

**BOARD FOR
PROFESSIONAL ENGINEERS,
LAND SURVEYORS, AND GEOLOGISTS**

***PROFESSIONAL GEOPHYSICIST (PGp)
EXAMINATION OUTLINE
JUNE 2014***

Professional Geophysicist Examination Outline

I. PROJECT PLANNING (44%): This content area assesses the candidate's knowledge of designing a project that is consistent with geophysical methods and client objectives.	
A. Predesign Planning (22%)	
<i>Job Task</i>	<i>Associated Knowledge Statement</i>
<ol style="list-style-type: none"> 1. Determine applicability of geophysical methods for projects by evaluating client objectives. 2. Assess geophysical project sites through field inspection, site history, and review of existing data to identify conditions that may impact project scope. 3. Select geophysical investigation methods in accordance with site conditions, geology, and client objectives. 4. Select equipment and instruments required for various geophysical investigation methods. 5. Identify and evaluate public safety concerns related to geophysical projects. 6. Develop conceptual geophysical models for geophysical projects. 	<ol style="list-style-type: none"> 1. Knowledge of geophysical investigation methods and their applications. 7. Knowledge of methods used to estimate geophysical parameters. 2. Knowledge of methods for obtaining existing physical, geophysical, geological, and other relevant data. 10. Knowledge of interference sources that affect geophysical data quality. 37. Knowledge of geological principles related to geophysical projects. 5. Knowledge of site physical characteristics that could impact the quality of geophysical data. 8. Knowledge of geophysical characteristics that differentiate targets from their surroundings. 18. Knowledge of magnetic measurement methods and their applications. 19. Knowledge of seismic measurement methods (e.g., surface wave analysis, seismic refraction/reflection, ground vibration analysis, seismic tomography) and their applications. 20. Knowledge of gravity measurement methods and their applications. 21. Knowledge of electrical measurement methods and their applications. 22. Knowledge of electromagnetic measurement methods (e.g., VLF, GPR, TDF) and their applications. 23. Knowledge of borehole geophysical methods and their applications. 9. Knowledge of geophysical instruments, their applications, and their limitations. 11. Knowledge of procedures for assessing public health and safety risks associated with geophysical projects. 39. Knowledge of physics principles related to geophysical projects.

Professional Geophysicist Examination Outline

B. Project Design (22%)	
<i>Job Task</i>	<i>Associated Knowledge Statement</i>
<p>7. Design geophysical projects based on site conditions, geology, regulations, and client objectives.</p> <p>8. Identify and evaluate environmental and operational hazards related to geophysical work.</p> <p>9. Prepare/revise project work plans in accordance with geophysical project requirements.</p> <p>10. Identify and apply relevant local, state, and federal regulations to geophysical projects.</p> <p>11. Develop quality assurance (QA) and quality control (QC) plans and procedures to ensure the validity of data gathered during geophysical projects.</p> <p>12. Assess the limitations of geophysical projects using available data.</p>	<p>37. Knowledge of geological principles related to geophysical projects.</p> <p>35. Knowledge of how geohazards impact human occupancy, infrastructure, and the environment.</p> <p>6. Knowledge of methods used to calculate cost estimates for geophysical projects.</p> <p>3. Knowledge of local, state, and federal regulations related to geophysical projects.</p> <p>34. Knowledge of California Occupational Safety and Hazard Act (Cal/OSHA) laws and regulations related to geophysical work.</p> <p>12. Knowledge of quality assurance (QA) and quality control (QC) requirements and procedures related to geophysical data.</p> <p>17. Knowledge of methods for minimizing interference and instrument error when collecting geophysical data.</p> <p>4. Knowledge of the limitations of geophysical surveys.</p>

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II. INVESTIGATION PREPARATION AND DATA COLLECTION (22%): This content area assesses the candidate's knowledge of preparing an investigation and collecting data for a geophysical project.			
<i>Job Task</i>		<i>Associated Knowledge Statement</i>	
13.	Develop and implement site safety plans and procedures to mitigate hazards related to geophysical work.	32.	Knowledge of operational and environmental hazards related to geophysical work.
14.	Set up survey grids and lines on geophysical projects.	33.	Knowledge of methods for minimizing hazardous site conditions (e.g., safety zones).
15.	Initialize and set recording parameters on geophysical instruments.	15.	Knowledge of basic field survey techniques (e.g., map reading, grid layout, compass use, GPS use) and their applications for geophysical projects.
16.	Calibrate or validate instruments used in geophysical projects according to equipment specifications.	13.	Knowledge of procedures for setting up geophysical instruments and recording their parameters.
17.	Record data using measurement methods outlined in work plans or geophysical survey designs.	14.	Knowledge of calibration/validation requirements and techniques for geophysical instruments.
18.	Verify that geophysical measurements and data have been collected in accordance with applicable standards and work plans.	16.	Knowledge of methods and procedures for using various instruments and equipment in geophysical projects.

III. DATA ANALYSIS AND REPORTING (34%): This content area assesses the candidate's knowledge of processing, analyzing, and interpreting geophysical data. It includes the candidate's knowledge of communicating project results. It also includes professional ethics and legal compliance.			
A. Data Analysis and Interpretation (20%)			
<i>Job Task</i>		<i>Associated Knowledge Statement</i>	
19.	Process geophysical data using appropriate techniques.	25.	Knowledge of methods for processing geophysical data.
20.	Analyze geophysical data using applicable principles.	26.	Knowledge of geophysical software applications for data analysis and their limitations.
21.	Interpret geophysical results by integrating geological information, site conditions, and project objectives.	24.	Knowledge of methods for evaluating the quality of geophysical data.
		27.	Knowledge of data analysis techniques for geophysical data.
		28.	Knowledge of methods for integrating a geophysical model into a geological model.
		37.	Knowledge of geological principles related to geophysical projects.
B. Reporting and Compliance (14%)			
22.	Prepare technical documents to communicate the findings of geophysical projects.	29.	Knowledge of methods for documenting and communicating geophysical results to various audiences (e.g., client, public, regulatory agency).
23.	Report geohazard findings to clients and/or governmental agencies.	30.	Knowledge of methods for preparing data visualizations (e.g., digital presentations, maps, cross sections) to depict results of geophysical projects.
24.	Conduct professional work in compliance with ethical standards and legal requirements.	31.	Knowledge of requirements for reporting geophysical findings to clients and regulatory agencies.
		36.	Knowledge of legal responsibilities for reporting geohazards to clients and governmental agencies.
		38.	Knowledge of California Code of Regulations, Title 16, Division 29 (Professional and Vocational Regulations), Sections 3000 - 3067 related to geophysicists.
		40.	Knowledge of California Business and Professions Code related to geophysicists.