to compute survey measurements.

⇐ BACK

(continued)

Level 1-7: Geodetic Technician, GS-1374 (continued)

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of geodesy sufficient to:

- provide technical support to test and evaluation activities by determining measurement requirements for geodetic data;
- determine reliability and quality of existing data to support the specific tests or activities such as:
  - the order of accuracy needed;
  - line-of-sight requirements;
  - required instrumentation; and
  - site selection transmission characteristics;
- determine:
  - power line characteristics;
  - electro-magnetic interference and ambient electro-magnetic features;
  - terrain features; and
  - geodetic orientation; and
- explain the expected additional time and cost involved with first-order work and what can be provided with a lower order for degree of accuracy needed for the requested project.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of geodesy sufficient to perform a variety of field and office duties in collecting and analyzing strain and geodetic data, to include:

- working with project scientists in the collection, reduction, interpretation, and publication of geodetic data on earth deformation;
- explaining methodologies of various experiments to other technicians and scientists;
- providing results to local landowners and citizens; and
- directing a field crew in measuring crustal movements.

⇐ BACK

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of geodesy sufficient to:

- maintain and perform minor repairs on monitoring systems including:
  - laser geodimeters;
  - seismometers and tiltmeters;
  - borehole strainmeters; and
  - associated radio and data links;
- set up, align, operate, maintain, repair, and calibrate (i.e., make operational adjustments) surveying equipment and accessory equipment used for high-precision geodetic measurements including:
  - digital telephonic;
  - satellite;
  - microwave; and
  - radio telemetry systems;
- modify existing equipment to use in special projects to increase reliability and improve functionality; and
- troubleshoot and identify instrument problems, and repair or contact the manufacturer for technical assistance.

⇐ BACK

(continued)

Level 1-7: Geodetic Technician, GS-1374 (continued)

Comprehensive, practical knowledge of, and extensive experience and skill in applying, the principles and practices of geodesy sufficient to:

- conduct reconnaissance to establish new geodetic control sites;
- explain research and usage conditions to landowners;
- obtain land use permits as necessary; and
- oversee the construction of shelters, platforms, and monuments and obtain utilities to install equipment at semi-permanent sites.

⇐ BACK

APPENDIX F4 – FACTOR 4 ILLUSTRATIONS

Level 4-2: Physical Science Technician, GS-1311

Nature of Assignment – Work consists of duties that involve related steps, processes, and methods such as analyses and tests, and assisting scientists or higher-grade employees on special projects.

What Needs To Be Done – The employee chooses from among several standardized methods and procedures to:

- prepare samples for analysis;
- set controls of instrumentation and automated equipment;
- check laboratory equipment for cleanliness, operational functions, and standardized adjustment;
- implement procedures; and
- review and record data and/or instrumentation readings.

Difficulty and Originality Involved – The employee must recognize probable errors, respond to abnormal or incomplete data, and determine if data fall within expected results.

⇐ BACK

Level 4-2: Hydrologic Technician, GS-1316

Nature of Assignment – Work involves using various data collection methods, computing measurements, and analyzing hydrological data using standard approaches and procedures.

What Needs To Be Done – The employee chooses from several standardized collection processes by applying established hydrological methods and procedures to:

- initiate data-logger systems and hookup field instrumentation;
- set-up, adjust, and maintain instruments in the field; and
- run elementary diagnostics on standard instrumentation.

Difficulty and Originality Involved – Exercises judgment to:

- perform a sequence of hydrological data collection activities that are routine and require accuracy and attention to detail;
- operate and service equipment; and
- recognize unusual situations that may adversely affect the adequacy of water measurements or data collected.

⇐ BACK

Level 4-2: Meteorological Technician, GS-1341

Nature of Assignment – Work involves using various data collection methods, computing measurements, and analyzing meteorological data using standard approaches and procedures.

What Needs To Be Done – The employee chooses from several standardized collection processes by applying established meteorological methods and procedures to:

- initiate data-logger systems and hookup field instrumentation;
- set-up, adjust, and maintain instruments in the field; and
- run elementary diagnostics on standard instrumentation.

Difficulty and Originality Involved – Exercises judgment to:

- perform a sequence of meteorological data collection activities that are routine and require accuracy and attention to detail;
- operate and service data collection equipment; and
- recognize unusual situations that may adversely affect the adequacy of measurements or data collected.

⇐ BACK

Level 4-2: Cartographic Technician, GS-1371

Nature of Assignment – Work consists of performing a variety of related cartographic duties on clearly defined projects or tasks.

What Needs To Be Done – The employee chooses from several standardized collection processes by applying established methods and procedures to:

- review map source materials ensuring a high degree of accuracy and attention to detail;
- annotate map materials in preparation for digital capture; and
- adjust, add, or delete digital cartographic detail within allowable limits.

Difficulty and Originality Involved – Exercises judgment to carry out functions such as digitizing, evaluating and organizing data. Few, if any, problems are encountered in performing the well-established procedures.

⇐ BACK

Level 4-2: Geodetic Technician, GS-1374

Nature of Assignment – Work consists of performing standard computations from observation and measurement data obtained using established tables and formulas, calculators, and personal computers.

What Needs to Be Done – The employee chooses from several standardized collection processes by applying established methods and procedures to compute standard deviations for measurements, including:

- vertical corrections for length and temperature of rod;
- level correction;
- scale factor;
- Global Positioning System reduction;
- sea level reduction;
- ties to other lines;
- extra foresights; and
- distance and benchmark elevations above mean sea level.

Difficulty and Originality Involved – Recognizes different procedures to:

- compute clear status control data; and
- choose from various standard geodetic formulas to verify the level of accuracy required.

⇐ BACK

Level 4-3: Physical Science Technician, GS-1311

Nature of Assignment – Work consists of preparing samples and conducting analyses in the laboratory and field for interpretation by the project scientist.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- determine which accepted standard laboratory techniques and field procedures to use;
- make minor modifications such as calculating quantities of materials needed; or
- determine how samples are handled.

Difficulty and Originality Involved – Exercises judgment to:

- provide general laboratory assistance to ongoing non-standard procedure development work;
- select appropriate techniques; and
- analyze and interpret the results.

⇐ BACK

Level 4-3: Hydrologic Technician, GS-1316

Nature of Assignment – Work consists of collecting data on water supply and condition using:

- a system of ground water wells;
- stream discharge sites;
- reservoirs;
- river stations, and/or
- water users.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- determine which generally accepted standard field and laboratory techniques to use;
- set up and monitor hydrologic data collection platforms; and
- gather accurate and timely information.

Difficulty and Originality Involved – Uses initiative and resourcefulness in solving problems and adapting to conditions found at the worksite.

⇐ BACK

Level 4-3: Meteorological Technician, GS-1341

Nature of Assignment – Work consists of conducting weather watches for recording and disseminating meteorological data to supported units and organizations. Produces local forecasts or other routine products from a variety of radar, satellite, and other data collection platforms.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- interpret and transcribe data onto climatological forms and provide them to users; and
- gather data from various instrumentation, including:
  - wind speed and direction;
  - cloud cover, type, and height;
  - visibility;
  - obstruction to visibility;
  - temperature;
  - dew point;
  - barometric pressure; and
  - rate of change of pressure.

Difficulty and Originality Involved – Exercises judgment to:

- prepare forecasts by collecting, analyzing, interpreting, and evaluating:
  - numerous meteorological and oceanographic charts (both hand-drawn and computer-generated);
  - observation station reports; and
  - satellite imagery; and
- assess conflicting computer models and inaccurate information to generate the most accurate forecast.

⇐ BACK

Level 4-3: Cartographic Technician, GS-1371

Nature of Assignment – Work consists of a number of steps or tasks that require accuracy and attention to detail in one or more stages of the map- or chart-making process.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- prepare standard and special purpose maps and photo imagery products;
- use computer-assisted cartographic hardware and digital graphic editing systems to assign attribute codes;
- prepare products for final review or publication using various map source materials;
- plot data to produce color map graphics; and/or
- process data for eventual storage in a cartographic database.

Difficulty and Originality Involved – Exercises judgment to resolve problems including:

- coding and tagging of digital cartographic data including materials that:
  - vary in size and scale;
  - may be planimetric or topographic; and
  - may be congested or crowded;
- resolving multiple source documents of varying scale;
- clarifying areas of extremely dense topographic elevation or extremely rugged terrain; and
- determining which features are significant to justify inclusion, omission, or individual treatment.

⇐ BACK

Nature of Assignment – Work consists of a number of steps or tasks that require accuracy and attention to detail in one or more stages of the map- or chart-making process.

What Needs To Be Done – The employee selects the appropriate procedures from many alternatives to:

- make computations using complex mathematical formulas;
- compromise with or adapt cartographic methods, techniques, and procedures;
- modify standard practices to meet unique requirements of projects or to solve unusual problems;
- determine which features are significant to justify inclusion, omission, or individual treatment; and
- work with source documents of varying scale.

Difficulty and Originality Involved – Exercises judgment to:

- apply symbols, map-feature interrelationships, and map projection construction and application to the mapping process;
- sequence and carry out graphic and/or digital mapping operations;
- lay out and monitor difficult digital projects;
- edit or review complex manuscripts for proper encoding of map data;
- build digital files that can be manipulated to produce maps of a variety of scales; and
- evaluate the geodetic consistency necessary to transform the graphic/digital data into various forms of output.

⇐ BACK

(continued)

Level 4-3: Cartographic Technician, GS-1371 (continued)

Nature of Assignment – Work consists of a variety of duties involving planning, organizing, and preparing a variety of geologic and hydrologic maps, diagrams, and illustrations.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- review a variety of data from different sources including data from surveying parties and contractors;
- revise old maps or develop new maps;
- incorporate field data in charts or maps for programs such as construction, dredging, navigation, beach erosion, and property surveys; and
- produce final map products.

Difficulty and Originality Involved – Exercises judgment to:

- detect and resolve differences between erroneous survey results or incomplete or conflicting data;
- perform manual computations, using arithmetic, geometric, algebraic, and trigonometric calculations, to ensure the accuracy of details of topographic and hydrographic data submitted by survey parties that reflect problematic terrain, site conditions, or equipment limitations; and
- ensure the accuracy of information for finalization.

⇐ BACK

Level 4-3: Geodetic Technician, GS-1374

Nature of Assignment – Work consists of assisting in the planning of and participation in geodetic field survey parties using high precision survey instruments. The employee uses well-established geodetic survey and data reduction methods but may make adjustments within allowable limits.

What Needs To Be Done – The employee selects the appropriate process from many alternatives to:

- plan for, select from, and make adjustments to a variety of survey equipment and instruments;
- verify data accuracy while still in the field using a number of steps and processes; and
- convert measurements of control systems that may include points established in diverse grid systems.

Difficulty and Originality Involved – In converting survey data to a usable form, the employee must analyze and resolve problems and conflicts such as those associated with data that:

- are fragmentary;
- have varying levels of accuracy and reliability;
- are frequently vague;
- are of unknown origin;
- are old or presented in an unusual order; or
- are added from prior surveys.

⇐ BACK

Level 4-4: Physical Science Technician, GS-1311

Nature of Assignment – Work consists of performing diverse and complex laboratory analysis using newly developed methods. Methods vary considerably; each type of method follows specific performance criteria that must be thoroughly understood by the employee.

What Needs To Be Done – The employee selects appropriate instrumentation to obtain valid results based on instrument readings during their operation. The employee performs such duties as:

- planning, directing, and personally conducting a variety of tests and experiments associated with complex research and development projects;
- evaluating data generated during long-term testing to determine the adequacy of the method; and
- working with scientists who developed the experimental methods in order to solve related problems.

Difficulty and Originality Involved – Exercises judgment and originality to:

- resolve problems in conducting tests that are often new, unique, or offer significant technical challenges since the details are not reviewed or discussed in scientific literature or validated by known precedents;
- adapt methods that are innovative and must be closely monitored during each stage so problems are immediately identified; and
- suggest procedural modifications to achieve desired results.

⇐ BACK

Nature of Assignment – Work consists of conducting validation tests and documenting the method development process for a variety of chemical analyses.

What Needs To Be Done – The employee selects and performs tests and experiments to validate various sample preparation procedures and the applicability of instrumental/techniques to refine new analytical methods for use by others.

Difficulty and Originality Involved – Exercises judgment and originality to:

- use complex instruments in new applications;
- refine approaches during experiments and validation studies;
- identify abnormal readings and reassess when conflicting data are encountered; and
- recommend options for further study.

⇐ BACK

Nature of Assignment – Work consists of performing a wide range of radiation control operations, handling incidents, and monitoring major repairs and overhaul or refueling operations.

What Needs To Be Done – The employee decides what must be done by:

- analyzing the situation;
- reviewing plans and procedures to assure that radiological controls are adequate for on-the-job conditions; and
- taking charge of a total situation during radiation-related emergencies and incidents until replaced by a relieving or supervisory radiological control official.

Difficulty and Originality Involved – Exercises judgment and originality to:

- develop, refine, or adapt procedures or training to local needs;
- recommend improved radiological control and related trade procedures; and
- analyze incidents to pinpoint responsibility and recommend ways to prevent recurrence in similar situations.

⇐ BACK

Level 4-4: Hydrologic Technician, GS-1316

Nature of Assignment – Work consists of computing and validating instrument readings, and reconciling anomalies of various hydrologic factors and measurement site conditions to ensure the reliability of data collected.

What Needs To Be Done – The employee selects appropriate methods or instrumentation to ensure the needed level of precision, avoid conflicting data, and obtain valid results based on field conditions and instrument responses. The employee performs duties such as:

- overseeing field collection of water-quality data for special purposes involving the interpretation of hydrologic information;
- taking indirect measurements of flood discharges; and
- conducting pumping tests.

Difficulty and Originality Involved – Exercises judgment and originality to:

- deviate from standard approaches when installing and maintaining instruments;
- recognize incomplete or conflicting data when performing analyses; and
- make compensating adjustments.

⇦ BACK

Level 4-4: Meteorological Technician, GS-1341

Nature of Assignment – Work consists of providing naval forecasts to advise harbor masters and ship captains on optimum ship routing.

What Needs To Be Done – The employee selects appropriate instrumentation to obtain valid results based on field conditions and instrument responses during their operation. The employee performs the following duties:

- incorporates meteorology, oceanography, and a wide range of geography to develop forecasts;
- incorporates unique meteorological phenomena which are often unpredictable or volatile including:
  - Gulf Stream influences;
  - topography influences;
  - seasonal changes; and
  - weather phenomena such as projected hurricane activity in planned routes;
- develops specific forecasts for ships that have organic aircraft or unique parameters such as:
  - submarines;
  - salvage ships carrying divers; or
  - ships that are carrying sensitive or highly unstable cargo; and
- prepares wide-area forecasts for current operational areas.

Difficulty and Originality Involved – Exercises judgment and originality to:

- evaluate diverse, complex weather systems and develop forecasts for extremely large areas such as:
  - North and South Atlantic;
  - Caribbean and Gulf of Mexico; or
  - North Sea; and
- analyze and interpret data to make decisions under pressure and stress of time and mission impact.

⇦ BACK

(continued)

Level 4-4: Meteorological Technician, GS-1341 (continued)

Nature of Assignment – Work consists of providing forecast and atmospheric data collection on a micro-meteorological scale for a research and development (R&D) facility that requires nonstandard or extremely narrow testing parameters.

What Needs To Be Done – The employee selects appropriate instrumentation to obtain valid results based on field conditions and instrument responses during their operation. The employee performs the following duties:

- provides forecasting for a test field by adapting established data collection and processing techniques to meet testing requirements;
- collects various atmospheric data using large arrays of sensors to provide site-specific information on a very fine scale; and
- adapts instruments to obtain unique atmospheric measurements that are not typical of meteorological information such as:
  - long and short solar radiation exposure;
  - transmissivity; and
  - specific optical wavelengths.

Difficulty and Originality Involved – Exercises judgment and originality to:

- identify when new or state-of-the-art instrumentation is required to meet the test requirements;
- draw on experience and technical skill to plan and configure unique instrumentation for the specific data collection parameters required by the test manager;
- consider various complex marine/land weather influences in the area while preparing a forecast; and
- adapt standardized, national meteorological models to provide specialized forecasts and detailed information required by the site or test manager.

⇐ BACK

Level 4-4: Cartographic Technician, GS-1371

Nature of Assignment – Work consists of varied duties completed through the application of differing, unrelated procedures and methods in order to perform complex tasks or solve difficult technical problems.

What Needs To Be Done – The employee decides what must be done by interpreting considerable data, devising plans, or refining methods or technological approaches.

Difficulty and Originality Involved – Exercises originality to:

- adapt unusual control configurations or inadequate horizontal and/or vertical control;
- analyze new technology or techniques for future projects; and
- resolve problems including:
  - methods to use in order to meet control specifications of small- and large-scale mapping projects;
  - extending horizontal and vertical control where ground control is inadequate; and
  - producing maps with complex configurations and a wide range of information.

⇐ BACK

Level 4-4: Geodetic Technician, GS-1374

Nature of Assignment – Work consists of planning and coordinating geodetic field projects using high precision survey instruments and modifying or developing new instrumentation based on field conditions.

What Needs To Be Done – The employee selects appropriate instrumentation and data measurement and reduction methods to obtain valid results based on field conditions and required accuracy. The employee performs the following duties:

- evaluates the data collection objectives taking into consideration weather forecasts and safety conditions;
- secures proper permits for access to public and private land; and
- obtains instruments needed to obtain the level of accuracy required;

Difficulty and Originality Involved – Exercises judgment and originality to:

- plan and modify procedures based on environmental conditions;
- determine personnel and logistical requirements for survey teams; and
- determine the geodetic adequacy as a basis for horizontal and vertical control for situations such as:
  - originating points based on various data; and
  - grid systems where the origins of data are:
    - frequently vague;
    - fragmentary; i.e., based on incomplete or suspect survey data; and/or
    - inaccurate; i.e., not at the required level of accuracy.

⇐ BACK

APPENDIX F5 – FACTOR 5 ILLUSTRATIONS

Level 5-2: Physical Science Technician, GS-1311

Scope of the Work – Work involves ensuring compliance with radiological control rules, regulations, and procedures in an area of moderate ongoing industrial activity such as a storage area or segment of a vessel.

Effect of the Work – Work affects determinations on whether:
- areas or facilities require radiological control; and
- decontamination procedures are acceptable.

⇐ BACK

Scope of the Work – Work involves analyzing bodily fluid for the use of alcohol or specifically designated chemical compounds. The employee follows well-established laboratory steps and meticulous record-keeping procedures to:

- test, label, and segregate samples;
- record and report results; and
- ensure confidentiality.

Effect of the Work – Work affects the accuracy of test results and the equity of subsequent decisions.

⇐ BACK

Scope of the Work – Work involves supporting scientists and/or engineers by analyzing samples as well as facilitating the development of new methods.

Effect of the Work – Work affects the quality and timeliness of analyses.

⇐ BACK

Level 5-2: Hydrologic Technician, GS-1316

Scope of the Work – Work involves collecting and reporting basic hydrologic data used for such purposes as planning water development projects, devising conservation approaches, or measuring water quality.

Effect of the Work – Work affects the timeliness of hydrologic data requested or reimbursed by customers, cooperative organizations, water districts, and project personnel.

⇐ BACK

Level 5-2: Meteorological Technician, GS-1341

Scope of the Work – Work involves conducting a basic weather watch for the purpose of taking, recording, and compiling a variety of meteorological data.

Effect of the Work – Work contributes to information that is used to develop flight forecasts for aircrews.

⇐ BACK

Level 5-2: Cartographic Technician, GS-1371

Scope of the Work – Work involves determining whether properties to be acquired for flood control or other similar projects have current maps in a civil works or engineering office.

Effect of the Work – Work supports the preparation of project maps showing legal descriptions and acreage for the properties.

⇐ BACK

Level 5-2: Geodetic Technician, GS-1374

Scope of the Work – Work involves performing a variety of basic horizontal and vertical control network surveys and topographic surveys to support cartographic products produced by departments such as engineering and construction.

Effect of the Work – Work impacts the decisions of engineers and planners who depend upon the accuracy and completeness of the employee's field work and office data.

⇐ BACK

Level 5-3: Physical Science Technician, GS-1311

Scope of the Work – Work involves:

- developing and validating analytical methods for use by scientists, engineers, and higher-grade technicians;
- providing sample analyses; and
- generating data for research projects.

Effect of the Work – Work supports a variety of research studies by performing sample analyses and affects the adequacy and timeliness of analytical data generated for scientists. The information generated by the studies supports research efforts.

⇐ BACK

Scope of the Work – Work involves assessing or investigating unusual radiological control situations and dealing with incidents in the critical minutes before senior employees can take over.

Effect of the Work – Work impacts:

- radiological control;
- production deadlines when a stop work order is issued;
- determining causes of incidents; and
- preventing or containing radiological contaminates from affecting the harbor ecology and health of agency employees and local citizens.

⇐ BACK

Level 5-3: Hydrologic Technician, GS-1316

Scope of the Work – Work involves collecting, computing, and compiling hydrologic data for:

- publication in hydrologic data reports;
- research by hydrologists;
- customers for hydrologic studies; and
- project personnel.

Effect of the Work – Work affects:

- the accuracy of reports generated; and
- the quality of scientific studies by hydrologists.

⇐ BACK

Level 5-3: Meteorological Technician, GS-1341

Scope of the Work – Work involves providing the most accurate and timely weather forecasts using collected data. The employee also evaluates historical data in order to refine forecasts and weather models.

Effect of the Work – Work affects the ability of organizations in the area to schedule events that are weather sensitive and allows organizations to avoid or prepare for undesirable weather conditions.

⇐ BACK

Level 5-3: Cartographic Technician, GS-1371

Scope of the Work – Work involves digitizing, coding, and tagging cartographic data; processing digital images, and producing digital cartographic data. The data is stored in a database where it is made available to other Government agencies and the private sector.

Effect of the Work – Work affects the timeliness, accuracy, reliability, and acceptability of the digital cartographic data and the products generated from them.

⇐ BACK

Scope of the Work – Work involves:

- providing horizontal and vertical control values and base sheet plotting instructions to support map compilation and orthophoto operations;
- validating mapping projects for compliance with established standards; and
- providing operational support to mapping activities.

Effect of the Work – Work affects the accuracy and timeliness of final map products and contributes to the quality of the computation of photogrammetric control information for the final project.

⇐ BACK

(continued)

Level 5-3: Cartographic Technician, GS-1371 (continued)

Scope of the Work – Work involves:

- supplying a full range of cartographic services and products including:
  - producing and updating maps; and
  - resolving geographic discrepancies; and
- using transfer technology to go from graphic map production to digital map production to include:
  - defining required digital techniques; and
  - implementing the automated dissemination of digital procedures and products.

Effect of the Work – Work affects the reliability, accuracy, and timeliness of the cartographic products used by the public, private firms, and a wide range of Government organizations.

⇐ BACK

Level 5-3: Geodetic Technician, GS-1374

Scope of the Work – Work involves conducting a variety of surveys supporting cartographic products produced by departments such as engineering and construction, involving:

- basic horizontal and vertical control networks;
- cadastral information;
- hydrographic data;
- topographic data; and
- requested special surveys.

Effect of the Work – Work affects the decisions of engineers and planners who depend upon the accuracy and completeness of the incumbent's field work and office data.

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APPENDIX H – HISTORICAL RECORD AND EXPLANATORY MATERIAL

KEY DATES AND MILESTONES

In **March 1997**, the Classification Programs Division (CPD) (formerly the Office of Classification) within the U.S. Office of Personnel Management (OPM) notified agencies that we were about to resume an earlier effort to develop the Position Classification Standard for Technical Occupations in the Physical Sciences Group, GS-1300.

During **1998** we conducted factfinding at 14 locations representing five major agencies within the Federal Government. We applied the information gathered from the factfinding and other data collected to develop the Draft Job Family Position Classification Standard for Technical Work in the Physical Sciences Group, GS-1300. Thereafter, we electronically released the draft for agency review, comment, and test application. The release of this draft represented the first use of our pre-planned lead agency approach in which we asked those agencies with the largest covered populations to take the primary role in reviewing and commenting on the draft. By using the lead agency approach, we did not require agencies with few or no employees in the covered occupations to provide comments if it was of no appreciable benefit to them. The new streamlined approach worked well by yielding prompt, comprehensive information and suggestions. This appendix addresses concerns expressed by reviewing agencies and describes our responses in this final job family position classification standard. It also gives information that may help in transitioning from cancelled standards to this new job family standard.

RESULTS OF AGENCY REVIEW, COMMENT, AND TEST APPLICATION

A. JOB FAMILY STANDARDS – GENERAL ISSUES. In addition to using the job family standard approach to developing and issuing position classification standards, we make every attempt to simplify and streamline position classification concepts, documents, and procedures with each succeeding issuance of a new job family standard (JFS). We relied on the help of agency subject-matter experts and human resources officials in developing and reviewing this JFS. This standard also incorporates lessons learned from recent JFS issuances.

1. **Changing Titling Practices to use "Technician" for Technical Support Work.** As we move forward with developing General Schedule JFSs, we are continuing our policy to establish consistent titling practices. We proposed a change in position titling for the occupations covered by this standard. Just as in other one-grade interval standards, we are eliminating use of the term "Aid" in titling. Formerly, we prescribed the use of the term "Aid" for titling lower graded technical support positions in the GS-1300 Group such as those graded at the GS-4 grade level and below. We found that this titling practice was not applied consistently and caused confusion to users. The elimination of the term "Aid" in the final version of this JFS reflects our continuing effort to simplify all aspects of position classification and to ensure consistent titling practices for similar categories of work.

   Agency Comments: An overwhelming majority of respondents supported the change. Only one respondent felt it was inappropriate to apply the term "Technician" to the positions of lower-graded employees such as temporary employees hired for the summer.

Our Response: We are implementing the new titling practice in this JFS and will continue to eliminate the term "Aid" from subsequent JFSs that cover one-grade interval technical occupations. In cases where agencies wish to distinguish between lower- and higher-level technical work, they may use an organizational title, which could use a label such as "Aid," in addition to the official position classification title to emphasize the distinction.

2. **Evaluating Technical Work Using a Professional Standard.** Under rare circumstances, the work of a technician may exceed the factor levels in the JFS. We have included guidance in "How to Use These Grading Criteria" and a note in FLD 1-7 to aid in evaluating such work. It is important to classify a position, whether professional or technical, by comparing it with the appropriate standard in its entirety, rather than by selecting only those portions that seem to fit on a piecemeal basis. When cross-referencing a professional standard, in this case for a scientific discipline, to assign factor levels above those contained in this JFS, you must consider the nature of assignments, qualifications, and the intent of the position.

   Agency Comments: No agencies commented on the additional guidance.

   Our Response: We believe it is important that we caution users concerning cross-referencing professional standards when evaluating technician work to emphasize that they must be applied in their entirety. We will retain the additional guidance.

B. THE GS-1300 JOB FAMILY STANDARD FOR TECHNICAL WORK – SPECIFIC ISSUES. We also requested responses to a set of specific questions relevant only to technical work in the Physical Science group that this JFS covers.

1. **Eliminating the Use of Numbers as a Grade Determining Factor.** Two of the occupational series, the Hydrologic Technician Series, GS-1315, and the Meteorological Technician Series, GS-1341, previously used the number of customers as an aspect of grading criteria. That method quickly becomes antiquated and loses meaning with shifts in populations.

   Agency Comments: No agencies commented on our proposal to eliminate numbers as an aspect of grading criteria.

   Our Response: This final JFS does not include references to the numbers of customers served in grading criteria.

2. **Updating the Terminology To Reflect Current Technology in the JFS.** The most significant change in all the occupations covered by this JFS is the computerization of equipment and instrumentation. Obviously, these advances in technology permit technicians in positions covered by this JFS to work with greater precision and efficiency than ever before. The availability of spatial data in digital form, the interface of analytical instrumentation with computerized data collection and data reduction devices, and access to remote sensing technology to gather and record scientific information permit faster acquisition of data, while providing more reliable and readily accessible data. The impact of these technical advances is pervasive in the work covered by this JFS and in many other scientific job families.

Technological advances are manifested in such systems as: (1) the Global Positioning System (GPS), a satellite-dependent remote sensing system originally developed for navigation; and (2) the Geographic Information System (GIS), a system developed to record and retrieve spatial information using digitized data. GPS allows employees to map, survey, and collect a variety of information rapidly and accurately. Employees can pinpoint the longitude and latitude from which data and specimens are acquired with a level of precision, speed, and reliability formerly unknown. GIS facilitates the collection and retrieval of innumerable types of data in relation to the geographic area to which they pertain. Both systems represent important tools in gathering and analyzing information concerning a multitude of issues and phenomena.

Agency Comment: Because of the growing use of GPS and GIS a few agencies asked that we make greater reference to them in factor level descriptions and in illustrations.

Our Response: This final JFS includes references to GPS and GIS in factor levels and illustrations. This appendix further addresses the implications of advanced technology on occupations covered by this JFS.

Agency Comment: One agency suggested that the Geography Series, GS-0150, should be incorporated into this JFS because his agency often encountered job candidates versed in the use of GIS among graduates with academic degrees in Geography.

Our Response: This JFS recognizes the use of GIS as an important tool used by technicians to record and retrieve data. However, the Geography Series is a professional series that demands full academic credentials in a field that requires broad conceptual and theoretical understanding of a recognized scientific field. Simply because a GIS course may be offered as part of the curriculum does not mean that all occupations that utilize the Geographic Information System should be covered by this JFS.

Products and information recorded and presented using GIS technology are applicable to diverse projects undertaken in many different scientific and engineering disciplines, as well as in law enforcement and medical research activities. Current applications of GIS are wide ranging. They relate to such efforts as controlling urban sprawl; planning infrastructure and transportation systems; enhancing economic development; gauging the status and demographic trends in species of flora and fauna; depicting subsurface geologic formations and mineral deposits; defining the location and the three-dimensional boundaries of archeological sites; and mapping visible natural and man-made surface features, as well as invisible phenomena such as geomagnetic patterns and naturally occurring radioactivity.

We found that the knowledge of the procedures, content, and retrieval methods applicable to GIS is secondary to the principal knowledge essential to carry out the work of occupations covered in this JFS. In those situations where skill in the use of GIS is an important selection consideration, agencies may supplement basic titles with a suitable parenthetical title.

Agency Comment: One respondent engaged in map development expressed the view that the increased variety and volume of information available from multiple digitized and traditional sources justified credit at levels higher than those described in the draft for

Factor 3, Guidelines, and Factor 4, Complexity. Respondents cited the following work as worthy of higher credit:

- downloading data from various sources;
- unzipping compressed data files;
- converting/matching data and scales from more than two sources;
- merging mosaic images;
- enhancing pixels to take the tilt out of photographic images; and
- implementing GIS files for mapping use.

***Our Response**:* We agree that modern mapping methods draw on new technology and diverse types of data. However, Factor Level 3-4 in the JFS is consistent with the Primary Standard at Appendix 3 of the Introduction to the Position Classification Standards, against which we must equate all factor levels. The JFS at Factor Level 3-4 specifically states that the employee must draw upon guidelines to use new methods, *and* that the employee must also deviate from traditional methods and develop new methods to accommodate novel variables. Therefore, we made no changes in Factor Level 3-4. As described in this JFS, the factor level fully covers modern map-making practices identified by the respondent.

Similarly, Factor Level 4-4, the highest level described in the draft, easily accommodates the level of complexity described in the comments supplied by the respondent. Factor Level 4-4 in the JFS describes complexity in terms of the need to assess unusual circumstances or conflicting data and to make determinations regarding interpretation of considerable data and refinement of methods. The JFS is consistent with the Primary Standard and provides credit that meets or exceeds the nature of the work described by the respondent. Factor Level 4-4 continues to be the highest level described in the final JFS.

3. **Assessing Impact on Grades.** We followed our usual practice of requesting that reviewing agencies report any effect that applying the draft JFS had on the grades of the tested positions. The JFS covers approximately 4,500 positions Governmentwide.

   Agency Comments: Most reviewing agencies reported that the test application of the draft JFS resulted in little or no changes to current grades. Only one agency reported a potential downgrade of one position.

   Our Response: Based on the results of agency test application and final review and on our accommodations of final comments and concerns, we had ample justification to release the final JFS and thereby establish up-to-date classification guidance.