

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Develop a  
Risk-Based Decision-Making Framework to  
Evaluate Safety and Reliability Improvements  
and Revise the General Rate Case Plan for  
Energy Utilities

R.13-11-006  
(filed November 14, 2013)

**PACIFIC GAS AND ELECTRIC COMPANY'S (U 39 M)  
RESPONSES TO QUESTIONS**

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# **ATTACHMENT A**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**RESPONSES TO THE QUESTIONS SET FORTH IN**  
**ATTACHMENT A TO THE ORDER INSTITUTING RULEMAKING**  
**(R.13- 11-006)**

## Introduction

Pacific Gas and Electric Company (PG&E or the Company) hereby provides responses to the questions listed in Attachment A to the California Public Utilities Commission's (CPUC or the Commission) "Order Instituting Rulemaking to Develop a Risk-Based Decision-Making Framework to Evaluate Safety and Reliability Improvements and Revise the General Rate Case Plan for Energy Utilities," dated November 22, 2013 (OIR). The OIR is designated Rulemaking (R.) 13-11-006.

As the Commission explained, the questions in Attachment A to the OIR "examine the way utilities identify risk and evaluate the value of investments and operations, so that we might more effectively determine what changes are necessary in our regulatory practice." (OIR, p. 13.) At PG&E, the identification and evaluation of risk and the value of investments permeates nearly all of PG&E's activities either explicitly or implicitly. To provide succinct responses to the Commission's questions is challenging. Toward this end, PG&E has taken the following steps.

- First, PG&E has focused its responses on illustrating the corporate Enterprise and Operational Risk Management Program and how its three core lines of business - Gas Operations, Electric Operations and Energy Supply - use that program to manage operational risk. This is not meant to suggest that these are the only lines of business that manage risk. For example, PG&E's Information Technology department manages PG&E's cyber security risk.<sup>1</sup> Also, PG&E's Customer Care organization addresses many safety risks by serving as the frontline, receiving customer notifications of possible safety hazards.
- Second, due to the volume of potentially responsive activities, many of PG&E's responses are illustrative in nature. In several instances, in the interest of brevity, PG&E has provided examples of initiatives, not comprehensive lists.
- Third, PG&E's responses reflect a current snapshot in time of a rapidly evolving area. PG&E continues to improve its risk management procedures. PG&E expects that today's data and procedures will be replaced by better data and procedures in the coming months and years. PG&E has not tried in these responses to forecast activities or procedures in the future.

To the extent that the Commission would like more information in areas that PG&E has not addressed, PG&E looks forward to opportunities during the course of this OIR to address the Commission's interests.

Finally, PG&E notes that certain terms used by the Commission in the OIR are open to different interpretations. For instance, terms like "risk management" or "safety risk" may mean different things to a risk professional than to a lay person. PG&E urges the Commission to develop common definitions of key terms early on in the OIR process.

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<sup>1</sup> PG&E provided a detailed evidentiary showing on cyber security in its recent General Rate Case, A. 12-11-009.

**1. Please provide a description of your risk management units/divisions, programs, functions, and process, including organization charts.**

PG&E's Risk and Audit department is charged with establishing and managing Pacific Gas and Electric Company's (PG&E or the Company) risk management program. Risk and Audit is a centralized organization led by the Chief Risk and Audit Officer (CRO), and ultimately reports to the Chief Financial Officer. Within this organization are five departments: Enterprise and Operational Risk Management (EORM), Internal Audit, Compliance and Ethics, Market and Credit Risk Management and Corporate Security. The EORM department is responsible for defining and guiding the EORM Program, including tracking and monitoring Enterprise Risks.<sup>2</sup> This organization is led by a senior manager and there are three EORM Principals and an EORM senior analyst within the group.

Each of the core lines of business (LOB)<sup>3</sup> has established a risk function to implement the EORM Program within its LOB. Risk managers embedded within the LOBs are responsible for implementing the EORM Program within their LOB. The structures of the LOB risk functions differ based on the LOB operations and organization structure, but the roles and responsibilities for supporting the EORM Program are consistent. Specifically, each LOB identifies and evaluates its risks, develops a LOB-specific Risk Register,<sup>4</sup> establishes and implements risk response plans, and develops metrics to monitor top risks. Additionally, each LOB has established a Risk and Compliance Committee, chaired by a senior executive, to actively manage the top risks on its Risk Register.

The Board of Directors and the Audit Committee monitor the EORM Program and results. Enterprise Risks identified through the EORM Program are overseen by Board committees. The Audit Committee assigns specific Enterprise Risks to the Nuclear, Operations, and Safety Committee or, as appropriate, other committees of the Board. For each of the identified Enterprise Risks, the assigned committee receives periodic reports from management regarding the nature of the risk and the status of the Company's mitigation and control activities.

**Risk and PG&E's Integrated Planning Process**

Risk management is also a foundational component of PG&E's operational and financial planning, which is done through PG&E's "integrated planning process." The planning process is composed of three major activities:

1. *Identifying top enterprise and operational risks facing the Company, and key compliance requirements for each LOB.* This component of the integrated planning process is referred to as the Risk and Compliance Session or "Session D." In Session D, each LOB describes its list of top risks and mitigation strategies, and

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<sup>2</sup> "Enterprise Risks" are risks that could have a catastrophic impact on PG&E.

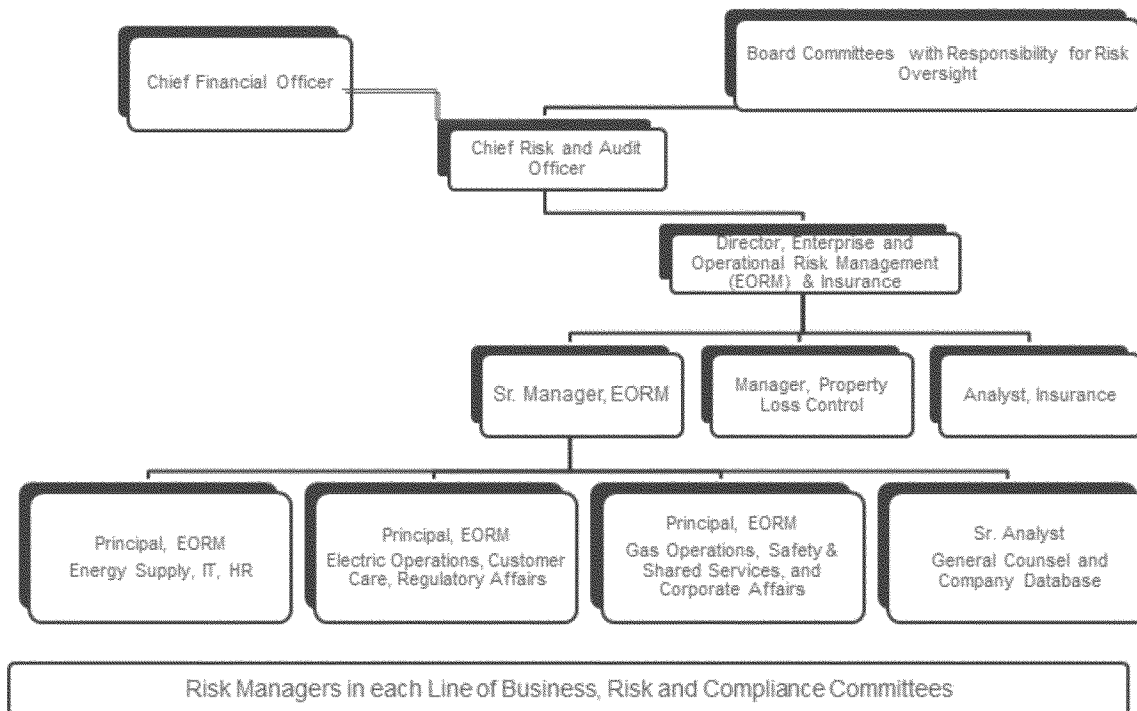
<sup>3</sup> The core LOBs include Gas Operations, Electric Operations, and Energy Supply.

<sup>4</sup> The Risk Register includes the inventory of risks within each LOB and provides a record of what the LOB is doing to manage the risks.

- discusses the specific support needed from other LOBs to help manage those risks. Additionally, senior management examines the range of risks represented by the LOBs and, from that list, identifies the Company's top risks or Enterprise Risks.
2. *Developing a strategic plan that supports PG&E's goals regarding public and employee safety, reliability, and affordability.* This element of the integrated planning process is referred to as the Planning and Strategy Session, "Session 1." In this session, strategic imperatives and business objectives are established. Management discusses strategies, goals and initiatives, and risk management activities that enable successful plans to meet PG&E's short-term and long-term goals.
  3. *Conducting review and prioritization meetings and approving expense and capital budgets.* This component of the integrated planning process is referred to as the Execution Plan Session, "Session 2." In Session 2, senior management reviews the LOBs' forecast operating and capital expenditure submissions with the goal of optimizing the use of financial resources toward achieving the business objectives. This session also focuses on the metrics, targets, and operational objectives (including those dedicated to risk management) for each LOB.

Included below is an organization chart for the Company's Enterprise and Operational Risk Management group.

## EORM Organizational Structure



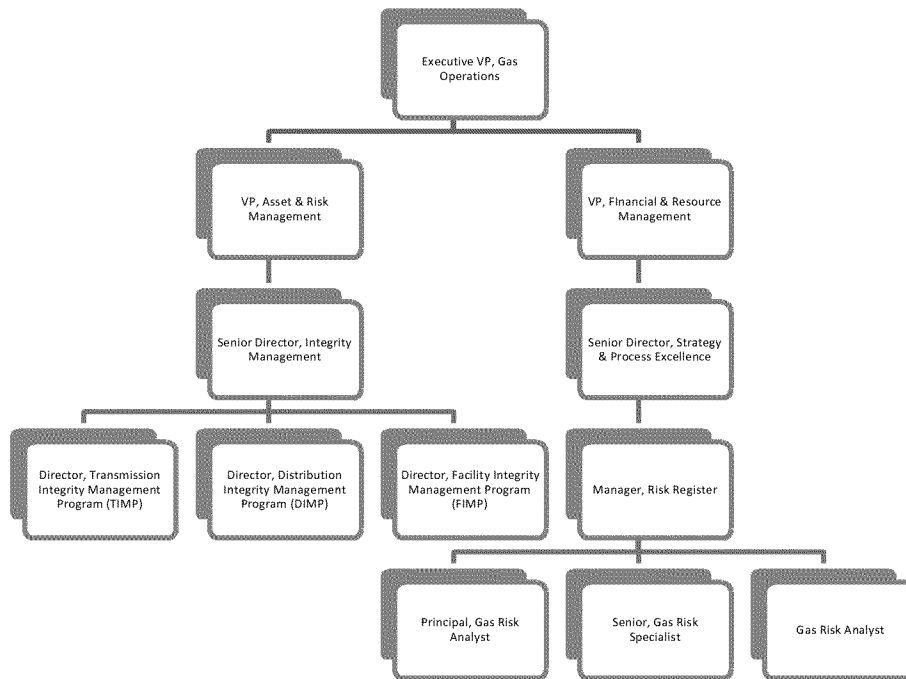
Gas Operations, Electric Operations and Energy Supply each have a risk manager function responsible for the following activities:

- leveraging subject matter expertise to identify and evaluate enterprise and operational risks;
- developing and maintaining a LOB-specific Risk Register;
- monitoring the on-going status and completion of approved risk mitigations;
- ensuring that risk is explicitly included in both the strategy and execution plans developed as part of PG&E’s integrated planning process.

The following organization charts illustrate the risk management structure within each of PG&E’s three core operations areas: Gas Operations, Electric Operations and Energy Supply.

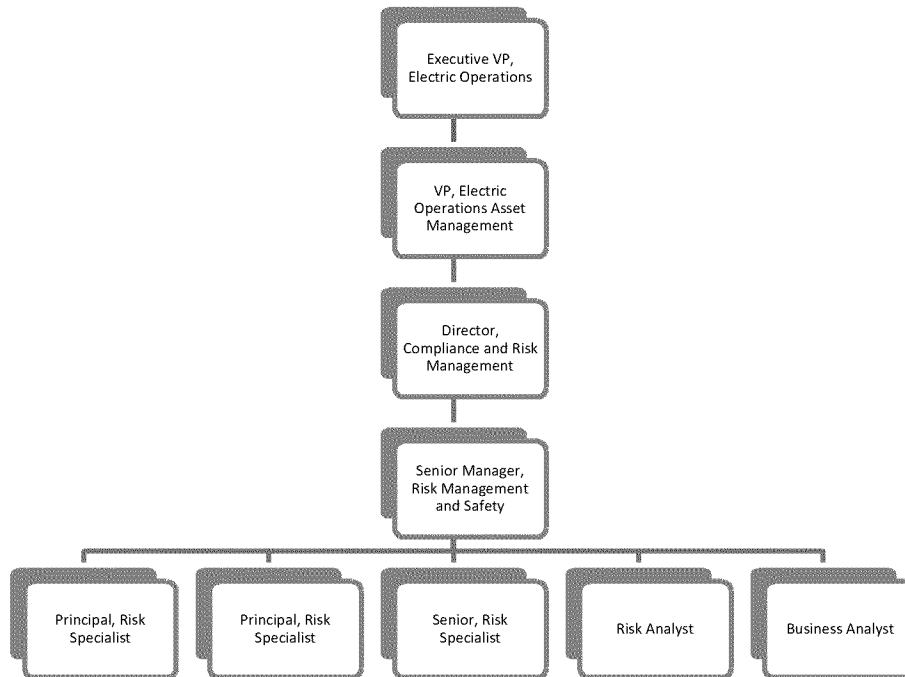


## Gas Operations Risk Management Organizational Structure



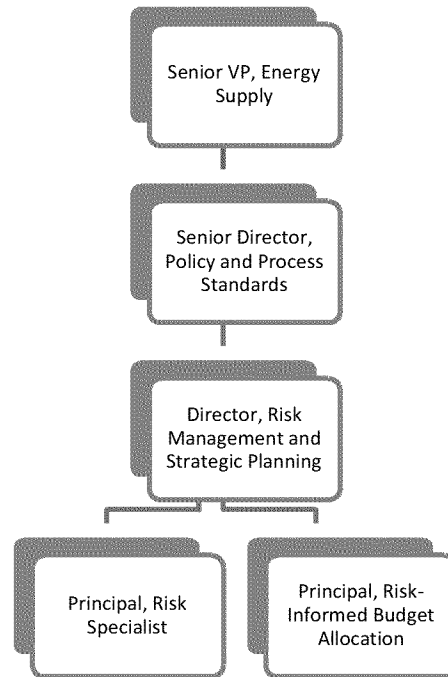
In Gas Operations, the risk manager function is performed by the Manager, Risk Register.

## Electric Operations Risk Management Organizational Structure



In Electric Operations, the risk manager function is performed by the Senior Manager, Risk Management and Safety.

## Energy Supply Risk Management Organizational Structure



In Energy Supply, the risk manager function is performed by the Principal, Risk Specialist.

## **2. How do you currently identify and characterize risk?**

### **Overall Risk Identification Process**

As mentioned in response to Question 1, each core LOB has developed and maintains a Risk Register, an inventory of risks facing the LOB.

New risks are generally identified in one of two ways:

1. In the fourth quarter of every year, the LOB Risk Manager performs an annual risk refresh (described below) that is aimed at updating the existing Risk Register and identifying new risks; and
2. Between each year's annual refresh, a new risk may be identified through ongoing communication and consultation with subject matter experts and leadership, and added to the Risk Register.

For the annual risk refresh, the Risk Manager conducts various Risk Identification Workshops and determines the overall approach to identifying risks within his/her LOB, including the following steps:

1. Reviews the current Risk Register and integrated planning documents;
2. Assesses the objectives and strategies of the Company and the LOB to determine if there are risks not already included on the Risk Register that would prevent the LOB from meeting its current objectives and strategies; and
3. Reviews internal and external data to determine if there are any potential exposures that would require new risks to be added to their Risk Register.

The Company uses a risk evaluation tool, known as Risk Evaluation Tool 2.0 or RET2, to score risks. RET2 is used to calculate the inherent risk, the current residual risk, and the forecasted residual risk that remains after proposed mitigations. Each risk event is measured against the following six impact groups: safety, reliability, compliance, environmental, reputational, and financial. The model uses weightings to ensure the output prioritizes risks that could significantly impact the Company's goal of providing safe, reliable and affordable service to its customers.

Once risks are evaluated using the tool, RET2 generates "heat maps" showing the relative placement of risks on scales measuring the likelihood of occurrence and the possible consequences. These heat maps help management prioritize which risks require additional mitigation.

The following sections provide additional information on how each of the three core LOBs identify risks.

### **Gas Operations**

To help manage the diversity of PG&E's Gas Operations assets, and as a foundational step in implementing an asset management system consistent with Publicly Available

Specification (PAS) 55,<sup>5</sup> PG&E established separate “asset families” within its Gas Operations business. For each of the families, an Asset Family Owner (AFO) was designated. This structure provides a single point of accountability and responsibility for fully understanding and managing the health of the assets within the family.

In Gas Operations, the risk identification process begins with collaboration workshops between the Risk Manager, AFOs, subject matter experts, industry experts and other relevant sources to methodically identify and assess the risks and associated threats that could impact Gas Operation’s ability to meet its strategic objectives. Risks and threats are identified and categorized. They are then recorded in the Risk Register in preparation for evaluation. Identification and monitoring of risks and threats is done on an ongoing basis. Risks with potentially high impact on public and employee health and safety are acted upon immediately. Other risks are added, scored and maintained on each asset family’s Risk Register with mitigating projects and programs considered and prioritized both within and across the asset families.

Using RET2, during the risk evaluation portion of this phase, a risk score is quantified as a product of the assessed likelihood of failure (LOF) and consequence of failure (COF) for each operational risk identified in the Risk Register. The risk scores are captured and can be ranked in the Risk Register by asset family and as an aggregate by Gas Operations. The Gas Operations Risk and Compliance Committee approves the Risk Register.

The development of this fully integrated asset risk management framework is complementary to the integrity management programs that are in place in Gas Operations, including the Transmission and Distribution Integrity Management Programs (TIMP and DIMP). The risks identified through TIMP and DIMP are also reflected in the Risk Register.

### **Electric Operations**

Risks included in Electric Operations' formal Risk Register are identified through review of historic event data, industry trends, leadership insight, previous corporate risk lists, and field observations. Risks in the register may or may not have occurred at PG&E, or even at other utilities, but are believed plausible threats to achieving the Company's goals of safe, reliable, and affordable electric service.

Electric Operations System Safety & Risk Management department also reviews public injury and fatality data (e.g., CPUC-reportable PG&E incidents, PG&E insurance claims) regularly to ensure that causes of such events are appropriately addressed in the scope of existing risk assessments. In addition to the steps outlined above, Electric Operations holds annual interviews with key Electric Operations leaders involved in strategy, engineering, and operations to identify additional possible risks for the Risk Register. Such possible risks are collected and

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<sup>5</sup> In 2014, Gas Operations is working to attain a globally recognized certification, PAS 55. PAS 55 is a world-class standard for Asset Management Excellence.

proposed to the Electric Operations Compliance and Risk Committee for approval and inclusion in the formal Risk Register. Electric Operations continues to evolve and enhance its approach to identifying new risks based on industry insights, operational experience, scenario planning, and workforce concerns.

### **Energy Supply**

Energy Supply's formal Risk Register includes risks identified through review of historic event data, industry trends, leadership insight, field observations, compliance violations, internal audit findings, and external audit findings. In addition, Energy Supply engages stakeholders across strategy, asset management, operations, and maintenance to identify additional possible risks for the Risk Register. As part of the annual risk refresh process, existing risks are revalidated and new risks are proposed to the Energy Supply Compliance and Risk Committee for approval and inclusion in the formal Risk Register. While the risk refresh process occurs on an annual basis, new risks may be identified at any time.

Both the Diablo Canyon and Power Generation operating groups have a formal asset management process to identify potential risks associated with equipment and infrastructure. These assessments are used to develop risk scores for these assets, which are in turn used to prioritize work in the planning process.

In addition, Diablo Canyon developed and has used an NRC-required formal Probabilistic Risk Assessment (PRA) program for over 20 years to assess, manage, and mitigate nuclear risk from internal plant activities such as maintenance and external environmental risks such as seismic. This NRC-required program is used on a daily basis and refreshed as necessary to optimize risk performance. Activities that are deemed higher-risk require risk management plans and pre-approval from the senior management team.

### **3. What are your top ten safety risks?**

The Company does not maintain a “top ten” list of safety risks. For the purpose of this response, PG&E has summarized (i) the Enterprise Risks and (ii) the Operational Risks for the core lines of business that have a large safety component.

Please note that the risks identified below are the result of analysis of a broad range of risks that have the potential to affect Company operations. Identification of such risks enables the Company to prioritize management activities and identify the related investments and revenue requirements necessary for the Company to provide customers with industry-leading operations. The risks identified should not be construed to reflect immediate threats to public safety. They do not. Such threats, if known, would be immediately addressed.

#### **Enterprise Risks**

The Company’s Enterprise Risks that could have a significant impact on public or employee safety are set forth below (in alphabetical order):

- **Cybersecurity Risk** – An intentional/unintentional loss of control of information and systems used for gas and electric operations (e.g., SCADA, plant networks, trading) and business operations.
- **Electric System Safety Risk** – A system condition associated with electric facilities that could directly lead to personal injury or fatality of either the public and/or employees.
- **Emergency Preparedness and Response to Catastrophic Events Risk** – The risk of ineffective preparation for or response to a catastrophic emergency. This risk includes business continuity and disaster recovery.
- **Environmental Risk** – The risk of actual or perceived impacts to human health or the environment from past, present, or future operations.
- **Gas System Safety Risk** – A system condition associated with gas facilities that could directly lead to personal injury or fatality of either the public and/or employees.
- **Hydro System Safety Risk** – The failure of a PG&E dam or other hydro facility that may result in significant harm to the public, PG&E resources (i.e., people and infrastructure), and/or the environment.
- **Nuclear Operations and Safety Risk** – Nuclear reactor core-damaging event with the potential for radiological release, as well as an extended shutdown of the Diablo Canyon Power Plant (for longer than three months or with a financial impact greater than \$100 million) due to equipment failure, natural disaster, regulatory action, or some other significant event.
- **Wildfire Risk** – PG&E assets may initiate a wildland fire that is not easily contained and that endangers the public, private property, sensitive lands, and/or leads to long-duration service outages.

## **Gas Operations**

Within the Enterprise Risk defined as “Gas System Safety Risk,” Gas Operations has provided additional specificity around the components of the overall risk. They are set forth below:

- Construction (Transmission) – Failure of vintage construction pipe in known regions of geo-hazards and localized landslide zones can result in significant impact on public safety, significant property damage, wide-scale/prolonged outages and/or significant environmental damage.
- Manufacturing (Transmission) – Rupture of transmission pipe with specific seam types can result in significant impact on public safety, significant property damage, wide-scale/prolonged outages and/or significant environmental damage.
- Internal Corrosion (Distribution) – Corrosion of copper pipe inserted in or connected to steel service can result in gas migration and ignition.
- Excavation Damage, Third Party Rupture (Distribution) – Damage to gas distribution facilities from a third party can result in public or employee safety issues and/or significant property damage.
- Excavation Damage, Cross Bore (Distribution) – Damage to distribution facilities as a result of the asset running through a sewer can result in public or employee safety issues and/or significant property damage.
- Manufacturing (Distribution) – Failure of Aldyl-A pipe can result in gas migration and ignition.
- Equipment Failure (Liquefied Natural Gas (LNG)/Compressed Natural Gas (CNG)) – Third party CNG vehicle tank ruptures due to integrity management shortfall by third party; occurs while filling tank at PG&E facility. The loss of containment can result in personal injury, loss of reliability (outage for days or weeks), and/or reduced capacity.
- Equipment Failure (Customer Connected Equipment) – Failure of meter sets (inside meter sets), especially in poorly ventilated spaces, can result in severe health issue or safety issue such as ignition.
- External Corrosion (Transmission) – Leak or rupture from transmission pipe resulting from external corrosion can result in public safety issue, significant property damage, wide-scale/prolonged outages, and/or significant environmental damage.
- Excavation Damage, Third Party No Rupture (Distribution) – Third party digging into PG&E pipelines results in damage to pipe, but no rupture.

## **Electric Operations**

In developing Electric Operations risk definitions and scoring scenarios, PG&E places emphasis on the public and employee safety consequences of the risk event. In addition to the Wildfire Risk and the Emergency Preparedness and Response to Catastrophic Events Risk



included in the Enterprise Risks listed above, Electric Operations' top safety risks include the following, most of which are sub-components of the Enterprise Electric System Safety Risk:

- System Safety, Distribution Overhead Conductor – Failure of, or contact with, energized electric distribution primary conductor results in public or employee safety issues, significant environmental damage, prolonged outages, or significant property damage.
- System Safety, Failure of Substation (Catastrophic) – Complete loss of substation results in significant wide-scale/prolonged outages, public or employee safety issues, significant environmental damage, or significant property damage.
- System Safety, Substation Transformer – Failure of or contact with energized substation transformer components results in public or employee safety issues, ignited fires, significant property damage.
- System Safety, Transmission Overhead Conductor – Contact with energized electric transmission conductor results in public or employee safety issues, ignited fires, significant property damage.
- System Safety, Distribution Overhead Support Structures – Failure of or interaction with distribution overhead wood poles/structures may result in public or employee safety issue or significant property damage.
- System Safety, Network Components in Urban/ High Density Areas – Failure of or interaction with network components in urban areas results in public or employee safety issue or significant property damage.
- System Safety, Transmission Wood Support Structures - – Failure of or interaction with transmission overhead wood poles/structures may result in public or employee safety issue or significant property damage.
- System Safety, Transmission Steel Support Structures – Failure of or interaction with transmission overhead steel structures may result in public or employee safety issue, reliability impacts, and/or significant property damage.

### **Energy Supply**

In addition to the two Enterprise Risks (i.e., Hydro System Safety Risk and Nuclear Operations and Safety Risk) mentioned above, Energy Supply has identified a number of Operational Risks with potential safety impacts.

- Public Access to Conveyance – Accessing hydro project water conveyance features not intended for public access (including canals, flumes, ditches, tunnels and penstocks) by any person may result in injury.
- Class B/C Waste Disposal – An incident associated with disposal of Class B/C Waste from the Humboldt Bay Power Plant decommissioning project could result in public, employee, and/or contractor safety issues.

- Liquid Waste Transportation Incident – An incident associated with liquid waste transportation may result in an inadvertent release of a significant amount of radioactive or industrial matter to the environment, which could lead to public and employee safety issues.
- Employee Qualification – Inability to maintain knowledgeable and qualified staff could lead to safety or security incidents and/or degraded performance.
- Fuel Cell – Operation of Fuel Cell systems may result in hydrogen explosion and/or natural gas leak/explosion.
- Ammonia Release Following Major Incident – Delivery, storage, and use of anhydrous ammonia may result in a major incident that leads to injury or environmental impacts.

#### **4. How do you identify changes to address these risks? Are practices beyond compliance with current regulation considered?**

In general, risks are identified and evaluated (scored using RET2), addressed, and monitored through the process described in response to Question 2. When risks are scored, LOBs evaluate the strength of current controls for the risk (many of which are compliance-related) to determine the level of current residual risk. For safety risks and other risks, PG&E often implements additional mitigations above and beyond whatever may be required for compliance with regulations.

PG&E has set forth below a few of the many areas where the Company's risk mitigation plans go beyond what is required by law.

##### **Gas Operations**

As a part of PG&E's asset management process, once threats and risks are identified and scored, PG&E identifies mitigation procedures based on compliance with regulations as well as going beyond compliance to consider industry best practice and professional judgment. PG&E continually assesses and revises its standards and procedures and goes beyond compliance in many instances. Current examples of work above and beyond compliance and regulatory requirements include:

- Patrol gas transmission pipelines more frequently than required by regulation.
- Annual leak survey of distribution system in areas identified with higher historical leak frequency, which is beyond the 5-year cycle required by regulation.
- Inspect sewer mains and laterals for unintentional boring of gas facilities through sewers—Cross Bore Program—which is not prescribed by current regulation.
- Perform In-Line Inspection in excess of the required pipe that is located in High Consequence Areas.
- Replace distribution pipeline beyond the levels of maintenance required by regulation.

##### **Electric Operations**

Asset strategy plans, work procedures, design and construction standards, and maintenance practices are established to both comply with regulations and manage exposure to operational risks. Examples of work above and beyond compliance and regulatory requirements include:

- Work to mitigate wildfire risks through additional wildfire patrols and vegetation removal. For example, in 2006, PG&E began developing an Urban Wildfire Reduction plan and took specific actions to reduce the risk of fire in designated urban areas. In 2011, PG&E expanded its fire risk work to include rural areas and the removal of overhanging tree branches on selected high risk circuits. This fire risk reduction work has been made a part of PG&E's Routine Tree Work and is

supplemental to the required distances for tree trimming specified in General Order 95 Rule 35 and Public Resources Code 4293.

- Annual inspections (which is above the required three year interval for general inspections of underground equipment) of Underground Load-Break Oil Rotary switches to determine whether a component has reached the end of its useful life. PG&E uses the assessment information to identify and prioritize switches for replacement.
- Installing manhole covers which are able to vent the sudden release of smoke and pressure and lock in place if there is an explosion within a vault, which is not required as part of General Order 128.
- Infrared inspection of distribution facilities, which is not required as part of General Order 165.
- Wood pole intrusive re-inspections are performed on a 10-year cycle which is faster than the required 20-year cycle.

### **Energy Supply**

As part of identifying appropriate mitigations, Energy Supply evaluates and implements activities that go beyond compliance obligations, such as additional dam inspections in order to manage the Hydro Operation Safety risk. While the Federal Energy Regulatory Commission requires regular independent inspections on all of PG&E's high hazard and significant hazard dams which are associated with its large and small dams, PG&E instigates independent inspections on other dams as well to ensure that there is a comprehensive view of potential risks. PG&E also performs inspections on its water conveyance systems (canals, flumes, penstocks, and tunnels), which are not required by any regulatory body. Other non-required activities include dam electrical and mechanical equipment seismic restraint evaluations to ensure equipment associated with dam operation will survive seismic events and also assessment of the survivability of personnel access routes to dams following seismic and flood events.

At Diablo Canyon risk assessment is formalized by procedures for all plant activities through a proven work control process that integrates Operations, Maintenance, Work Control and Engineering in assessment, prevention and mitigation. Any initiated work order will trigger the risk assessment process, which uses a graded approach. Plant personnel screen and evaluate the work using consistent tools to assess the degree of risk. The higher the risk, the more prevention and mitigation measures are applied and the higher level of leadership involvement occurs. When appropriate, risk management actions are specified based on the outcome of the assessment, and can take many forms, such as protection of other plant equipment that is redundant to the equipment being worked on, restriction of other activities, and application of prepared contingency plans. Risk assessment at Diablo Canyon goes well beyond regulatory requirements to ensure all activities at and around the plant are assessed in an individual and integrated fashion to maximize nuclear, industrial and radiological safety and to ensure the highest level of safety for the public.

**5. Currently how do you decide on resource expenditures to address recognized risks? Who decides? How is inspection and record-keeping used in this process?**

**Overall Integrated Planning Process**

PG&E's overall operating expense and capital budgets are developed, discussed, and approved through PG&E's integrated planning process, which was referenced in response to Question 1. Risk identification, mitigation, and management are submission requirements and discussion topics for Session D, Session 1, and Session 2 of the planning process. Present at these sessions are the Company's senior leaders, which include PG&E Corporation's Chairman and CEO, the utility President, and the senior officers from each LOB.

Session D is the first stage of the annual integrated planning process and includes a senior officer discussion of the top enterprise and operational risks facing the Company, as well as the key compliance requirements for which each LOB is responsible. During Session D, senior officers from all LOBs share their Risk Registers, mitigation strategies for their top risks, and specific support needed to help manage those risks. Additionally, the group collectively examines the range of risks presented by the LOBs and identifies the Company's Enterprise Risks to be overseen by a committee of the Board of Directors.

Informed by the results of Session D, in the May/June timeframe, each LOB then develops its strategic plan describing what it needs to do to achieve the Company's overall goals. At Session 1, senior officers meet to present the short- and long-term strategies, goals, and initiatives for their LOB and to discuss each other's work needs and priorities. Included in the Session 1 discussion is how each LOB plans to manage its identified risks to be successful in accomplishing its LOB strategic plan. At the conclusion of Session 1, the senior officer team determines the priorities for the Company as a whole to achieve its strategic goals.

In the September/October timeframe in Session 2, each LOB develops a detailed plan to execute on the strategies and priorities identified and agreed upon in Session 1. Also included in the Session 2 are the key metrics used to determine progress toward meeting short- and long-term goals. Each LOB's execution plan (known as the Session 2 submission) is developed through a bottom-up planning process involving engineers, subject matter experts, managers, and officers from across the LOB. An update on each LOB's risk profile as well as the funding levels, key activities, and metrics dedicated to managing the LOB's top risks are included in the Session 2 submissions from the LOBs and then discussed with the senior officer team at the Session 2 meeting. As part of the Session 2 process, senior officers from all LOBs collectively meet to discuss and prioritize, where necessary, the work and associated funding levels forecast by each LOB. At the conclusion of Session 2, the senior officer team agrees on specific budget targets for each LOB for the following year.

Additionally, the Company is expanding a risk-based work prioritization framework that was launched by PG&E's Gas Operations business in 2013. This initiative is called Risk-Informed Budget Allocation (RIBA), and its goal is to drive consistent application of risk scoring

and work prioritization within and across LOBs. The creation of the RIBA framework is a collaborative process across the core LOBs (Electric Operations, Gas Operations, and Energy Supply) and with the Enterprise and Operational Risk Management team. Teams in Finance and EORM are leading a working group of managers and directors from the core LOBs in developing the framework, and a Steering Committee of senior LOB officers is overseeing the initiative. The RIBA framework will initially be employed by the core LOBs.

Under the RIBA framework, the group proposing the work is asked to justify proposed work by assessing how it would address various risks and meet core Company obligations. The framework requires the group proposing the work to evaluate the potential risks to safety, reliability, and the environment if the work is not done. This evaluation results in a risk score for each work proposal.

Work will be prioritized for funding due to regulatory compliance, customer, and other obligations, regardless of risk score. The remaining work will be ordered from highest to lowest risk score and then adjusted as necessary. The full list of prioritized work will then be vetted by subject matter experts in LOB challenge sessions.

LOB challenge sessions will bring together engineers, asset managers, investment planners, finance managers, and business managers to discuss and debate the details of proposed work, and to ultimately develop a prioritized work plan that is presented to the LOB officer for approval. After reviewing the proposed list of prioritized work with the LOB officers, a cross-LOB challenge session will be held among the senior directors and officers of the LOBs.

PG&E has initiated a pilot phase to begin testing this framework with its core LOBs, which will run through early 2014. Once the core LOBs feel comfortable with the new RIBA framework, PG&E will establish process governance and data management protocols and train key members of the core LOBs on how to use the framework. PG&E's goal is to deploy the RIBA framework in time to prioritize 2015-2016 work proposals that emerge from Session 1 of the 2014 integrated planning process.

Additional detail on the allocation of resources to address identified risks for the three core LOBs is provided below.

## **Gas Operations**

In the development of an executable investment plan across all asset families, the Gas Operations Investment Planning team works with Asset Family Owners (AFOs), subject matter experts and others, to consistently score programs across asset families utilizing the same general framework that AFOs used to score risks at the asset level. The work to assess and rank threats and risks, as well as develop mitigation programs, uses (among other things) assessment of inspections and other records. At this point in the development of the investment plan, the focus is on scoring specific programs by risk reduction rather than scoring risks at the asset level. Once the total portfolio of proposed programs has been risk scored, Gas Operations Investment Planning applies constraints to the total portfolio, including system, resource, and execution

constraints. These include, for instance, not being able to perform the work while keeping the system operational to meet delivery requirements, or not having sufficient trained and qualified personnel available to perform the work.

Gas Operations Investment Planning then works with the AFOs to finalize the proposed investment plan based on the risks and constraints identified. This process requires discussion and tradeoffs among mitigation programs across asset families.

The process of developing an executable plan is completed twice within a year, once to develop and communicate the strategic plan as part of Session 1 and again to develop and communicate the detailed execution plan as part of Session 2. The output of this process feeds into the overall corporate development and approval process described above.

Since natural gas pipeline operations are dynamic—conditions change and new information develops—Gas Operations must adapt to these changes. PG&E manages these changes by relying on the AFOs to identify and assess threats and where appropriate propose mitigation of the threats revealed by the new information. If Gas Operations determines that the new threat ranks higher than others and must be funded and executed in the current year, Gas Operations considers that “emergent” work and adjusts the overall investment plan as necessary.

### **Electric Operations**

As part of the annual resource allocation process, Electric Operations addresses risks through both planned (where the quantities are known) and forecasted (where the quantities are estimated) work categories. Both of these categories of work are included in the development of the Electric Operations Session D, Session 1 and Session 2 plans. Additionally, work to address emergent risks may cause reprioritization within these work categories throughout the year.

Planned work, which includes mitigations for recognized asset risks, represents the foundational aspect of Electric Operations’ asset management approach. This work is identified and prioritized as part of the annual strategic planning process and is prioritized in alignment with Electric Operations’ strategies for improving public and employee safety. Planned work includes proactive asset replacement programs to mitigate identified risks, such as oil-filled switch replacements and venting manhole cover replacements, which span over multiple years with specific units to be completed each year.

Forecasted risk mitigation work is estimated in advance but the specific units to be worked are identified throughout the year. An estimated volume of this work is forecasted and budgeted during the annual resource allocation process, but patrols, inspections and other preventive measures identify assets at risk and drive the actual units of work to be completed. For example, the number of wood poles to be replaced in a given year is estimated in advance based on historic trends, but the results of PG&E’s Pole Test and Treat program may identify more or less units that actually need to be replaced. Similarly, Electric Corrective Tag completions vary year-to-year based on the findings of on-going patrols and inspections.

Lastly, emergent work may be identified as risks in the Electric Operations Risk Register move from the “Identify and Evaluate” phase into the “Risk Response” phase. Or, as emergent risks occur, such as unexpectedly early component failures, incremental actions may be required to address this risk exposure. Depending upon the urgency of the new risk mitigation measures, this incremental work may be included in a reprioritized current year work plan or folded into the integrated planning process for future years. If this emergent work is to be deployed over a multi-year period it becomes part of either the planned or forecasted work as appropriate.

## **Energy Supply**

The Policy and Process Standards group in Energy Supply manages the overall integrated planning process for Energy Supply and coordinates the development of the Energy Supply Session D, Session 1, and Session 2 plans. The operating groups within Energy Supply develop proposed investment and operating plans needed to ensure the safe, reliable, affordable, and environmentally sound operation of PG&E’s utility-owned generation fleet and contacted energy resources. Work is identified by operations and maintenance (O&M) personnel and subject matter experts based on data gathered from performance monitoring, operator rounds and inspection of assets. Work is also identified through formalized asset management programs which track condition data and trends and include regular inspections of asset condition. Regulatory bodies may also require work to comply with licenses, permits, or other regulations. All work is then scored based on a number of criteria (including risk factors, compliance requirements, and project execution parameters), and is ranked. Work that is intended to mitigate direct or indirect safety risks and required compliance work are considered the highest priorities. The proposed work for each operating unit is then cross-prioritized at the Energy Supply level and compared to constraints such as system limitations, resource constraints, and execution windows. This process requires discussion and tradeoffs among the operating groups to finalize the proposed investment plan.

The process of developing an executable plan is completed twice a year, once to develop and communicate the strategic plan as part of Session 1 and again to develop and communicate the detailed execution plan as part of Session 2. The output of this process feeds into the overall corporate development and approval process as described above.

Since the Energy Supply business is dynamic and continually changing, as conditions change and new information develops, Energy Supply adapts to these changes. The operating groups within Energy Supply manage high-risk emergent work by making tradeoffs during the year to ensure that the highest priority work is being done.

At Diablo Canyon a Probabilistic Risk Assessment (PRA) program is also used on a daily basis by the NRC-Licensed Operations Shift Manager to assess, manage, and mitigate nuclear risk from internal plant activities such as maintenance and external environmental risks such as seismic. This dynamic, highly sophisticated, program is supported by a PRA engineering group, a work control manager and multiple plant personnel, who assess, manage, and mitigate risk.



Risk profiles are published daily and records are retained. The process and execution is overseen by senior plant managers.

## **6. What is the role of executive management in making or accepting these decisions?**

The Company's executive team is involved in all parts of the integrated planning process, which is described in the response to Questions 1 and 5. At the individual LOB level, the senior officer of the LOB reviews the risk mitigation, strategic plan, and execution plan developed by subject matter experts and other leaders within the LOB, and the senior officer then approves those plans for submission and discussion at the integrated planning Session D, Session 1, and Session 2 meetings. At these meetings, the senior officers from all LOBs meet collectively with PG&E Corporation's Chairman and CEO, and PG&E's President to discuss, provide feedback on, and ultimately approve the plans submitted by each LOB. The following year's operating expense and capital expenditure plan—that is approved at the conclusion of the Session 2 process—is then presented to the PG&E Corporation and utility Boards of Directors for their concurrence.

At the LOB-level, the Gas Operations executive team, led by the Executive Vice President of Gas Operations, coordinates the development of the Gas Operations Session D, Session 1, and Session 2 submissions. The corresponding Electric Operations executive team is led by the Vice President of Strategic Business Management. Energy Supply's Policy and Process Standards group coordinates the development of the Energy Supply Session D, Session 1, and Session 2 submissions.

**7. What are the major elements in your approach to managing safety risk? Specify programs or practices your company has in place to manage safety.**

PG&E's management of safety risk is done through the risk management procedures described earlier. This includes the EORM program approach and the use of the RET2 model. Below is additional information on the programs PG&E's Safety Department and the core LOBs have in place to manage safety and safety-related risks.

**Safety**

PG&E has a number of programs and practices to manage the safety of employees, the public and contractors. The Safety Department is staffed with safety professionals that focus on supporting safety in the various LOBs; understanding, documenting and ensuring regulatory compliance; performing reporting and analysis on safety performance with a focus on identifying and supporting process improvement and programs that will improve safety performance; and establishing and executing on a robust contractor safety program. Other examples include ensuring the proper use of personal protective equipment, safety training, safety tailboards, job hazard analysis, job safety analyses, safety observations, near-hit reporting, and other tools. In addition, the Safety Department provides support to the strong grass-roots safety teams that drive safety improvements throughout the Company.

For safety compliance, in 2013 the Company established a Safety Compliance and Auditing group within the Safety Department. The group focuses on ensuring that PG&E personnel understand and are compliant with all applicable safety regulations, especially OSHA. This includes the development of safety standards, communication across PG&E to ensure the regulatory requirements are included in the Company's training and work methods and procedures, and establishing and executing a safety compliance audit process.

**Gas Operations**

Gas Operations' vision is to be "The safest, most reliable gas company in the United States" and is focused on reaching this vision through pursuing a strategy of 'Gas Safety Excellence' which includes three elements: asset management, process safety and safety assurance.

The first element is a comprehensive **asset management system** that provides a holistic approach to monitoring and maintaining the health of its system and assets. With better information provided by such a system, PG&E can promptly identify safety concerns, manage operational risks and make informed decisions to improve operations. Gas Operations has adopted PAS55 as its asset management system. Operators using this standard have the following characteristics:

- Risk based approach to managing assets
- Data-driven approach to formulating strategies and plans
- Investments focused on risk mitigating efforts

The second element is a robust plan to strengthen **process safety**. Throughout every function of the organization, Gas Operations is making safety and process improvements. With a focus on system integrity, Gas Operations continues to increase its understanding of the condition of its assets. Gas Operations is testing and upgrading the methods used to monitor and control its assets, while designing new programs devoted to integrity management and hazard identification.

The third element is a commitment to **safety assurance**. Safety assurance represents the alignment of human performance with the organizational strategy. Aligned goals help Gas Operations by providing employees with a clear understanding of how their work supports the goals of their department and, ultimately, the vision. PG&E has the ability to inspire a culture focused on safety and continuous improvement. To do this, PG&E must fully understand the organizational culture through regular assessments and a holistic approach to employee engagement.

### **Electric Operations**

The Electric Operations Strategy Plan (described in the 2014 GRC as the Electric Operations Improvement Plan) is the centerpiece of Electric Operations' current approach to managing safety risks, particularly within the public/system safety and employee safety key focus areas. Electric Operations has a goal of zero public safety incidents. To achieve that goal, Electric Operations has a number of programs and practices in place to manage safety risk, including:

- Regularly reviewing historic performance, CPUC-reportable incident data, and industry insurance data to understand how people negatively interact with the electric system and assets.
- Focusing risk mitigation efforts to address the major root causes of public safety events, to help limit the recurrence of such events. For example, developing tree worker outreach materials and training to address key segments of the public who have demonstrated higher number of injury or fatality incidents due to contact with electric facilities.
- Identifying areas where the public exposure to a particular risk is elevated. For example, the consequence of an asset failure near areas where people congregate, or in a wild fire area, or in a sensitive environmental habitat, may be greater than the same asset failure in a less populated, less fire prone, or less sensitive habitat.
- Keeping assets in good working order as designed to limit failures. Examples of actions taken to address equipment failures include oil sampling for certain oil-filled transformers, switches and cable terminations; installing manhole covers that are able to vent the sudden release of smoke and pressure and lock in place if there is an explosion within a vault; and replacement of network transformers in high-rise buildings.

- Conducting an extensive and effective Vegetation Management program which helps prevent overhead conductor failures due to tree contacts. PG&E has established programs to address wildfire risk including enhancing wildfire patrols, completing electric corrective maintenance in wildfire areas prior to the fire season, and increasing focus on the fire risk in the Vegetation Management program.

Electric Operations' strategy for improving employee safety is to foster a culture that is absolutely committed to safety. This involves encouraging a reporting culture for employees, which includes "near-hit" reporting and a focus on thorough training, such as technical training in switching, grounding and climbing. Electric Operations has been emphasizing training not only on the safety procedures applicable to an employee's work, but also training in the applicable rules and regulations related to that work. Knowing both the relevant procedures and related rules/regulations increases the likelihood that employees will work more safely. Electric Operations is also rolling out a multi-year safety initiative, designed to reinforce employees' safety training.

### **Energy Supply**

Public and workforce safety are the most important goals for the Energy Supply organization and, as such, Energy Supply has a number of programs and practices in place to manage safety. From a public safety perspective, Power Generation's asset management program (described in the response to Question 2), assesses and mitigates the potential public safety risk associated with its water conveyance and storage facilities. Power Generation also has a program to reduce the public safety risk by educating the public, installing signs, and putting up physical barriers to keep the public out of high-risk areas. At Diablo Canyon there is an extensive Nuclear Regulatory Commission (NRC) required program in place to protect reactor integrity and the health and safety of the public.

From a workforce-safety perspective, there are a number of processes and procedures in place in Power Generation designed to protect employees and contractors. Examples include the proper use of personal protective equipment, training and qualification programs for various job functions and specific tasks, safety tailboards, job safety analyses, safety observations, near-hit reporting, and many other tools. In addition, Power Generation has very strong grass-roots safety teams.

Workforce safety is of vital importance at Diablo Canyon as well. Numerous programs and procedures are in place to protect employees and contractors. Examples include radiation safety, personal protective equipment, electrical safety, confined space entry safety, safety at heights, chemical safety, heat stress, vehicle safety, and rigging, and material handling procedures.

**8. Do you currently have practices designed to support management of compliance, safety risk and/or quality?**

**9. If yes, on what management directive, guidelines, standards or process design criteria have you based the design of these practices?**

PG&E has practices in all three areas: compliance, safety, and quality assurance/control. For the compliance and safety areas, there are overall corporate programs as well as LOB-specific programs. Additionally, each of the core LOBs have quality control and quality assurance programs specific to the needs of their operations.

### **Compliance Management Program**

PG&E's overall compliance management program, which is closely linked to its risk management program, is designed to support PG&E in becoming the safest, most reliable electric and gas company in the United States. There are three main elements to the Program: governance, a compliance framework and an ethical culture.

*Governance:* The Boards of Directors provide oversight of the compliance function, the CEO and the President establish the tone at the top, and the LOBs direct their compliance obligations and performance. The Compliance and Ethics (C&E) department is responsible for establishing a compliance framework, facilitating the annual compliance risk planning process, tracking compliance progress, overseeing a Compliance Champions team (team members are responsible for coordinating and implementing compliance practices within their LOB), and establishing compliance guidance. Senior officers focus on risk and compliance activities by chairing a LOB risk and compliance committee that meets at least quarterly to discuss and review compliance obligations and performance. Each LOB also actively participates in the annual risk and compliance planning session (Session D) to prioritize compliance concerns for the Company.

*Compliance Framework:* PG&E's compliance framework incorporates the fundamental components of many best practice compliance frameworks:

- Know your compliance requirements, risks and controls
- Enable employees to comply
- Provide evidence of compliance

Twice a year, each LOB reports its progress on implementing the compliance framework to the Audit Committee of the Board of Directors.

*Ethical Culture:* PG&E's Ethics Program is structured to promote a strong ethical culture among employees. For example, PG&E provides employees with annual compliance and ethics training and guidance through the PG&E Employee Code of Conduct. PG&E employees are responsible for knowing and complying with the requirements applicable to their work activities, including those described in the Code of Conduct and those described in Company guidance documents (policies, standards, procedures, bulletins, and manuals).

PG&E's Compliance Program is structured to conform to the United States Sentencing Commission Organizational Sentencing Guidelines, as well as to best in class compliance internal control frameworks, such as the Committee of Sponsoring Organizations of the Treadway Commission, which includes a focus on control environment, risk assessment, control activities, information and communication, and monitoring. The compliance management program has also been validated by benchmarking with various companies and other organizations, such as the Ethics and Compliance Officers Association, the Compliance and Ethics Leadership Council, the Society of Corporate Compliance and Ethics, and Ernst and Young. PG&E's program reinforces the Company's efforts to promote a culture that encourages ethical conduct and a commitment to compliance with all laws and regulations.

### **Safety Risk**

Detail on PG&E's overall risk program, which addresses safety-related risks, is provided in response to Questions 1 through 7. In addition to its overall risk program, PG&E has an OSHA safety compliance risk program which is modeled after the compliance management program described above. The safety compliance risk program assists the LOBs in complying with federal and state OSHA regulations.

Safety compliance (OSHA/Cal OSHA) risk program governance is provided by the Safety Integration Committee (SIC) and the Executive Safety Steering Committee (ESSC). The ESSC reports to the President of PG&E, and is chaired by the Lead Safety Officer. The SIC is a working committee made up of director-level leaders. SIC recommendations are ultimately brought to the ESSC for final review and approval.

Through the Safety Compliance & Auditing Manager, the Safety Department is responsible for: establishing a Companywide compliance framework; reviewing various standards, policies and procedures to ensure compliance with regulations; and making recommendations for new or updated standards, policies and procedures. The SIC then provides recommended standards, policies and procedures for approval and recommended implementation to the ESSC. The Safety Department also partners with the LOBs to link specific work procedures to specific standards and assist the LOBs in profiling training requirements to the appropriate classifications of employees. Finally, the department audits the entire process for compliance with state and federal OSHA regulations. Audit findings and corrective actions are reviewed with the SIC first, then ESSC on a periodic basis.

### **Quality Assurance and Quality Control Programs**

Each operational LOB has its own quality assurance/quality control (QA/QC) program. The focus of these programs is to assess quality through reviews of individual work activities and end-to-end processes. Key processes such as engineering, design, construction, maintenance and operations are reviewed to determine gaps and areas of improvement. The QC activities include quality verifications through field assessments either in real-time (as work is being performed) or after-the-fact.

QA activities include audits of PG&E's processes and programs. QA activities also include conducting issue analysis and assessments to provide recommendations for improvement and building an overarching Corrective Action Program CAP. Corrective actions are documented and tracked through completion using the Enterprise Compliance Tracking System (ECTS) Regulatory Compliance tracking process.



**10. How do you monitor trends in performance for your own management purposes (including but beyond regulatory reporting requirements)?**

In addition to the integrated planning process described in the responses to Questions 1 and 5, one of the primary ways in which the Company's trends in performance areas are reported, monitored, and discussed is through the monthly Business Plan Review (BPR) report and meeting.

The BPR report includes comparisons of month results, year-to-date results, and full-year forecasts against agreed-upon targets for significant Company-wide and LOB metrics and initiatives. At the monthly BPR meeting led by the Utility President and attended by the Corporation's Chairman and CEO, senior officers representing each LOB review and discuss the Company's and LOBs' current and planned performance for the year.

The purpose of the BPR process is to further enable the senior leadership team to improve Company performance. The BPR meetings help ensure that the senior leadership team is both aware of how the Company and each LOB is performing in relation to established targets, and to identify opportunities for the team members to work together to address any key issues or challenges which may arise.

The Company's performance in various areas is also monitored in other Company forums, including the following:

- Chairman and CEO's Senior Leadership Team Meeting – This monthly meeting is led by the Chairman and CEO and attended by the Utility President and the senior officers for each LOB. The purpose of the meeting is for the senior leadership team to discuss key strategic issues and other critical items as they arise.
- Risk Policy Committee (RPC) & Utility Risk Management Committee (URMC) – Chaired by PG&E Corporation's CEO, the RPC/URMC is a senior management committee chartered to provide management-level oversight for PG&E's risk management activities. Annually, the Chief Risk Officer presents the status of the EORM Program to the committee and provides an update on how the LOBs are implementing the EORM standard.
- Risk and Compliance Committees – Each LOB holds regular Risk & Compliance meetings to discuss LOB risk management activities and progress. LOB Risk and Compliance meetings are chaired by the senior-most executive within the LOB and are attended by LOB risk owners, risk managers, compliance champions, and representatives from the Chief Risk Officer's organization.
- Session D – the portion of PG&E's Integrated Planning Process that includes a senior officer discussion of the company's top enterprise and operational risks and progress made in managing them.
- Executive Project Committee (EPC) – The Utility EPC is a cross-LOB Officer committee established to approve or reject major projects with costs or benefits of

\$20 million or greater and any additional projects identified for oversight based on risk, strategic impact, cross-LOB complexity or other potential issues. Chaired by the Vice President of Strategic Business Management, the EPC also monitors project progress, validates status, and determines corrective action as necessary. Sponsoring Officers for projects under EPC oversight remain accountable for their projects, and EPC meetings are not intended to replace such accountability.

- Financial Plan Committee (FPC) – The FPC is comprised of the Utility President, Chief Financial Officer, and Vice President of Finance. The FPC’s role is to recommend and/or approve the 5-year financial targets, the annual capital and expense budgets, and any mid-year funding changes for the Company. At the monthly meeting, officers from LOBs seeking mid-year funding changes present their requests to the FPC members, and the FPC members then decide whether to approve or deny the requests, taking into account other high priority and/or emergent work and the current year’s financial performance.
- Safety Reports – PG&E’s Safety organization reports and analyzes safety performance through traditional metrics, such as the counts and/or rates for Lost Work Days, Lost Work Day Cases, OSHA recordable, Days Away Restricted Transferred (DART)<sup>6</sup>, Motor Vehicle Incidents, and Serious Preventable Motor Vehicle Incidents. PG&E also captures leading indicators (e.g., near hits, leadership and technical observations, timeliness of reporting) for reporting and analysis. On the OSHA-required Log 300 and 300A forms, PG&E additionally records and reports work-related injuries and illness. Program results and analyses are provided to the LOBs on a daily basis, provided to executive management on at least a monthly basis, and provided on a timely basis as appropriate to Safety Governance Groups (e.g., Chairman’s Safety Review Committee (CSRC), Executive Safety Steering Committee (ESSC), and Safety Special Attention Review (SAR)).

At the LOB level, Gas Operations, Electric Operations, and Energy Supply have identified key metrics that are planned, tracked, and reported from the executive level in the BPR report (described above) down to first line supervisor level. This cascading of metric information ensures alignment, visibility, and support throughout the organization for the key performance measures of the business. In addition to the cascading of high-level metrics, the LOBs track a number of additional metrics to monitor and measure performance. Each month, and sometimes more frequently, the LOB executive team meets to discuss the metrics’ performance against plan, as well as the variance explanations, drivers, and if needed, actions to get back on track.

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<sup>6</sup> DART refers to cases which involve days away from work, days of restricted work activity, and/or days of job transfer.

**11. How do you keep up with industry best practices? Which industry standards do you follow? What do you do with what you learn? Please provide examples.**

PG&E's has historically made significant efforts to benchmark its operations and these efforts have increased in recent years. In the latter part of 2011, PG&E undertook an across-the-board effort, comparing its performance with the best utilities in the industry. PG&E has built on this effort by annually refreshing benchmarking and best practice information through participation in formal studies and industry group conferences. Findings from these activities are used to create improvement plans as part of the annual integrated planning process.

Examples of benchmarking efforts and their results are described below for each core LOB as well as PG&E's Risk department. While the number of "industry standards" applied across the Company are too numerous to list, PG&E has mentioned some examples of where each LOB uses industry standard relative to safety and/or risk programs.

**Risk**

When PG&E's EORM Program was first established in 2011, the Company retained Det Norske Veritas (DNV), an engineering firm with wide experience in operational risk management and developer of the International Safety Rating System, a proprietary risk management framework designed to systematically evaluate the effectiveness of risk management programs. DNV helped PG&E develop an industry-leading EORM program built on the principles of the ISO 31000 Risk Management Standard and included the "best in class" operational risk management practices DNV had collected through years of auditing various asset-intensive companies.

Since that time, PG&E's EORM department has helped PG&E's risk managers to stay abreast of industry developments and innovations as follows:

- EORM retained external experts to deliver operational risk management and risk assessment training to all risk managers.
- EORM established a "Risk Management Community" within PG&E where risk managers meet monthly to discuss best practices they have developed or have learned from their own benchmarking efforts.
- EORM team participates in a thrice yearly forum where utilities from across North America convene to discuss best practices and lessons learned.
- The EORM team are members of the Corporate Executive Board Risk Management Leadership Council, an industry group that provides unfettered access to a library of risk tools, templates and governance documents used industry wide to allow for convenient, cost effective benchmarking of key components of PG&E's EORM program.

Information gathered during these forums is used to inform risk response plans for specific risks and influence the Company's EORM Program. For example, PG&E benchmarked with General Electric on how risk is used in establishing company strategy and

execution plans and, from that, EORM developed and the Company adopted Session D as a mechanism for ensuring risk is integrated into the Company's integrated planning process. Additionally, PG&E has been working with Hydro One, a Canadian utility company, to identify best practices for developing an asset health index.

## **Gas Operations**

Gas Operations uses benchmarking, both formal and informal, to identify industry best practices. The formal benchmarking process involves engaging trade associations to learn more about the processes, practices, and standards used by their members. In developing PG&E's proposed programs, the Company also used information from informal benchmarking. One opportunity for informal benchmarking is through new hires at PG&E who have experience in the industry. PG&E has benefited from hiring executives, managers and subject matter experts who are able to share industry information about best practices. In addition, through visits with other companies, both inside and outside the industry, PG&E and other companies share ideas and best practices and learn from one another. PG&E's personnel also learn about industry best practices by attending conferences, participating in industry committees, talking to peers in the industry, and reading industry studies and publications.

Gas Operations is also a participating member in the American Gas Association (AGA) SOS process. The AGA SOS process is a tool whereby member companies can quickly pose operational or engineering questions to other member companies. Requesting members typically receive a voluntary response to their questions from other member companies within a relatively short period of time. The responses are then compiled and shared with all companies that participated.

PG&E also uses outside experts to assist in developing best practices. For example, Gas Operations plans to have an external party review PG&E's gas SCADA system and perform a best practices review of SCADA systems and their usage within other gas pipeline companies and related industries. This will include an evaluation of whether the installation of additional SCADA monitoring points above what is already proposed is warranted.

In addition, as discussed elsewhere in these responses, PG&E is pursuing a best practice asset management certification offered by the British Standards Institute under its PAS 55.

## **Electric Operations**

Electric Operations also uses benchmarking, both formal and informal, to identify industry best practices. Electric Operations participates in nine annual benchmarking surveys including IEEE's Reliability Study, EEI's Reliability and Safety Studies, PSE&G's Peer Panel Survey, Southern Company's Distribution Survey as well as maintaining membership in the Utility Public Safety Alliance, utility risk management round table, as well as EPRI. PG&E has presented and/or led discussions at other well-established utility forums such as PSE&G annual risk summits and hosted an Emergency Preparedness Summit. Learnings are brought back for discussion with senior leadership and incorporated into PG&E's tools and programs. For

example, Electric Operations' development of the System Tool for Asset Risk (STAR – an application PG&E is developing to calculate asset specific risk scores based on the severity of risk and probability of occurrence) has benefitted from benchmarking with Duke Energy and Hydro One to learn about how they are applying asset analytics in strategic planning. Additionally, PG&E has led discussions with the Utility Public Safety Alliance, regarding public safety performance metrics in the utility industry, such as wires down and “911” response.

## **Energy Supply**

Energy Supply also uses benchmarking, both formal and informal, to identify industry best practices. Energy Supply uses the information it receives through benchmarking to improve its processes. Energy Supply actively participates, and in many cases holds leadership positions, in a number of industry organizations.

Some of the key organizations that Energy Supply is a member of include:

- Institute of Nuclear Power Operators (INPO)
- Centre for Energy Advancement through Technological Innovation (CEATI)
- Combined Cycle Users Group (CCUG)
- Edison Electric Institute (EEI)
- Electric Utilities Cost Group (EUCG)
- National Hydropower Association (NHA)
- Pumped Storage Users Group (PSUG)

These organizations provide benchmarking on specific metrics and provide forums for the sharing of industry best practices. Energy Supply also participates in a number of surveys and does direct benchmarking with companies that are known to be leaders in specific areas such as asset management, maintenance planning, and risk management. A sampling of the benchmarking activities in which Energy Supply has participated are described below.

As the largest investor-owned hydro system owner in the U.S., PG&E is very involved in industry organizations. In addition to chairing a number of committees, PG&E leaders are on the Boards of Directors for both the National Hydro Power Association and the Electric Utility Cost Group, and led the formation of the CEATI Asset Management Task Force. PG&E also helps shape hydro industry policy. FERC is currently seeking guidance in the industry about risk-informed decision making in regards to dam safety. PG&E's chief dam safety engineer is integrally involved with FERC's leadership and other industry members on shaping what this policy should look like to improve public safety. PG&E's hydro organization performed direct benchmarking with BC Hydro in 2012 and Seattle City Light in 2013, and is incorporating some of the findings from these trips into its operations. Additionally, in 2012, Mears Group (Mears) assisted PG&E in conducting a risk-management benchmarking study on hydroelectric facilities. The primary focus was on dams, water conveyance and penstocks. Seven companies participated in the survey, which had approximately 100 questions in the following areas of asset risk management programs, emergency action plans, records management, information

technology, quality assurance and control, management of change, and repair, refurbish, replace, retire or run to failure (5 R's). Over 600 responses were categorized, and analyzed for best practices. The final report provides all of the responses and identification of 27 best practices.

PG&E also participates in a number of industry organizations for Fossil generation and is the committee co-chair of the Combined Cycle Users Group. PG&E has implemented a number of improvements to its fossil fleet as a result of its participation in these committees, including implementing the Smart Signal technology which allows for real-time condition monitoring of critical equipment to assure a greater level of reliability at its Colusa and Gateway Generating Stations.

Diablo Canyon Power Plant has implemented a station procedure on the conduct of self-assessments and benchmark trips. On average, 15 self-assessments and 10 benchmark trips are scheduled and performed annually. In addition to these formal activities, informal, or "quick hit," self-assessments are also conducted which are smaller in scope and do not require a peer from outside the company. In addition telephone calls, email surveys, or industry working group meetings take place where best practices are also gathered. In 2013, nine formal benchmark trips took place, from which best practices were identified, applicability determined, and in many cases actions implemented. Topics included (but were not limited to) special nuclear material handling, radiation protection practices, emergency preparedness response equipment. Ten formal benchmark trips were taken in 2012 and five formal benchmark trips are currently planned for 2014.

**12. What do you include in your assembly of data or information to support continuous learning related to safety performance (e.g., incidents, close calls, precursors or leading indicators, root causes of events)?**

PG&E captures - for reporting and analysis - traditional safety performance information:

- Lost Work Days and Lost Work Day Case Rate;
- OSHA recordable (counts and rates);
- DART (counts and rates);
- Motor Vehicle Incidents (counts and rates); and
- Serious Preventable Motor Vehicle Incidents (counts and rates).

As described further below, PG&E also captures leading indicators such as near-hits and leadership and technical observations.

Sources of information and data to support continuous learning include:

- Audits – Conducting assessments to determine level of compliance.
- Culture Survey – In November 2013, PG&E contracted with Behavioral Science Technology to conduct an internal safety culture survey with employees.
- Grassroots Safety – PG&E’s grassroots safety teams are encouraged to bring forward any safety issues and solutions to share across the enterprise.
- Contractor Safety Program – PG&E’s contractor safety program is establishing a more formal and comprehensive method to evaluate the safety-related performance of the Company’s contractors. This information is collected to support learning and improvement of safety performance and culture for the contractors, their sub-contractors, the public and employees. PG&E is currently benchmarking with other utilities and with contractors to compare how they are measuring safety performance success so that PG&E can incorporate the best practices and learning into PG&E’s program as the Company requires contractors to measure and report on their safety performance.
- Benchmarking – Benchmarking in every area of safety has become a predominant theme for PG&E as the Company continues to evolve its safety culture and improve its safety performance. As PG&E begins to better use leading indicators, PG&E is looking to others in the industry as well as external to the industry for both metric definitions and best practice applications PG&E can apply in the field.
- Root Cause Analysis – Conducting root cause analysis on all incidents and sharing broadly through the organization. These analyses are used to identify trends. As necessary, corrective action plans are put in place to implement system-wide changes that may be required as a result of lessons learned. Corrective actions are assigned and tracked to completion. Findings from root cause analyses are communicated to all employees.

- Employee Observations – Employee observations are conducted to identify trends in behaviors, work procedure adherence, and overall work site safety.
- Near-Hit Program – The Company’s near-hit pilot provides a safe environment for employees to share incidents that could have caused serious injury or equipment damage. Near-hits are shared with all employees to foster a culture of learning and to prevent future incidents from occurring.
- External Information Sources – Additional external sources of information are also used, such as: CPUC public injury/fatality, property damage, and other reportable event log analysis; insurance carrier analyses and data reports; industry bulletins and reports; governmental reports and bulletins; and participation in Utility Public Safety Alliance (UPSA).

The Safety Department is in the process of developing and implementing a system-wide corrective action program within the Safety & Environmental Management System (SEMS) to systematically have the ability to share the lessons learned from analyses across the enterprise.



**13. How do you monitor the condition of the infrastructure to support decisions on accelerated inspection/testing, repair or replace? How do you make related decisions? How often are these practices reviewed?**

Each of the core LOBs has practices in place to monitor the condition of assets for purposes of prioritizing work—whether that work is inspection, testing, repair or asset replacement.

Each core LOB’s practices are described below.

**Gas Operations**

Gas Operations has established a comprehensive asset management process that incorporates the risk management framework and roadmap built by the EORM team as well as integrity management programs to understand the condition of all of its assets and build asset management plans for driving asset performance to target levels over time. Within this asset management process, Gas Operations uses both leading and lagging indicators to monitor the condition of assets and the external factors affecting the assets. These indicators are used to facilitate decision-making about actions to test, inspect, repair or replace assets. The findings and analysis performed within the asset management process are used in Gas Operations' overall risk register and risk management process.

Gas Operations monitors the condition of assets during planned maintenance and inspections at regular intervals (monthly, bi-monthly, bi-annually, annually, or greater) depending on the requirements (as reflected in the gas standards and procedures) for the particular assets. Overall system performance is monitored continuously by Gas Control, and Gas Operations conducts daily operations calls to identify and discuss system performance and issues, as needed. Gas Operations also monitors external factors (such as seismic conditions, landslides, incidents, safety observations, population density changes and changes in laws or codes) to identify impending concerns that need to be taken into account for identification and prioritization of work. Monitoring frequency and procedures are established in the gas standards and procedures. Finally, as mentioned earlier, Gas Operations actively participates with other utilities and companies to identify best practices and emerging technologies as well as issues affecting other operators to improve the safe, effective operation of the gas system.

**Electric Operations**

In Electric Operations, a variety of methods are used to monitor the condition of infrastructure to support asset-related decisions.

- Distribution line inspection and patrols – General Order 165 provides the required cycle for overhead and underground patrols and inspections. Line equipment inspections and testing are based on PG&E’s internal standard practices. Generally, distribution line equipment is inspected and tested on an annual basis. Some equipment, such as auto transfer switches, is inspected and/or tested more often.

- Diagnostic testing (i.e., dissolved gas analysis or “DGA”) for certain pieces of substation equipment – Diagnostic based analysis can determine whether a component has reached the end of its useful life, determined by such factors as age of the equipment, switch location, oil condition, and loading history.
- Pole testing and treating program and, when necessary, associated pole loading calculations – Pole inspections are designed to determine the condition of poles and, where appropriate, extend the life of the asset by preserving the pole’s wood strength.
- Site investigations of wire down incidents – Electric Operations has enhanced analysis and follow-up for wire down events by dispatching engineers to the field site following an event to investigate whether PG&E should take a mitigation action broader than simply addressing the immediate cause. For example, multiple splices on a section of line might indicate the need to replace the entire wire span instead of repairing it.
- Daily outage reviews that can potentially identify deteriorated infrastructure – Outage reviews are done at a local level with a centralized reliability engineer participant. These reliability engineers provide a consistent approach across the Company on the review process and follow up actions. A common action is to conduct post outage inspections to determine root cause and address areas of deterioration of infrastructure and monitor the condition of facilities, with the main goal being to take action (e.g., repair or replace) to prevent future incident recurrence.
- Root cause analysis of safety or other significant incidents – High profile incidents such as safety issues and reliability issues require a higher level deep dive into the root cause. The root cause investigations drive decisions in accelerated maintenance or enhance inspection of facilities. From this new initiatives/pilot programs are formed to address the need for repairs or replacement of assets to prevent similar incidents from occurring.

Decisions regarding accelerated inspection/testing or asset repair or replacement will vary depending on the specific asset in question and its condition.

## **Energy Supply**

In Energy Supply, infrastructure condition is monitored and assessed in multiple ways. Performance and design criteria for infrastructure is compared against inspection and test results on a prescribed schedule through planned maintenance activities as performed by operations and maintenance (O&M) personnel. Results are captured in the SAP Work Management Database and any unusual trends are noted for calibrating future inspection process and frequency.

In addition, focused asset management test and inspection programs are in place for equipment and infrastructure that has the highest potential risk. Standards to guide these additional tests and inspections are in place for each program. The entire test and inspection history from both O&M and asset management is evaluated for each equipment type and location to develop consequence, risk, and health scores of Energy Supply assets. Once these scores are produced, decisions on the frequency and extent of additional testing, changes to maintenance practices and/or the replacement of equipment are made.

For example, at Diablo Canyon, asset management is implemented through multiple coordinated programs, to which senior plant leadership provides oversight. The preventive maintenance program focuses on maintaining critical and non-critical equipment to meet the required levels of nuclear safety and reliability. It is augmented with the Surveillance Test Program which periodically verifies functionality of important plant equipment. These two base programs are augmented by frequent inspections by Engineering, Operations and outside entities. Life cycle management plans are also developed and implemented to ensure equipment aging and degradation mechanisms are addressed through plant upgrades and replacements. Each of these programs has a healthy feedback mechanism using the Corrective Action Program to monitor, adjust and implement enhancements, which is continuously in use. Decisions on higher risk impacts are made by senior plant leaders using established decision-making processes. These programs and their effectiveness are reviewed collectively at least every two years and specific programs are additionally reviewed periodically. The most recent comprehensive review was in August 2013.

**14. How do you track progress in meeting explicit or implied commitments, including those implied in rate case proceedings?**

**15. How, if at all, do you communicate the status of and need for modification of these commitments?**

The primary sources of “commitments” are through Commission decisions, audits by various regulatory agencies, and notices of violation. PG&E has a variety of tools for tracking these commitments. PG&E’s primary tool for tracking compliance with CPUC decisions is an internal compliance tracking tool, referred to as “c-net,” which is managed by the Regulatory Affairs department. When a CPUC decision, resolution or other directive is issued, compliance items are logged into the c-net system and assigned an owner who is responsible for ensuring compliance.

In addition to c-net, Gas Operations, Electric Operations and Energy Supply primarily use the Enterprise Compliance Tracking System (ECTS) to track commitments. Specific work tasks required to meet commitments are assigned, monitored and tracked using SAP and internal action plans.

Progress on meeting commitments is tracked through a variety of methods, including c-net, ECTS, and corrective action plans as well as various reports filed with the CPUC that provide regular updates on performance relative to plans and commitments, e.g., Gas Pipeline Distribution Safety Reports, Gas Pipeline Transmission Safety Reports, Budget Compliance Reports, Electric Reliability reports, and Gas Pipe Replacement Program Reports.

For directives from General Rate Cases or other related proceedings, PG&E provides affirmative testimony that describes how PG&E has complied with prior decisions. To the extent that PG&E seeks modification of such commitments, PG&E may submit testimony proposing changes to current requirements. For instance, in its 2015 Gas Transmission and Storage Rate Case, PG&E is proposing a process for gathering stakeholder input to make modifications to various reporting requirements.

**16. How do you solicit and manage employee input to safety issues?**

**17. How do you follow-up on this input (e.g., make decisions to address issue, decide on how to address the issue[s], communicate to the originator the decisions and timeframe on which to expect closure)?**

PG&E solicits and take action on employee input to safety issues in a number of ways as described below.

Near-Hit Reporting Initiative – One approach to soliciting input is through PG&E’s Near-Hit Reporting Initiative. A near-hit is an incident that occurs or situation that exists which has the potential to create a safety hazard or injury. The objective of near-hit reporting is to report and correct the situation before it becomes an actual incident. Near-hit reporting, used in a preventive, non-punitive manner, is an effective way to reduce employee, contractor and public safety incidents and injuries. By using this approach, PG&E is working to create a safety culture where PG&E employees look out for one another and prevent incidents from occurring to co-workers, contractors and the public.

PG&E’s Near-Hit Reporting initiative is an enterprise-wide effort focused on:

- Creating a culture of trust that supports and encourages near-hit sharing and dialogue;
- Providing a library of near-hit stories accessible to all employees;
- Developing a simple, common process to share near-hits and use these stories to educate each other so PG&E can prevent future incidents;
- Supporting each LOB to customize near-hit processes so they meet their business needs and lead development of system business requirements; and
- Establishing an action-based approach to correcting the hazards PG&E learns about using data, trends and analysis.

By leveraging best practices from various LOBs and comparator companies, PG&E encourages communication about near-hits, makes trend analysis and corrective actions widely available, and improves follow-up communications to close the loop with employees who share near-hits.

PG&E’s new safety information management system will improve the Near-Hit Reporting initiative by simplifying data gathering techniques that will allow the Company to quickly identify safety trends or concerns and prioritize corrective actions. This system is expected to be online to support near-hit reporting by mid-2014.

Grassroots Safety Teams – Another way PG&E solicits employee input on safety issues is through its Grassroots Safety Teams. A true safety culture starts with those who see the opportunities to create a safer climate day in and day out—employees. PG&E recognizes that the best ideas often come from the employees closest to the work. The members of the Grassroots Safety Teams work together to make PG&E a place where employees can trust that

they will return home in a safe and healthy condition. Team members come from diverse backgrounds and experiences across all lines of business. They share a common goal and commitment to improving workplace and employee safety.

The Grassroots Safety Teams include more than 1,000 union-represented and management employees. While employee-led efforts have always been important to PG&E, they will play an increasingly important role in the future. Grassroots Safety Team members serve as the direct connection between their coworkers, local leadership and safety governance bodies. They are empowered to respond to safety concerns and to advise and inform management, which in turn supports their efforts by providing resources and removing obstacles to their efforts to improve safety performance.

PG&E leaders including Vice Presidents, senior directors, directors and managers are also responsible for understanding and supporting safety initiatives, and many Grassroots leaders attended PG&E-sponsored Safety Leadership Workshops so they could learn firsthand about PG&E's new approach to safety. It is important that all PG&E leaders support grassroots initiatives and actively promote their success—this includes serving as coaches, mentoring team members, periodically attending grassroots meetings, and supporting the engagement of local union representatives to foster a sense of alignment.

Additional Efforts to Solicit Employee Input – There are numerous additional ways to get employee input, including:

- Field Safety Specialists – By April 2014, PG&E will have 80 field safety specialists assigned throughout PG&E's service territory, which will provide employees opportunities daily to directly communicate with safety professionals.
- Informal Feedback – PG&E encourages employees to “speak up” as a key to changing the Company's safety culture. PG&E actively encourages employees to report safety issues, and has committed to discipline only as a last resort, and only when employees act in a reckless manner, demonstrate a pattern of carelessness or non-compliance, or put themselves, their co-workers, or the public at risk by violating safety standards or codes of conduct. PG&E has been proactive in reinforcing employees feedback, using intranet postings, tailboards and featuring examples of how employee feedback has made improvements to safety and operations.
- Union Partnership – Partnerships with the Company's unions are vital to changing the safety culture, which creates a culture where employees feel that can speak up on safety issues and that action will be taken. Union leadership has been actively participating in the Near-Hit Reporting initiative and Grassroots Safety Teams. This culture change partnership further solidifies the encouragement to PG&E employees to provide input on safety issues.
- Ride-Along Program – In the fourth quarter of 2013, the Safety Department implemented a weekly “supervisor ride-along program” that pairs field safety specialists with field supervisors to better understand the challenges in the field and

- the perceived roadblocks to improved safety performance, and to coach and educate supervisors on the corporate safety approach to improving PG&E's safety culture. PG&E will analyze these ride alongs and report to LOB leadership trends or concerns that are currently influencing the Company's ability – both positively and negatively – to change the safety culture. Using continuous improvement practices, the program will be improved and expanded in 2014. Input from the program serves as an additional listening channel as PG&E seeks to ensure a strong safety culture.
- Safety Leadership Programs – PG&E implemented several safety training programs to educate leaders on the best practices for creating a work environment that promotes and encourages reporting of safety concerns. The Company currently has Management and Supervisor leadership programs, and in 2014 will implement a Crew Leadership Program. Finally, PG&E recently held its first director leadership forum that focused on aligning leadership direction with a specific focus on safety culture and performance.
  - PG&E's intranet website is another means of encouraging employee input, particularly by highlighting safety performance and promoting the results of proper safety reporting. The website's main page provides a daily report on the Company's safety performance. Additionally, the main page now has a highlighted link to the Safety Page, which is a one-stop safety-related site for employees.

Helpline – PG&E's Compliance and Ethics Helpline is available to employees, contractors, consultants, and suppliers 24 hours a day, 7 days a week. The Helpline can be used for both guidance on conduct matters and legal and regulatory requirements or to report situations that may require investigation. Callers have the option of remaining anonymous with any call. In addition to the Helpline, employees can raise concerns and ask for guidance on a range of Company policy topics through the web, by letter, phone call, email message, fax, or personal meeting with Compliance and Ethics staff. All concerns and questions are tracked, managed and prioritized to ensure identification of dispositions and solutions. All calls and emails received are prioritized to determine if immediate action is needed. The Helpline allows for confidential and anonymous reporting of safety concerns, issues and violations. Safety Department leadership investigates these reports and follows up with a report of findings.

Regardless of the manner in which employee input is received, each concern is promptly investigated and assessed for further follow through. The scope and gravity of the response is dependent on the seriousness of the issue and findings of an investigation.

As stated in several of the above examples, the Company follows up on corrective actions, communicates awareness information frequently, follows up with a thorough investigation on any anonymous compliance and ethics issues, audits for OSHA compliance, etc. This information is reviewed periodically by the Safety Integration Committee and the Executive Safety Steering Committee—providing necessary governance and strategic direction overall for safety at PG&E.

**18. Do you have an internal safety and/or compliance audit function? If so, how are the results from these audits translated into decisions and action? How are actions monitored? Please provide examples.**

PG&E has both an internal audit/compliance function and a safety compliance function. As described in more detail below, the Internal Audit Department has broad audit responsibilities across all LOBs related to processes and controls. PG&E also has a safety compliance program that is largely focused on employee safety and compliance with state and federal OSHA regulations.

**Internal Audit/Compliance**

The mission of PG&E's Internal Auditing Department (IA) is to provide the Company with independent, objective assurance over the adequacy of processes and controls to manage business risk and to provide control advisory services. IA follows a standardized, disciplined approach to help management evaluate and improve the effectiveness of risk management, control, and governance processes.

IA's scope of work is to determine whether management's processes, as designed, are adequate to ensure that:

- key risks are identified and managed commensurate with the risk;
- financial, managerial, and operating information is accurate, reliable, and timely;
- Company resources are adequately protected;
- employees act in compliance with policies, standards, procedures, and applicable laws and regulations; and
- interaction with appropriate internal governance occurs.

Generally, audit reports performed by IA, including those related to compliance and safety items (e.g., leak survey, leak repair, damage prevention, data security, patrols, abnormal operating conditions), are sent to the person that has direct responsibility for the functional area (e.g., director or Vice President or VP) and other responsible or impacted VPs, directors and others.

Management develops and implements an action plan to address the identified issues, and submits the plan to IA. IA tracks and monitors reports with medium- to high-risk issues in its database. The database contains the issues and the relevant management action plan including dates. Once management has implemented its action plan, IA will verify implementation and close the issue.

**Safety**

In 2013, the Safety Department centralized the OSHA compliance function under a director for Safety Compliance and Strategy, and hired a manager of Safety Compliance and Auditing. In 2014, the department will add two safety auditors. The Safety Compliance and



Auditing group's main responsibility will be to conduct compliance audits with each LOB to ensure compliance with applicable state and federal OSHA regulatory requirements.

This compliance process has multiple critical pieces to it. Under the leadership of the manager of Safety Compliance and Auditing, the Safety Department is currently reviewing and revamping over 100 corporate safety standards to ensure the Company is current with Cal-OSHA and federal OSHA regulations and meets the minimum requirements set forth in those regulations. The standards are then updated as necessary.

Once completed, the standards are compared to current work procedures and processes for each LOB, with the intent of bringing those procedures into alignment with current standards. Employees are identified for applicable training regarding the specific standard and accompanying work procedures. Each of these critical steps are currently taking place collaboratively – working with specific LOB personnel associated with work procedures and training and with PG&E's training organization to ensure alignment at all levels.

As each standard and associated procedure is completed, the Safety Department will communicate these revised standards and procedures through “compliance champions” assigned by each LOB. Broader communication will simultaneously take place through such media as internal bulletins and extended leadership communications.

Further, a standardized and disciplined audit procedure monitors continued compliance by each LOB and employee identified with a particular safety standard. The procedure mitigates at-risk behaviors. Corrective actions are identified and followed up on appropriately and in a timely manner.

**19. Have you ever commissioned independent (including outside) safety and/or compliance audits? How are results translated to action and the results monitored? Please provide examples.**

PG&E has commissioned a number of independent safety audits -- using both internal and external services -- in recent years. Generally, the results of the audits are translated into action plans that are implemented. Independent compliance audits are typically performed by PG&E's Internal Audit department as described in response to Questions 8 and 9.

Described below are examples of recently conducted safety audits.

ColdWorks Engineering -- In 2010, PG&E was directed by the Consumer Protection and Safety Division (CPSD, now the Safety and Enforcement Division) of the CPUC to perform a complete review of the Gateway Generating Station's anhydrous ammonia chiller system with regard to how it might impact public and employee safety. ColdWorks Engineering was engaged to perform the review. The review was extensive and was performed with CPUC oversight over the course of a year. PG&E made significant improvements with regard to the safety of the system, responding to every recommendation by ColdWorks Engineering. In addition, in 2011, PG&E had ColdWorks Engineering review all of the changes that were made and provide a final report.

Blacksmith Review -- In the fall of 2010, the Boards of Directors of PG&E Corporation and PG&E retained Process Performance Improvement Consultants, a unit of The Blacksmith Group, to conduct an independent review of the utility's natural gas transmission and distribution practices. The review identified industry practices that PG&E could adopt to improve the operations and maintenance of its natural gas system, including safety-related practices. This work was overseen by the Special Review Committees of the Boards. The Blacksmith Group made a series of recommendations which have resulted in specific action plans and initiatives that are tracked with regular status updates to PG&E's senior leadership.

Zero in on Safety (ZIOS) Audit -- In January 2011, a Safety Department audit team completed interviews of leaders from PG&E field organizations to assess compliance with the elements of the ZIOS program, which was mandated by the Chief Operating Officer in 2008. ZIOS was a Company-wide initiative that provided the tools and resources to help employees identify and resolve safety issues, develop effective safety committees, and improve safety performance in the field. The audit found gaps in a majority of the ZIOS program elements. At the root of the findings were unclear roles and responsibilities and multiple tools and processes (that existed prior to ZIOS) that were still used in various locations across the Company. These findings highlighted the need for a thorough change management process when revising processes and rolling out guidance documents. PG&E has since created an enterprise change governance and management process.

Behavioral Science Technology, Inc. (BST) Assessment -- In February 2011, PG&E retained BST to conduct an audit entitled the Occupational Health and Safety Systems

Assessment. The objectives of the audit were to evaluate the effectiveness of safety systems and identify any gaps in the safety program, policies and procedures in place at that time. The audit revealed gaps regarding safety ownership, safety focus (on rules versus prevention) and in collaboration between leaders and front-line workers. In addition, the audit concluded that the safety systems in place were not robust and were adversely affected by PG&E's culture (e.g., the incident investigation process was not uncovering comprehensive root cause data because it was linked to discipline). These findings (along with those of the Leadership Safety Assessment described below) drove changes to PG&E's discipline process for safety incidents. The findings also suggested that PG&E should employ a more holistic approach to safety, including compliance, policies, work procedures and associated training. In 2012, PG&E hired a new Senior Director of Safety who is responsible for building an integrated approach to safety across all LOBs.

Leadership Safety Assessment -- In August 2011, an internal Leadership Safety Assessment was completed that identified opportunities for safety performance improvements within the utility's field organizations. The assessment focused largely on the enterprise safety strategy and how well leadership communicated the strategy and turned it into actions that reduced exposure and improved safety performance. The summary findings were that: PG&E lacked a system-wide strategic approach for safety, metrics PG&E used to measure safety were incomplete or driving the wrong behavior, and safety communications were confusing to employees. These findings were the catalyst for changes to PG&E's safety metrics, a revamping of enterprise safety governance, including the addition of a Lead Safety Officer and the creation of the Executive Safety Steering Committee (ESSC), and Safety Leadership Workshops that were delivered to approximately 4,700 leaders.

Stakeholder Safety Assessment -- In August 2011, a Stakeholder Safety Assessment was completed that identified best practices and opportunities for improvement related to the interaction between PG&E and its communities and customers from a safety perspective. The assessment identified and categorized the key activities in place that had the greatest impact on Stakeholder Safety, and also identified focus areas for continuing to enhance Stakeholder Safety. These findings resulted in the creation of PG&E's enterprise-level public safety metrics and were foundational to changes in how PG&E was organized to communicate with its communities and customers regarding safety.

Det Norske Veritas (DNV) Review -- In late 2011, PG&E retained the services of DNV, an engineering firm with wide experience in operational risk management and the developer of the International Safety Rating System, a proprietary risk management framework designed to systematically evaluate the effectiveness of risk management programs to address safety-related and other risks. Based on DNV's years of experience and extensive repository of "best in class" operational risk management practices that the company has developed through years of auditing various asset-intensive companies, DNV helped PG&E develop an enterprise and operational risk management standard which has now been implemented enterprise-wide.

GEI Consultants, Inc. (GEI) -- In late 2011 and 2012, GEI conducted an assessment of the public safety risks for all PG&E Hydro generation watersheds. The safety assessment of the waterway system identified potential hazards and recommended options to further enhance PG&E's public safety program. GEI completed the study by compiling information from PG&E's GIS watershed maps and conducting site walks for all canals and flumes in the Hydro system. Following the site visits for each watershed, a debriefing workshop with PG&E was conducted to present preliminary results from the field visits and rankings of public access points based on risk and likelihood of public contact. GEI's final report included recommendations for mitigation controls. This assessment/study is a key component of Hydro's long-term plan related to further enhancing the Company's public safety mitigations.

In addition to specific safety-related audits, PG&E routinely retains expert consultants to advise on specific complex, high consequence, hydroelectric projects such as dam safety improvements. An independent Board of Consultants (BOC) evaluates PG&E's assumptions and assessments regarding critical structures and provide guidance based on their expertise and industry experience. This approach ensures that proper levels of protection and rigor are in place to provide the mitigation needed to improve a water retaining structure to an acceptable level of safety. Most recently, PG&E completed the seismic retrofit of Crane Valley Dam, a 90-year old hydraulic fill dam located near Fresno. The BOC retained to guide PG&E on this job consisted of three recognized experts in the field of Civil and Geotechnical Engineering and Liquefaction of Soils.

At Diablo Canyon Power Plant (DCPP) a number of safety-related audits are performed on a recurring basis. The Institute of Nuclear Power Operators (INPO) performs an evaluation and assessment of DCPP's safety performance every two years. Additionally, the Nuclear Safety Oversight Committee (NSOC), which is comprised of industry peers, and the Diablo Canyon Independent Safety Committee (DCISC), which is appointed by the CPUC, perform onsite visits quarterly to assess safety performance. In addition, nuclear safety culture assessments are performed every two years through the Utilities Service Alliance/Strategic Teaming and Resource Sharing (USA/STARS) alliance.

**20. What are you doing to promote and assure an appropriate safety culture? Have you documented what an appropriate safety culture should include?**

PG&E undertook several safety culture initiatives in 2012 and 2013 after the formation of, and at the request of, the Executive Safety Steering Committee (ESSC). The list of those initiatives follows, with a brief description of each initiative's objectives:

- Grassroots Safety – Bolster grassroots safety (employee-led safety teams) efforts by assuring consistent application of the Grassroots Safety Process and encouraging the sharing of information and best practices across all LOBs.
- Leadership Safety Engagement – Positively change safety culture through three key objectives for leadership: demonstrating care, increasing field visibility, and developing trust. This initiative provided a process and training tools for leaders (directors and above) to visibly engage with workers to hear their safety concerns and demonstrate their commitment to removing perceived obstacles and barriers to safety.
- Near-Hits – Create a climate of trust that supports and encourages near-hit sharing and discussion about how near-hits can help employees recognize and minimize hazards. This is accomplished by providing a library of near-hit stories accessible to all employees, and developing a simple, common process to share near-hits and use these stories to educate each other to prevent future incidents.
- Safety Leadership Workshops – Introduce and align approximately 4,700 leaders around a new safety strategy at PG&E and prepare them to lead safety culture change. The resulting climate of trust will support safety performance improvements as employees will feel comfortable speaking up, stopping jobs, sharing incidents or near-hits and learning from one another – without discipline or fear of reprisal.

After completion of the safety leadership workshops in July 2013, the Company took further steps to formalize its safety culture program to reinforce and sustain safety culture improvements. In the fourth quarter of 2013, the Company launched a 3-month project, called the Safety Culture Roadmap, to build a high-level plan to improve and sustain PG&E's safety culture and related safety performance.

The Company's safety culture change benchmarking efforts have provided data that suggests a very strong correlation exists between the investment in, and delivery of, a focused safety culture change program and safety performance improvements. PG&E has concluded that the Company will only achieve improved and sustained incident and injury reductions through a focus on enterprise-wide safety culture change. The safety culture change strategy and roadmap is foundational to changing the safety culture within PG&E and supporting the Company goal of being the safest utility in the nation. This work will include effectively leveraging current culture change activities (ESSC Initiatives, LOB initiatives and related communications) in the development of a longer-term culture change strategy. The Roadmap process will design a multi-year implementation plan that will establish the structures, activities and change management approach that will enable PG&E to create a self-reinforcing safety culture. To lead

and drive progress on safety culture efforts, the Company created and filled a Safety Culture Director position in December 2013 that reports to the Lead Safety Officer.

Behavioral Science Technologies (BST) was chosen to assist PG&E with Roadmap development. After reviewing the outputs from the studies and audits referenced in the response to Question 19, completing 25 executive interviews, spending two days at each of 13 PG&E sites, and conducting an enterprise Safety Culture Survey that has currently received over 8,900 responses, BST is drafting its findings and recommendations for PG&E. These findings and recommendations, due on December 30, 2013, will provide the foundation for PG&E's Safety Culture Roadmap.

As part of the Roadmap process, a subcommittee of the ESSC - the Safety Culture Steering Committee - has developed a draft set of traits and attributes that illustrate an end-state view of an appropriate safety culture. These traits and attributes are nearly identical to those documented by the Institute of Nuclear Power Operations (INPO) in their October 2009 publication, "Principles for a Strong Nuclear Safety Culture," with specific nuclear references changed to more general references that are applicable to the entire utility. The principles fall into three categories – Individual Commitment to Safety, Management Commitment to Safety, and Management Systems. Within each of these categories, the desired traits and attributes are further described as follows:

#### **Individual Commitment to Safety**

**Personal Accountability – All individuals take personal responsibility for safety.** Responsibility and authority for safety are well defined and clearly understood. Reporting relationships, positional authority, and team responsibilities emphasize the overriding importance of safety.

Standards: Individuals understand the importance of adherence to standards. All levels of the organization exercise accountability for shortfalls in meeting standards.

Job Ownership: Individuals understand and demonstrate personal responsibility for the behaviors and work practices that support safety.

Teamwork: Individuals and work groups communicate and coordinate their activities within and across organizational boundaries to ensure safety is maintained.

**Questioning Attitude – Individuals avoid complacency and continuously challenge existing conditions and activities in order to identify discrepancies that might result in error or inappropriate action.** All employees are watchful for assumptions, anomalies, values, conditions, or activities that can have an undesirable effect on safety.

Our Work is Recognized as Special and Unique: Individuals understand that complex technologies can fail in unpredictable ways.

Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding.

Challenge Assumptions: Individuals challenge assumptions and offer opposing views when they think something is not correct.

Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent problems, and inherent risk, even while expecting successful outcomes.

**Effective Safety Communication – Communications maintain a focus on safety.**

Safety communication is broad and includes enterprise-level communication, LOB - level communication, job-related communication, worker-level communication, equipment labeling, operating experience, and documentation. Leaders use formal and informal communication to convey the importance of safety. The flow of information up the organization is considered to be as important as the flow of information down the organization.

Work Process Communications: Individuals incorporate safety communications in work activities.

Bases for Decisions: Leaders ensure that the bases for operational and organizational decisions are communicated in a timely manner.

Free Flow of Information: Individuals communicate openly and candidly, both up, down, and across the organization and with oversight, audit, and regulatory organizations.

Expectations: Leaders frequently communicate and reinforce the expectation that safety is the organization's overriding priority.

### **Management Commitment to Safety**

**Leadership Accountability – Leaders demonstrate a commitment to safety in their decisions and behaviors.** Executive and senior managers are the leading advocates of safety and demonstrate their commitment both in word and action. The safety message is communicated frequently and consistently, occasionally as a stand-alone theme. Leaders throughout the organization set an example for safety. Corporate policies emphasize the overriding importance of safety.

Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to support safety.

Field Presence: Leaders are commonly seen in working areas and job sites observing, coaching, and reinforcing standards and expectations. Deviations from standards and expectations are corrected promptly.

Incentives, Sanctions, and Rewards: Leaders ensure incentives, sanctions, and rewards are aligned with safety policies and reinforce behaviors and outcomes that reflect safety as the overriding priority.

Strategic Commitment to Safety: Leaders ensure enterprise priorities are aligned to reflect safety as the overriding priority.

Change Management: Leaders use a systematic process for evaluating and implementing change so that safety remains the overriding priority.

Roles, Responsibilities, and Authorities: Leaders clearly define roles, responsibilities, and authorities to ensure safety.

Constant Examination: Leaders ensure that safety is constantly scrutinized through a variety of monitoring techniques, including assessments of safety culture.

Leader Behaviors: Leaders exhibit behaviors that set the standard for safety.

**Decision-Making – Decisions that support or affect safety are systematic, rigorous, and thorough.** Employees are vested with the authority and understand the expectation, when faced with unexpected or uncertain conditions, to place themselves and the public in a safe condition. Senior leaders support and reinforce conservative decisions.

Consistent Process: Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated as appropriate.

Conservative Bias: Individuals use decision-making practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop.

Accountability for Decisions: Single-point accountability is maintained for safety decisions.

**Respectful Work Environment – Trust and respect permeate the organization.**

A high level of trust is established in the organization, fostered, in part, through timely and accurate communication. Differing professional opinions are encouraged, discussed, and resolved in a timely manner. Employees are informed of steps taken in response to their concerns.

Respect is Evident: Everyone is treated with dignity and respect.

Opinions are Valued: Individuals are encouraged to voice concerns, provide suggestions, and raise questions. Differing opinions are respected.

High Level of Trust: Trust is fostered among individuals and work groups throughout the organization.

Conflict Resolution: Fair and objective methods are used to resolve conflicts.



## Management Systems

**Continuous Learning - Opportunities to learn about ways to ensure safety are sought out and implemented.** Work experience is highly valued, and the capacity to learn from experience is well developed. Training, self-assessments, and benchmarking are used to stimulate learning and improve performance. Safety is kept under constant scrutiny through a variety of monitoring techniques, some of which provide an independent “fresh look.”

Operating Experience: The organization systematically and effectively collects, evaluates, and implements relevant internal and external operating experience in a timely manner.

Self-Assessment: The organization routinely conducts self-critical and objective assessments of its programs and practices.

Benchmarking: The organization learns from other organizations to continuously improve knowledge, skills, and safety performance.

Training: The organization provides training and ensures knowledge transfer to maintain a knowledgeable, technically competent workforce and instill safety values.

**Problem Identification and Resolution – Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance.** Identification and resolution of a broad spectrum of problems, including organizational issues, are used to strengthen safety and improve performance.

Identification: The organization implements a corrective action program with a low threshold for identifying issues. Individuals identify issues completely, accurately, and in a timely manner in accordance with the program.

Evaluation: The organization thoroughly evaluates problems to ensure that resolutions address causes and extents of conditions commensurate with their safety significance.

Resolution: The organization takes effective corrective actions to address issues in a timely manner commensurate with their safety significance.

Trending: The organization periodically analyzes information from the corrective action program and other assessments in the aggregate to identify programmatic and common cause issues.

**Environment for Raising Concerns – A safety-conscious work environment is maintained where personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.** The organization creates,

maintains, and evaluates policies and processes that allow personnel to raise concerns freely.

**Safety-Conscious Work Environment Policy:** The organization effectively implements a policy that supports individuals' rights and responsibilities to raise safety concerns and does not tolerate harassment, intimidation, retaliation, or discrimination for doing so.

**Alternate Process for Raising Concerns:** The organization effectively implements a process for raising and resolving concerns that is independent of line management influence. Safety issues may be raised in confidence and are resolved in a timely and effective manner.

**Work Processes – The process of planning and controlling work activities is implemented so that safety is maintained.** Work management is a deliberate process in which work is identified, selected, planned, scheduled, executed, closed, and critiqued. The entire organization is involved in and fully supports the process.

**Work Management:** The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work.

**Design Margins:** The organization operates and maintains equipment within design margins. Margins are carefully guarded and changed only through a systematic and rigorous process.

**Documentation:** The organization creates and maintains complete, accurate, and up-to-date documentation.

**Procedure Adherence:** Individuals follow processes, procedures, and work instructions.

**21. What criteria should be used by the Commission to evaluate whether a utility has produced an adequate risk-informed GRC filing?**

The Commission posed this same question in Section 4.2, Question 2, of the OIR and PG&E expects to address this issue more fully throughout the course of the proceeding.

PG&E welcomes the development of criteria to evaluate the risk components of a GRC filing, as long as those criteria are clear and developed in sufficient time to affect the filing. Whatever criteria may be developed, they should also be flexible to accommodate improvements in risk analysis and presentation.

In its 2014 GRC, for the first time ever, PG&E described the Company's risk program and how it affected PG&E's forecast. PG&E also described expected improvements to the risk program. In PG&E's recently filed GT&S rate case application, the Company provides significant testimony on its integrated planning process and its gas transmission and storage risk-based decision-making process. The testimony includes, for each of the asset types (referred to as asset families in the testimony), identification of threats faced, an assessment of the risks arising from those threats, and the work PG&E proposes to implement to mitigate those risks.

PG&E has committed to continuing, and improving, its risk showing in the 2017 GRC. That is, the Company will include the following elements to demonstrate how risk informs its 2017 GRC proposed plans:

- PG&E will provide additional testimony on its integrated planning process; affirmatively showing that risk management through integrated planning forms the foundation of the system safety and compliance projects and programs forecast in its 2017 GRC.
- PG&E will prioritize projects and programs in the 2017 GRC by using risk-based criteria and will demonstrate how the projects and programs it is forecasting mitigate the system safety risks listed on PG&E's Risk Registers.
- PG&E will provide enhanced testimony on its overall risk program from its Chief Risk Officer as well as LOB-specific risk testimony from the risk or asset management leads from Gas Operations, Electric Operations, and Energy Supply.

This approach, which PG&E described in its 2014 GRC, was not challenged by any party. PG&E believes that the above approach is the right course for PG&E's 2017 GRC and that criteria built around these components would be appropriate to evaluate PG&E's 2017 GRC risk showing.