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.	FILED PUBLIC UTILITIES COMMISSION NOVEMBER 14, 2013 SAN FRANCISCO, CALIFORNIA RULEMAKING 13-11-006

CASE STUDY SUBMITTED BY SAN DIEGO GAS & ELECTRIC COMPANY AND SOUTHERN CALIFORNIA GAS COMPANY

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Introduction

As directed in a Policy and Planning Division (PPD) 'straw proposal' to R.13-11-006, SDG&E and SoCalGas (collectively the Sempra California Utilities or Sempra) submit this joint 'Case Study' for illustrative purposes. The case study addresses the four risk-based presentation points included in the PPD straw proposal, namely:

- A description of the utility asset needing replacement or upgrade. The estimated risk, the existing controls already in place to mitigate the risk, and the effect of not replacing or upgrading.
- A description of the method used to estimate the risk. For instance was the risk scored on a purely quantitative basis, a Subject Matter Expert (SME) basis, or a hybrid approach?
- A discussion of what alternative solutions are available to reduce or eliminate the risk?
- The estimated risk reduction if the replacement or upgrade is authorized or if the other alternatives are authorized.

This case study is crafted in two sections:

- Part 1 – The case study workpaper
- Part 2 – A narrative description of the components of the case-study workpaper and the risk-evaluation processes used to assess the project or program to which it may refer.

Part 1 – The Case Study Workpaper

Sempra anticipates that the presentation of projects or activities for evaluation purposes, whether in a separate process or as part of the GRC, would be accomplished through a standardized format. As the staff straw proposal indicates:

> *We are proposing that a similar mechanism be created for complete and transparent stakeholder process to form a risk-mitigation portfolio for each utility – i.e. identifying and ranking the risks to a safer and more resilient system* ***using a uniform process****, and providing a mechanism for the utilities to propose specific projects to reduce or allay that risk. [Emphasis present in the original]*

While the format may differ somewhat from utility-to-utility, we anticipate that what is desired is indeed a consistent general process and, within the utility, a standardized method to present those projects and activities.

The case study is presented using a workpaper template included within past GRCs, by the Sempra California Utilities for capital projects. The workpaper format used by Sempra addresses the attributes requested in the straw proposal and, with adjustment, describes a risk-based evaluation process envisioned by the OIR. The adjustment incorporates a description of the risk methodologies that can be used to support Sempra capital and O&M GRC requests. Whether the risk showing is separated from or combined with the GRC, the proposed template can serve dual purposes by providing both a risk-based presentation and a GRC workpaper.

The case study subject is the Sewer Lateral Inspection Program (SLIP) (See template for definition).

The SLIP case study presentation is an example of how Sempra envisions presenting a risk-based showing for other projects or programs within a GRC. Sempra is in the process of building an enterprise-wide risk management organization and associated tools, methodologies and procedures. This organization and the related tools and practices will evolve over time. Accordingly, while today the risk-procedures utilized by the Sempra California Utilities are not identical and also differ within each utility based on commodity/activity (e.g. electric distribution, gas transmission) over time more standardization will occur. Therefore, today the risk evaluation methods used for SLIP may not be identical to risk evaluation procedures used to assess other programs or projects.

The template for this case study appears on the following pages and is followed by an explanation of the components of the template.

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RISK ASSESSMENT PLANNING DOCUMENTATION

PROJECT TITLE	BUDGET NO.
Sewer Lateral Inspection Program (SLIP)	O&M
WITNESS	IN SERVICE DATE
	n/a

PROJECT COST ($000 in 2009$)	PRIOR YEARS	2012	2013	2014	2015	REMAINING YEARS	TOTAL
DIRECT LABOR	300	400	400	400	400	0	1900
DIRECT NONLABOR	5490	7103	7103	7103	7230	0	33903
TOTAL DIRECT COST	5790	7503	7503	7503	7630	0	35930
COLLECTIBLE	0	0	0	0	0	0	0
NET COST	5790	7503	7503	7503	7630	0	35930
FTE	4	4	4	4	4	0	4

Business Purpose

The Sewer Lateral Inspection Program (SLIP) is an initiative to address an emerging issue concerning pipeline damage associated with sewer laterals. This DIMP-driven mitigation measure aims to effectively address this potentially significant integrity issue.

SLIP is intended to eliminate potential conflict between plastic gas lines and sewer laterals by:

1. Developing a communication plan to educate plumbing contractors, equipment rental companies and municipalities;
2. Establishing a high priority locate-and-mark response for plumbers;
3. Performing an extensive records review to identify locations where plastic gas lines were installed by cross-bore technologies, and locations where sewer cross-bores are not an issue;
4. Performing on-site-site inspections to clear potential facility conflicts;
5. Documenting the results of all record reviews and physical inspections;
6. Updating Company practices and documentation to reflect new processes;
7. Adjusting the DIMP program as needed to address new issues that emerge from the knowledge gained.

Physical Description

Trenchless technology is an installation method that employs technology to enable the installer, in this case the utility, to install pipe underground without disturbing as much pavement or concrete as compared to the open-trench method. Further economic efficiencies are gained by minimizing surface disruption. Additionally, the trenchless pipe installation method is required

This example, including all values and figures, is for illustrative purposes only.

PROJECT TITLE **Sewer Lateral Inspection Program (SLIP)**	BUDGET NO. O&M
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by many of the Sempra California Utilities' franchise agreements when using public streets. It is a common and well-established technology. In fact, because the technology has less impact to the pavement and streets, the American Public Works Association regularly sponsors workshops to promote its use. Sempra's use of this technology is a prudent and cost-effective measure. Prior to installation, investigative work takes place in advance of the trenchless technology being deployed. This investigative work includes, but is not limited to, seeing that underground substructures are located and marked and potholed (depth checks). These activities are common construction practices for many industries.

The deployment of trenchless pipe installation started in the early 1970s. With the expanded use of plastic pipe, trenchless technology has become more prevalent. The potential risk associated with "cross bores" became an industry-wide focus in the late 2000s. A cross bore occurs during the installation of the pipeline using trenchless technology (boring or directional drilling) when the auger (the tip of the trenchless technology) accidently crosses a misplaced sewer lateral and consequently penetrates, or bores, through all or a portion of it. An operator can bore through a sewer lateral without realizing a conflict has occurred. The damage to the sewer lateral can create an immediate blockage or a blockage that slowly and progressively worsens depending on the encroachment of the gas pipeline. The cross bore can remain in place, undetected for a long period of time. At some point in time, the blockage to the drain is so significant that the sewer line needs to be unplugged and a cleaning tool, such as 'roto-rooter', used to ream the sewer lateral. A plumber or the property owner unknowingly cleans out what is seemingly normal sewer debris and blockage. The sewer line appears to be unclogged, but in reality the sewer-line auger has pierced the gas line. Depending on how extensive the damage caused by the sewer-line auger, the gas line, which has now been breached, will leak gas into the sewer line and elsewhere. This unwanted gas migration creates safety and security risks to property and persons. The Sempra California Utilities are prospectively and proactively addressing the emergent risk through the proposed risk mitigation enhanced safety program described in the case study. For example, the Sempra California Utilities revised their Gas Standards (installation policy) so that cross-bore situations will not occur prospectively. Additionally, the Sempra California Utilities

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implemented initiatives to inspect and cure cross bore situations existing within their distribution system.

Project Risk Analysis and Justification

The emergent risk to the integrity of the gas pipeline is the potential posed by cross-boring into sewer laterals. The longstanding working assumption has been that sewer lines were installed significantly deeper (6 to 8 feet) than gas mains and services (3 to 4 feet deep). Therefore there should not be a conflict during the installation of gas piping by horizontal boring. In addition, since municipalities consider sewer laterals to be the property of the landowner, municipalities take no responsibility for maintenance or for locating and marking them. Furthermore, because sewer laterals are normally made of clay or PVC plastic there were no means of locating them (i.e. no tracer wire or marking balls). However, cross bore incidents across the country have become more prevalent, and because of the risk consequence's associated with cross bore, it is imperative that safety programs be enhanced to address this emergent risk.

The Sempra California Utilities recognized this issue as a potential threat based on the investigatory work performed by Southwest Gas (SWG) and presented to the industry. SWG had found physical conflicts in approximately 0.02% of the records it investigated. Using data from its work scheduling system (CMS) that dates back as far as 1994, and applying a conservative value of 0.1%, SoCalGas estimated 410 conflicts for its service territory. SDG&E historical data was not kept in the same manner so an estimate of 20% of the value found for SoCalGas was therefore used.

While the number of conflicts is low, the threat presents a high consequence of damage. This conclusion is supported by SWG, and industry, state and federal pipeline safety representatives. The consequences were further underscored by a tragic incident that occurred in St. Paul, Minnesota, on February 1, 2010, when a sewer contractor attempting to unclog the sewer line with a cutting tool cut the natural gas line and, as a result, gas was released into the sewer lateral and into a home. The gas ignited, injuring the contractor, and the resulting fire destroyed the

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home.

To address the threat identified by SLIP, Sempra has adopted a two-step approach to first identify the conflicts, and then, as a second step, mitigate them. This two-step approach is being implemented over a five-year period commencing in 2010.

The same conditions can exist for steel gas pipe; however, the failure mode differs due to the resistance of the steel pipe to the grinding/cutting action of the sewer cleanout tools. Significant obstructions would lead to further investigation and discovery of the condition, and partial obstructions could lead to corrosion leakage resulting from damage to coatings. These types of failures do not have the same risk because the volume of gas released is significantly less and leakage would eventually be detected by conventional means.

SLIP addresses the type of concerns PHMSA expressed under DIMP, requiring operators to address these identified threats of low frequency but potentially high consequence (Pipeline Safety: Integrity Management Program for Gas Distribution Pipelines; Final Rule, 74 Fed. Reg. 63,906 (posted Dec. 4, 2009) (codified 49 C.F.R. pt. 192, section 192.007(c)). SLIP is characterized as a low probability but potentially serious issue relating to natural gas pipelines installed with trenchless technology where the natural gas pipeline is bored into the earth and inadvertently penetrates a sewer lateral.

[The following includes material that might be illustrative of additional background support as to how a risk-assessment of the project or program was made; it is not intended to show that SLIP underwent this specific type of risk analysis]

In a paper addressing the risk of cross bore, Mark Bruce, the President of the Cross Bore Safety Association and past Chairman of the North American Society for Trenchless Technology states: "Reports from hundreds of miles of inspection projects to eliminate gas line cross bores from sewers has found a range of between 2 to 3 per mile of sewer and sewer laterals inspected. Each one is a "ticking time bomb" waiting to be energized when the home or business owner has a

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plugged sewer[1].” Since 2010, cross boring has been recognized as a national issue that gas distribution companies are addressing. Shortly before that time, the companies formed a team to determine the level of risk that exists due to cross bores. While gas standards were and are adequate to address cross bores of sewer lines moving forward, gas mains and services installed with trenchless construction before the gas standards were updated present a potential for an incident similar to those experienced by other utilities.

Addressing cross boring has required change in activities performed by the companies. This in turn has increased operational and maintenance expenses, as well as capital replacement costs. These include purchase of specialized equipment; hiring of qualified personnel; review of service history records, project files and map products; field inspections of sewer laterals; repair of intrusions found; updating of records; training of personnel; communications materials for customers; and outreach to plumbers, local communities, municipalities and equipment rental agencies.

By itself, a cross bore is not dangerous, it is the exposure of a portion of the gas line that is intersected within a sewer line that poses potential damage when a clogged sewer line is cleaned using mechanical rooters. This could result in a gas leak within the sewer system that has the potential to back up into a structure and result in an explosion if any spark is encountered. The catastrophic consequences require mitigation. Sempra has addressed risk mitigation for cross bore incidents through its SLIP program. Sempra has established its inherent risk, residual risk and target risk levels for cross bore incidents, defined as:

- Measure of Inherent Risk (IR) – the impact if you stopped the current processes or programs.
- Measure of Residual Risk (RR) – the impact with current programs and processes implemented and no additional mitigation activities are incorporated.

[1] Bruce, Mark, Preventing and Eliminating Cross Bores – Increasing Safety and Reducing Risk, Cross Bore Safety Association, accessed February 2014, http://www.crossboresafety.org/documents/Preventing%20and%20Eliminating%20Cross%20Bores%20-%20Increasing%20Safety%20and%20Reducing%20Risk.pdf

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	n/a

- Measure of Target Risk (TR) – the risk level the corporation desires to attain through increased risk mitigation activities.

To this end, the Gas Technology Institute has national records of cross bore incidents and consequences. Sempra uses this data to validate its internal data concerning the likelihood of incident and the probability of consequence. Accordingly, Sempra has evaluated the risk in the following diagram (Figure 1). Sempra risk mitigation activities that establish our current residual risk include:

- Gas standards requiring that all sewer laterals must be adequately located, marked out and exposed or excavated to the point of no conflict.
- Training to reinforce implementation of gas standards.
- Quality Assurance of completed projects.

[The following Figure 1, although not performed for SLIP, might be used as illustrative of a quantified method to demonstrate current risk, the risk mitigated by SLIP, and a risk trajectory toward a target acceptable level of risk.]

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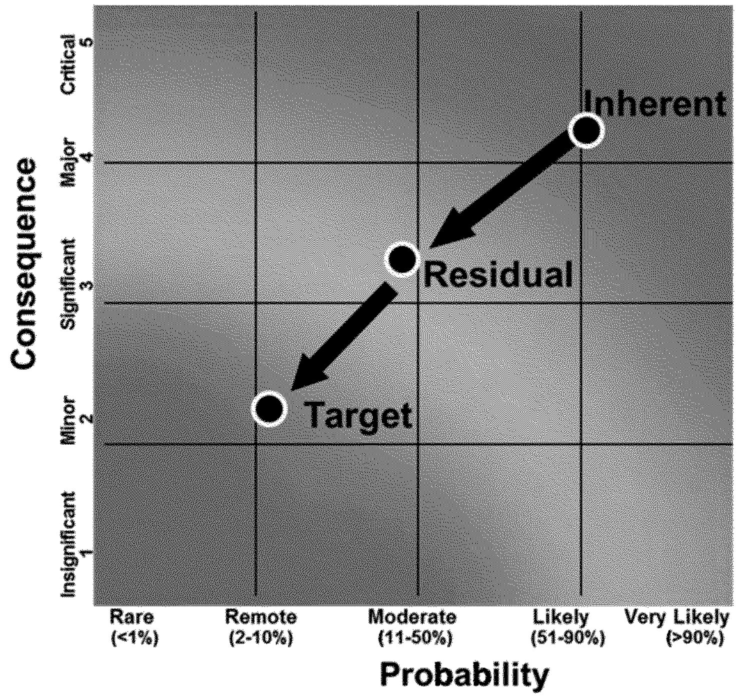
Figure 1 EXAMPLE ONLY - SLIP Risk Assessment



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As of the end of 2013, the Sempra California Utilities have reviewed and cleared approximately one million services or approximately 23,000 miles of pipe. Through this process the Companies found 265 conflicts or one in about every 87 miles of pipe by first targeting 'higher risk areas' – locations where the Companies' Claims department had received notification of sewer lateral conflicts. All of these conflicts have been found in SoCalGas' service territory. The original estimate based in part on the SWG experience was 410 potential conflicts. Using the current experience of one intrusion for every 87 miles, SoCalGas could find as many as 1,100 conflicts. However, it is anticipated that as the projects moves from higher to lower risk areas this rate will decrease.

With regard to the effect of not replacing or upgrading, claims history indicates that sewer cross bores in the Sempra California Utilities' service territory result, for the most part, in minor payouts for damages to the customer's sewer line. Other utilities however, have experienced explosions and fires associated with sewer lateral cross bores where losses of property, serious injuries, and deaths have occurred. In these cases, local gas companies were found liable, resulting in significant (multi-million dollar) payouts.

In addition the Sempra California Utilities are known for having high safety standards. One significant incident resulting in damage, injury or death, would likely erode the trust in the safety of the gas system, causing many residents to worry about whether a cross bore could exist at their location.

The Sempra California Utilities consider the above to be Low Probability, High Consequence, therefore funding provided to address this issue through increased mitigation activities could further reduce the risk probability and is a prudent investment. The additional mitigation activities include:

- Warnings and an increased Public Awareness effort. These should result in more plumbers or do-it-yourself residents contacting the Sempra California Utilities if they suspect or experience any issue with a cross bore.

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- The Sempra California Utilities develop and implement public awareness programs to communicate the potential risk associated with clearing clogged sewer laterals and to reinforce notification to Sempra of a suspected cross bore conflict.
- Include the cross bore corrective program under the Distribution Integrity Management Program (DIMP) as this work would identify and mitigate a potential threat to the integrity of the Distribution system.

Alternatives

Alternative solutions that may reduce or eliminate the risk identified by SLIP include:

- Promote enforcement of standardized design of sewer systems, which have vent lines above the roofline and water traps at each drain. These contribute to reducing the risk of gas entering the residence. A standard sewer design however, is not always the case, and cannot be controlled by gas utility companies. Given the diameter of the gas pipe, its pressure, and the unpredictability of migrating gas, a number of random factors can combine to cause a major accident similar to what other utilities have experienced.
- End the use of trenchless construction activity. This is not perceived to be a feasible option, as a number of municipalities currently require the use of trenchless technology whenever possible to decrease disturbing the road surface and traffic patterns, which is a benefit to local residents. Furthermore, the use of this technology has economic benefits to the company through savings in paving costs and a decrease in installation time as compared to open trench.

Forecast Methodology

Costs for performing SLIP is calculated as follows: The scope and magnitude of the program was established based on the potential number of conflicts to be addressed, the amount and format of data to be reviewed, and resolution requirements. The program and associated costs were spread over five and a half years with a partial year in 2010 to begin program development, records review, contractor identification and training.

- Labor: One Program Manager for 2010, Additional Project Manager in 2011, Two Additional Project Managers in 2012
- Non-Labor: Non labor expenses to cover company expenses and contract labor via local plumbing contractors.

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Schedule

SLIP is to be conducted over a five year period beginning 2010 and concluding at the end of 2015.

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Part 2 – The Components of the Case-Study Workpaper Template

Sempra's SLIP case study includes headings and content which Sempra proposes be used for GRC workpapers. The following is a description of the headings and content:

Project Title

The unique name of the project or program

Budget Number (Budget No.)

If a capital project, a budget number matching the same budget number that is expected to appear in a GRC filing. It is sometimes called a 'budget code'. Some budgets are considered 'routine' or 'blanket' (these are synonymous terms), wherein the budget number continues year-after-year for the management of many small, nearly identical assets such as pole replacements or installation of new services. Other budget codes are unique to a particular asset which, either because of scope, size or frequency, is treated as a singular project. These are sometimes called 'specific' budgets, for such things as a compressor station overhaul or a new electric substation. For this case study purpose, if the project is not within a capital budget, the label 'O&M' appears. The SLIP program is an O&M activity.

Witness

In the event the workpaper is to be part of a GRC filing, the witness name associated with the project and whose testimony includes the project.

In-Service Date

In the case of 'specific' projects, the anticipated date that the asset will enter service, becoming used and useful. In the case of 'blanket' budgets, the assets are closed to plant on a monthly basis and the word 'blanket' appears in this box.

Project Cost Table

The project cost table is a tabular representation of the expected costs associated with the project. The cells on the table are:

Direct Labor
The direct labor cost, without loaders or overheads (e.g. pension, benefits, taxes, insurance)

Direct Nonlabor
The direct nonlabor cost such as materials, without loaders or overheads (e.g. pension, benefits, taxes, insurance)

Total Direct Cost
The total of direct labor and nonlabor

Collectible
Any expenses that are obtained from the customer or other sources, offsetting the utility expenses for the project.

Net Cost
The total cost less any collectible costs, being the net utility cost of the project.

FTE
'Full-Time Equivalent' labor, measured in person-years. This is not the same as headcount, but represents the number of person-years required for the work usually using 2080 hours = 1 FTE.

Prior Years
The cumulative costs of the project incurred in years prior to the years shown on the table.

Remaining Years
The cumulative costs of the project incurred in years subsequent to the years shown on the table.

Total
A row total for direct labor, direct nonlabor and the other row headings shown on the table.

Business Purpose

Business Purpose describes how this project supports Utility operations.

Physical Description

This section would address the first of the points required in the straw proposal:

- *Description of the utility asset needing replacement or upgrade. The estimated risk, the existing controls already in place to mitigate the risk, and the effect of not replacing or upgrading.*

As part of the description, this section explains what is proposed to be installed, e.g. the physical aspects of the project. If identifiable, this includes units of product, length of pipe or specifics on the project type. The estimated risk being addressed by the project, existing controls would describe any infrastructure or activities currently used to mitigate the problem, and the foreseeable consequences of not completing the proposed project.

Project Risk Analysis and Justification

This section would address the last three points required in the straw proposal:

- *A description on the method used to estimate the risk. For instance was the risk scored on a purely quantitative basis, a Subject Matter Expert (SME) basis, or a hybrid approach?*
- *What alternative solutions are available to reduce or eliminate the risk?*
- *The estimated risk reduction if the replacement or upgrade is authorized or if the other alternatives are authorized.*

Project Risk Analysis and Justification describes why this project is required and the methods used to raise this project to the level at which it is proposed for construction. These methods include any risk-analyses performed, whether by SME assessment, quantitative measures or automated systems. Results of any of those methods (rating metrics, risk-ratings, risk reduction values) would be shown here. Alternative solutions, to the extent they may be defined and practicable, would be described as well along with a short rationale as to why they are not preferred.

This section also includes any economic analyses (NPV or other), cost-benefit calculations, planning assumptions, compelling regulation or other need for the project.

It is noteworthy here that the description of any risk-based methodologies, process mapping, lexicon or taxonomy is not repeated on the template for each and every project. Just as a method for calculation of a cost-benefit analysis or net-present value is not necessary to each template, a single description of the utility methodologies may be addressed in a related GRC testimony or as part of a risk-based project presentation submittal.

Forecast Methodology

Forecast Methodology includes either a qualitative discussion of how the forecast was developed; or where possible inclusion of the actual calculations with any accompanying discussion of your underlying assumptions (e.g. the average cost/unit was based on a 5-year average).

Schedule

This section is most applicable for single definable projects (“specific” projects as opposed to blanket or routine projects). This section describes the major workorder tasks in the construction schedule and expected in-service date of each workorder task that represents plant that will be 'used and useful', and eligible to be placed into ratebase. For blanket (routine) budgets, this section indicates that this is an on-going budget, e.g. "This is a blanket budget consisting of many like-kind projects that are constructed throughout the year and repeated annually."

As presented in Section 1 and illustrated by the case-study template, Sempra envisions that format would be suitable for the pre-GRC risk-assessment of the roster of programs or projects that would later be submitted as part of the GRC.

The Case Study and Risk Assessment Culture at the Sempra California Utilities Today

The material presented in this case study is not meant to imply tha5t the methodologies exist in comprehensive form at the Sempra California Utilities. Neither SDG&E nor SoCalGas currently have a fully-formed, mature, enterprise-wide uniform risk assessment protocol though which the various gas, electric or other projects are passed. Although there are a number of tools used for that purpose, they are localized and of varying sophistication. These range from simple SME evaluation to applications that in some way quantify attributes of the projects; SDG&E's cable-replacement program would be an example. Both utilities are in the process of establishing an enterprise risk management function, intended to result in the uniform process as expressed in the straw proposal.

The goal of this developmental process is to craft an enterprise-wide culture of risk-based management. As shown in the responses to Questions 2 and 10 of the data-request appendix to the OIR, at SDG&E we are using a model of a risk management process that is grounded on the guidelines for risk management presented in the international standard ISO 31000, and a model to illustrate evaluation of types of risks and their consequences. From this, a risk register and a risk taxonomy are being developed. Similar efforts are to be undertaken at SoCalGas.

From the data responses submitted December 20, 2013, Question 2 illustrating the process model:

> *The risk management process/framework shown in Figure 2-1 (below) is put into place at SDG&E to provide process guidance to all BFA's in risk identification, analysis and evaluation.*

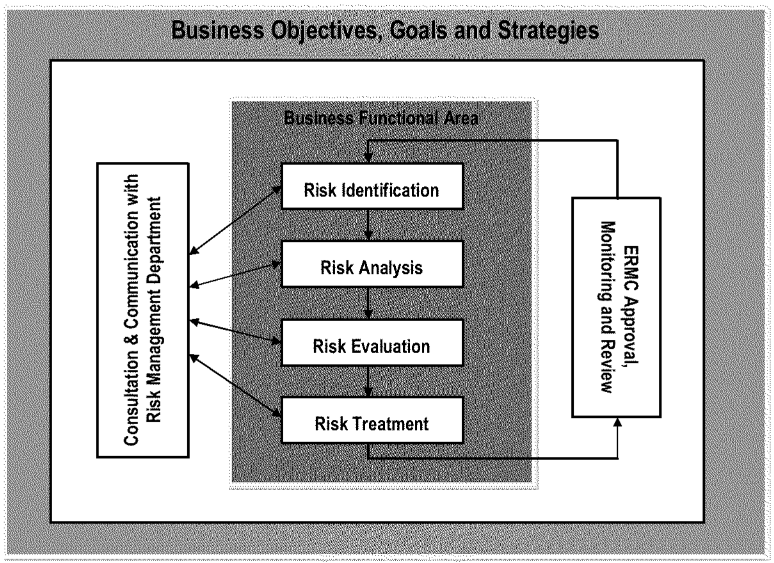
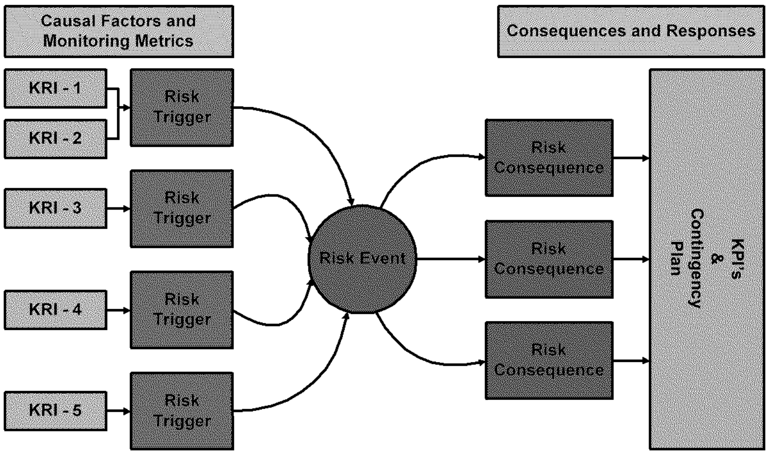


Figure 2-1

From the data responses submitted December 20, 2013, Question 10 illustrating the evaluation of risk types and consequences, to develop a risk taxonomy:

> *Two types of metrics, based on historical trends and data collection, are used to monitor risks. The first set of metrics is Key Performance Indicators (KPI), which are used to measure business results and, inherently, these are lagging indicators. The second set of metrics is Key Risk Indicators (KRI), which are measuring the performance of risk triggers and, therefore, the leading indicators of a risk profile.*



> *Like KPI's, KRI's need to be quantifiable so the management can track in time series against standards or limits. SDG&E is in the process of developing KRIs for certain key risks and will enhance its data mining effort to include more internal and external data sources in detecting risk and risk trend.*

Finally, Sempra would suggest that the risk-based decision framework for the GRC ought to be constructed so as to be risk-informed, not rigidly risk-determined. We desire a thoughtful, measured transition from the current rates-focused GRC process to one that incorporates a risk-aware methodology.

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