Lathrop Redline of Staff Straw-Proposal

R.13-11-006 (edits in Track Changes AND red-boxed text, pages 1-15 only)

The Commission staff will convene a three-day workshop to discuss this proposal. This will be an iterative process where we will refine as we get feedback from all stakeholders. The workshops are scheduled to begin on March 19th at the Commission Auditorium. More details on the workshop to follow.

The large utilities (i.e. SoCalGas, PG&E, SDG&E, and Edison) are asked to submit and serve a case study utilizing the new process – see below. By case study we mean we want the utilities to take this proposal and create an example of how it could work in real life – e.g. a utility can file its own Risk Assessment Planning Proceeding (RAPP) using hypotheticals. We are requesting this approach because the case studies can be used in the workshop to revise/refine the proposal. The utilities are asked to submit and serve their case studies on March 11th.

Logistically, the next steps on this proposal are as follows:

1. SoCalGas, PG&E, SDG&E, & Edison are to submit and serve their case studies on March 11, 2014
2. Workshops (March 19, 20, & 21) with all stakeholders to get feedback
3. Staff will revise the proposal based on the feedback from the workshops
4. Parties will file formal opening and reply comments on the revised proposal.
5. Prehearing Conference (PHC) will be scheduled for April 29, 2014 – ruling to follow.

I. Introduction

Coming out of the energy crisis, the Commission radically changed its policies around energy procurement to ensure reliability as it formed the so called "hybrid market" that combined elements of regulated utility services with competitive markets. This process evolved over the years to become the Long-Term Procurement Plan proceeding (LTPP). The LTPP combined two core functions: approving short-term (generally less than five year) procurement of electric energy supplies on an expedited schedule, and approving long-term contracts for generating resources to ensure adequate generation capacity was available to meet planning reserve margins.

Since the San Bruno natural gas pipeline explosion in 2010, the Commission has faced a similar need for transformation of its policies concerning the safety and resiliency of utility operations. In response to date, the Legislature has enacted multiple statutes, and the Commission has also opened several investigations and rulemakings; however, neither the statutes nor the rulemakings/investigations fundamentally changed the core mechanisms by which regulated utilities consider safety.

In this Rulemaking – R.13-11-006 - the Commission has asked stakeholders how to more effectively integrate safety into utility General Rate Case (GRC) funding proposals, and also asked for ideas to potentially streamline the GRC process. Over eighteen different stakeholders filed comments in

response to the Rulemaking. The Staff Straw Proposal draws on the ideas proposed by the Office of Ratepayer Advocates and the Coalition of California Utility Employees, among other stakeholders.

This Staff Proposal is introducing a process modeled after the LTPP proceeding. The LTPP proceeding focuses on ensuring reliability and ensuring necessary capacity is brought online consistent with state-policy goals. Essentially, the LTPP utilizes a transparent stakeholder process to identify need for resources based on load forecasts, policy directives and future expectations about resource availability and directs each utility to procure a portfolio of contracts to ensuring sufficient generation supply on a territory-wide and local resource area. 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.

a) A Definition, Then the Rulemaking's Goals, Challenges, and Benefits

This proposal covers a great deal of ground, and may seem overwhelming in the complexity of all of the issues discussed. But we can make that complexity more manageable by first laying out a clear framework with the definition of "risk," then the rulemaking's goals, challenges, and benefits. We will then refer back to this framework at different points later in the proposal. That framework:

Definition: When we say "risk" here, we mean the classic definition from Kaplan & Garrick (*Risk Analysis 1:1(11) 1981)*, which defines it as a list of triplets, of answers to three questions: What can happen (name of scenario)? How likely is it (some measure of likelihood)? How bad is it (consequences)? As such, that definition fits readily into list-based databases developed by utilities.

The goal of this Rulemaking R.13-11-006 is to develop a regulatory process, including rate setting and project prioritization, to manage the risks of utility operations such that:

- G1. All risks of utility infrastructure and operations are managed in a methodologically correct, transparent, third-party reviewable way. To list more specific conditions:
- G2. Those risks include emerging-novel risks (cyber risks, climate change, renewables, etc.), operational risks (routine and special operations), legacy infrastructure risks, and unanticipated risks. In scale, those risks range from pole failures to catastrophes at the scale of the San Bruno incident.
- G3. The utilities shall be compelled to conduct comprehensive and appropriately paced surveys to discover all risk sources.
- G4. The process is transparent, allowing the CPUC and all parties to effectively participate in risk management decisions, i.e., such that they can understand all steps and effectively check and cross-examine all aspects (data, assumptions, calculations, tradeoffs).
- G5. The process is open to effective third party review for methodological correctness and completeness.
- G6. The process specifically and transparently checks for efficiency.
- G7. The process specifically and transparently allows the GRC process to make the appropriate policy tradeoffs between cost-burden and risk reduction.

Each of the goals just listed has clear and obvious challenges associated with it. To list particular challenges that should be highlighted, in addition to the obvious challenges associated with each goal:

- C1. Lack of data, and so how best to manage risks given that lack of data.
- C2. Fairness: As will be seen in this proposal, much of the proposed process involves complex analysis. That gives large utilities an advantage, in that it will be frankly quite difficult for all other parties to apply the "analytic horsepower" required to effectively understand and challenge utility analyses.
- C3. Transparency: Closely related to, and in fact one part of a solution to, "Fairness." It is one thing for a utility to perform the data collection and analysis called for to manage its risks. It is quite a more difficult thing for the utility to do that in a way that can be reviewed by another party, either a party to the GCR process, the CPUC itself, or a third party review team.
- C4. Completeness: Risk assessment is a highly developed field of analysis, but it has not developed solid analytic bases to address the problems of completeness, i.e., anticipating all possible ways losses could occur, and anticipating all possible ways to reduce the risk of those losses.
- C5. The Other Side of the Completeness Coin: Unanticipated Scenarios. One of the key findings of the field of risk assessment is that it is essentially impossible to anticipate all accidents, all scenarios. So a sound risk management process must include ways to manage incidents that were not anticipated. That involves four processes:
  - Inherent robustness, such that the failure of any one element has a natural "backup" to minimize the consequences of that failure;
  - fail-safe, such that if a system does fail, it fails into a damage-limiting state;
  - Incident management and recovery, even from incidents "not on the list;"
  - Learning from those incidents, and learning from "near misses," with Corrective Actions and Corrective Action Tracking.
- C6. Managing Five Very Different Types of Risk: Earlier we listed five different types of risk: Emerging, Routine Operations, Special Operations, Legacy Infrastructure and Unanticipated. While each risk can be managed within its own area, there is then a special challenge to manage all five risk types in a mutually consistent way. Actual GRC decisions involve proposals to manage all five risks, and so must identify the appropriate balance in activities and funding among managing those five different risks.
- C7. Incentives: The utilities face pronounced incentives to invest in capital-based risk reduction measures, as opposed to operations/labor-based measures. Yet societally optimal risk management should take a balanced approach to those measures, considering each measure in terms of its societal cost-burden, independent of whether it appears as a capital vs. non-capital expenditure.
- C8. Blending analytic and policy processes: As will be seen in this proposal, much of the proposed process involves complex quantitative numerical analysis. Yet that analysis must effectively support a policy process, and specifically a process involving cost-burden vs. risk tradeoffs, which involves people and processes involving expertise in law and policy, not quantitative numerical analysis.
- C9. Culture change: Closely related to Challenge C8. The proposed process involves a shift from

prose-based advocacy contests to advocacy contests supported by complex quantitative analysis. That will involve a challenging cultural change by all parties and the process itself.

While the above goals and challenges are frankly daunting, the benefits are considerable. In addition to the benefits that directly flow from each of the above goals, if the rulemaking is implemented in a way that fully exploits its possibilities, its benefits will extend to:

-B1. An analysis-based risk management process is frankly the only way to address Challenges 1 through 7 listed above. The risk management process is simply too complex for any non-analytic approach to:
- "roll up" (aggregate) the overall risk reduction of a set of mitigation measures
- express that aggregated risk reduction in units and formats that can be used by the GRC process to determine efficiency and the appropriate risk vs. cost-burden pairing.

-B2. The proposed process "Opens up the Black Box," such that all parties can "look inside" and see the data/assumptions/calculations involved, understand "what causes what," and participate effectively in cross examination and seeking commonly agreed-upon analysis results.

-B3. The proposed process sets up an analysis process that can be tested against broadly established standard analysis practices and rules (see Special Issue 8 at the end of Section II).

-B4. The utilities move into a mode where they conduct their risk management in a methodologically defensible, transparent and third-party-reviewed way, with associated benefits in internal management.

-B5. Interveners move into a mode where they can participate effectively in both the technical and policy aspects of risk management

-B6. The CPUC moves into a mode where it supervises a process that is methodologically defensible, transparent, and vetted by third party review.

-B7. All parties move into a mode featuring a more predictable and orderly analysis-based process.

b) Foreshadowing the Essential Mechanics of the Process

~~The goal of this proposal is to develop fundamental regulatory processes for defining, acquiring, and disseminating risk-based information that supports rate-setting and project prioritizing decisions. This new process --~~ Later sections of this proposal describe the mechanics of the process in some detail. To prepare for that, here we include a foreshadowing of some essential elements: W~~w~~hether in a separate proceeding or a phase of the GRC proceeding ~~--~~ the utility proposal should include the following:

- 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 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.

Developing these processes and the capability to credibly deliver and interpret risk information suggests that several other supporting capabilities may also need to be in place. Utilities may need to expand their risk management processes, and the Commission, as well as interveners may need to expand their own capabilities and understanding of risk management.

Here are two possible alternatives for incorporating this process into GRC decision making:

A) A separate proceeding, conducted separately from and in advance of the GRC application, which results in a risk-informed portfolio of projects to address identified risks and uncertainties, and which establishes a ranking of these projects based on their expected costs and anticipated value to ratepayers. For the purposes of this proposal, we coin the term Risk Assessment Planning Proceeding (RAPP). The Commission-approved results of the RAPP process would then be incorporated into the utility GRC application as part of expenditure requests for utility operations and capital improvements.

B) Instead of holding a separate proceeding, the risk assessment and project planning could occur as the first Phase of each utility's GRC proceeding, with the risk-reduction project portfolio comprising a separate book of testimony and related working papers, and the budget for the approved project list incorporated into the utility's total revenue request for that Test Year.

While this proposal has selected these two options for consideration, Staff is not opposed to alternatives that fit the concepts further described in this paper. Regardless of the structure for considering risk and mitigation, however, this proposal also sees a necessity for adding a new verification component to GRCs, which would entail the utility at the time it files its Notice of Intent (NOI) to also file a very simple chart showing the projects that were approved versus the projects that were implemented. This verification process is discussed in more detail in the later section of this proposal.

Setting aside for the moment the matter of whether risk analysis is separate and preliminary to the GRC, or an early Phase of the case, this approach essentially consists of three components:

- Step 1 is to identify the risks for a safer and more resilient system, and to create a process that allows the utility to bring to the Commission its justification/rationale for these risks and ways to mitigate them. The outcome of this Step would provide guidance for establishing recommended levels of funding for Safety and Resilience~~y~~. This step is to be designed to achieve the goals, address the challenges and realize the benefits listed above in Section I.a.~~We'd like to discuss at the workshop whether this step should be incorporated into the GRC rate case plan.~~
- Step 2 is the traditional General Rate Case litigation for each utility. The prior identification and/or ranking of the risks to the utility would not guarantee that all costs proposed in the GRC

will get approved. In the GRC, stakeholders can debate the cost as well as the path the utility has chosen to eliminate and/or mitigate the risks identified.

- Step 3 is verification. The Commission requires **a uniform and simple verification** system that will be reported by the utility to the Commission's Safety & Enforcement Division (SED). For example, if utility X was approved in 2015 to replace 1000 poles by 2020 with a budget of $200 million; in 2020 the utility should show in a most simple chart that 1000 poles were approved in 2015; in 2016 250 poles were replaced at a cost of $30 million; in 2017 300 poles were replaced at a cost of $65 million; in 2018 450 poles were replaced at a cost of $100 million; the utility will refund the extra $5million and/or will use it for something else that it will clearly identify. This should be illustrated in a table and will include other items that were approved in the GRC.

In the next sections we will further explain each of these three steps.

II. Risk Assessment

a) A Requirements Based Design of the Process

The overall system we are dealing with, here, is the system of utilities, the CPUC, and all parties, as a system that generates risks, manages those risks, incurs those risks and pays for that risk management. That is a complex system. So in this section, we adopt the classic systems engineering perspective. As applied in this context, that perspective is: The CPUC sets requirements for what the utilities must do, then lets the utilities figure out the best ways to meet those requirements, subject to CPUC and all-party review. Here we spell out those requirements. They are based on – in fact they follow directly from -- the Goals, Challenges and Benefits listed above in Section I.a.

We start with an "Uber Requirement," from which all more detailed, operational requirements follow:

UR. The risk management system set up by this process shall:
- make the best use of available data, defining "best use" to include the best use of all efficient feasible means to collect, organize and analyze that data
- to calculate risk metrics and formats for presenting those metrics
- such that the GRC process can make the most fair and informed risk management decisions possible
- supported by processes that allow effective participation by all parties
- and supported by means to verify all results and verify methodological correctness.

Based on that Uber Requirement, we can state the Key Action Requirement, Metrics Requirements and Organizational/Procedural Requirements:

Key Action Requirement

R1. The utilities shall survey all possible risk sources, collect data and build methodologically correct risk management models, then use that data and those models to make the best use of available data to support the GRC process as specified in the Uber Requirement and all following Requirements.

Metrics Requirements

R2. The metrics shall be verifiable by a third party, and include full pedigrees.

R3. The metrics shall be understandable to all GRC parties.

The metrics shall provide the most efficient feasible basis for judgments in the GRC process, such that the process:

R4. … manages risk in a verifiably efficient way;

R5. … supports policy judgments trading off risk vs. cost-burden;

R6. … clearly separates the above two issues;

R7. … supports effective, informed participation by all parties;

R8. … is compatible with the legal regime of the GRC;

R9. … does not require any CPUC decision maker to exercise expertise he or she does not now possess.

Organizational/Procedural Requirements

R10. The system shall include an explicit process for managing and learning from unanticipated risks.

R11. The system shall include all technical/analytic support called for by Requirements R7, R8 and R9.

R12. That support shall be inherently and verifiably unbiased over all parties.

Advantage of a Requirements Based Approach

This approach addresses the key problem of what this proposal is seeking to accomplish: The complexity laid out in the Goals and Challenges listed above in Section I.a. With this Requirements Based Approach, the CPUC simply demands a ten-requirement check-off action with each utility (Requirements R1 through R10). The utility must demonstrate, to the CPUC's satisfaction, that it has met all ten requirements. Then the process must also be checked against Requirements R11 and R12.

b) A More Specific, Detailed and Operational Pass Through the Risk Assessment Step

The goal of this aspect of the proceeding is for the utility to identify and clearly define its priorities and policies for assuring a safe and resilient system. More specifically, the utility must identify the top risks to its system – the risks must be separated as operational risks that the utility faces, legacy risks, and emerging risks that could impact long-term performance and unanticipated risks to a safer more resilient system[1]. The utility must justify these risks based on measureable and verifiable risk assessment. This process should identify the safety objectives, implementation options, and the information required to evaluate the performance of the proposed projects. Further, the utility must also identify risk mitigation projects. They should show how, and by how much, each project is expected to reduce the probability of a hazardous event occurring and the consequences of the event if it occurs. The utility should also estimate when they expect these safety improvements to be realized and the duration or lifetime of the project impacts (e.g. replaced pipe has expected lifetime of "X" years, employees are retrained every three years, etc.). These projects should be identified as either direct safety mitigation projects (e.g. pipeline replacement), risk assessment projects (e.g. pipeline safety

[1] These are suggested risk categories and may be further developed as part of a risk taxonomy identification process in the RAPP

testing and inspection, risk modeling), or safety enabling projects (e.g. safety training).[2] Through this process all stakeholders will have an opportunity to comment on the utilities testimony and provide feedback, if any should be adopted and/or modified. The Commission's final decision would reflect this robust and transparent record.

One of the most apparent challenges is simply identifying the risks to a safer and more resilient system – e.g. breakdowns in infrastructure such as old utility poles in high consequence areas; transformer failures that lead to fires; cybersecurity threats; pipeline failures; natural gas storage failures. The assessment process must be designed to identify and contextualize these risks so that stakeholders can provide, input, feedback and/or meaningful alternatives. ~~The initial workshop for this proceeding is designed to identify/define a risk taxonomy that comprehensively classifies the risks that a utility faces, develop and agree on a set of requirements for measuring risk, evaluate options and alternatives for mitigating risks, and validate a process for prioritizing risks mitigation opportunities.~~

c) GUIDING PRINCIPLES for developing risk-based regulations

Based on a review of several risk management processes, we have identified five guiding principles of risk management that can form the foundation for proactive risk-based regulation.

- Risks involve uncertainty about achieving objectives. Although categories of risk, or even specified risk events can be identified and the likelihood of their occurrence quantified, there is still an underlying element of uncertainty in terms of when, extent of the impact, or ultimate outcomes of some event. Uncertainties are expressed as both negative and positive impacts. Negative impacts hinder the advancement of our objectives and positive impacts promote and enhance our objectives. Regulation should recognize this dual role and capability of risk management and adopt processes that provide incentives to utilities to address and find innovative ways to control risk in ways that comport with and advance stakeholder objectives.

- Risk is an analytically measurable quantity, and may be reduced to a metric that is a function of the probability of an event and the impact of that event. Each event can either enhance or inhibit the ability to achieve objectives. These metrics can characterize risks that have occurred in the past (Lagging indicators) or can also assess our expectations of future events (Leading indicators).

- Risk management is predicated on a comprehensive review of risks. The effectiveness of a risk management paradigm depends on the ability to comprehensively review all project risks individually and as a portfolio. Risk occurs at all levels of an enterprise so risk management is the responsibility of everyone.

- Learning is a core competency of effective risk management. The task of resolving uncertainties and reducing negative risk requires that organizations plan for and embrace learning and continuous improvement processes as an integral part of risk management.

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[2] These are suggested categories that may be further defined as part of the RAPP

- Transparency in risk evaluation processes and third party review is essential to developing robust comparable risk metrics, confidence in the measurement process, and consistency in overall risk management processes.

d) ~~Requirements~~ Steps for Risk Assessment and Planning

In order to better understand how system-wide risk assessment and management can be used to support and achieve the objectives of safe, resilient and cost effective service, we have developed a preliminary set of regulatory process ~~requirements~~steps. These ~~requirements~~ steps incorporate the five guiding principles and also recognize that developing a robust risk management paradigm for regulating IOUs also requires meaningful and informed input from stakeholders. The key issue~~s~~ to resolve with stakeholder input ~~are~~ is how to balance the fundamental objectives of safe and resilient service at reasonable rates~~; how to determine risk tolerance at the program level; and how to determine an acceptable level of risk for a portfolio of programs in the GRC~~.

The risk assessment process (whether in a separate RAPP proceeding or as a Phase of the GRC) is designed to ~~elicit~~ perform ~~these three~~ two fundamental ~~requirements~~ steps of risk assessment and management ~~in three steps~~:

1. Develop an objectives hierarchy / risk taxonomy,
2. ~~Identify and characterize program level risks and mitigating options, and~~
3. 2. ~~Select an acceptable level of risk given a limited set of alternatives~~.

These ~~requirements~~ steps outline the desired outcomes and goals of a new regulatory process.

1. Develop an Objectives Hierarchy / Risk Taxonomy

An objective hierarchy (or risk taxonomy) is a structured way to identify, classify and order the risks that can impact the core objectives of safety, resilience~~y~~ and costs. While the hierarchy is a stable representation of the concerns of stakeholders, it is also a comprehensive and evolving tool. This tool also documents and includes risks that have not recently occurred or may have not yet occurred.[3] This hierarchy has several benefits:

- Encourages a comprehensive review of all risks that can impact a utility.
- Refines the understanding of how core objectives are managed and can be impacted by specific programs.
- Creates a clear method for rolling up risks in an agreed on manner.
- Creates a clear way to identify the program risks such as operational, legacy, and emerging risks.

Initially developing and building out this hierarchy can be a challenge. It will require input from IOUs about the systems and process used to manage their systems. Interveners will also have input into how

[3] ~~The staff straw proposal focuses on the overall risk. However, there is an inherent accepted risk in the present systems. With that in mind, focusing on the net change in risk may be more productive as it relates to acceptance of risk relative to the difference from the present state. This may also help deal with the risk of not taking action on a project. While discussions about the risk inherent in the present systems may be productive overall, it may present a level of complexity that does not essentially focus on the proposed projects.~~

core objectives should be weighted in this hierarchy. Fundamentally the hierarchy is a tool for mapping core objectives to specific programmatic activities.

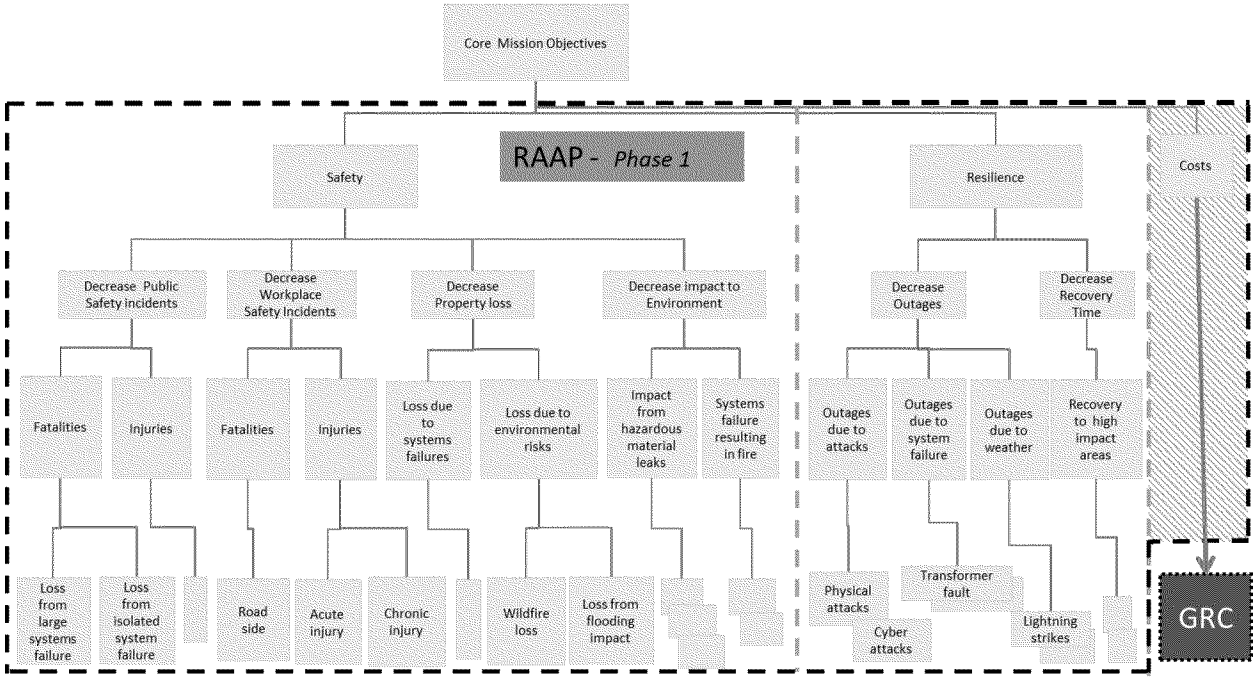


Exhibit : Notional diagram of an objective hierarchy –This is not a comprehensive review of objectives

This hierarchy has special significance for the proposed process, in that the GRC process of determining the policy-appropriate level of risk-vs.-cost-burden paired with risk reduction may need to involve different judgments for the different types of risk. Two reasons:

- the most effective risk metrics, in terms of supporting those judgments, are different for the different risk areas;
- the risk versus cost-burden tradeoffs are different for the different risk areas. For example, that tradeoff concerning fatalities is going to be quite different than that tradeoff concerning outages.

There is a methodology, multiattribute utility analysis (MUA), for addressing those tradeoffs in terms of importance weights, but that would be decidedly unattractive to apply here. MUA would call for value tradeoffs between, e.g., fatalities versus outages. It would be much more appropriate to simply address those two very different types of risk in two different risk-vs.-cost-burden policy judgments.

2. *Identify and Characterize Program Level Risks and Mitigating Options ~~reporting – Program evaluation~~*

With a hierarchy in place, each and every program proposed within the GRC should be identified within that hierarchy. Each of these proposed programs should be evaluated using a simple estimation of risk. This serves two purposes. First it informs the system-wide evaluation of risks. These program level risks can be rolled up using the hierarchy developed above. Second, it specifies an expectation of the program level risks and serves as a simple performance metric.

Risk evaluation is the IOUs' estimate of the performance expectations, the potential impacts (both negative and positive), and the overall risk mitigation potential for every project within the GRC. While

some projects may have a big impact on reliability, and others have an impact on safety, each project nevertheless has some impact on both of these core objectives. This evaluation could be summarized on a one page summary of the projects goals and expectations.

3. The Mechanics of the Process

The discussion so far may have left the reader with the impression that the proposed process must be dauntingly complex. Yet in fact, due to the requirements based approach, the proposed process can be described in reasonably simple terms. That is, the requirements based approach leaves all the "heavy lifting" to the utilities, but clarifies exactly what is called for from them and from the rest of the parties. Here below is the three-step structure, in deliberately drastically simplified terms, to lay out the underlying logic. There are extensive analytic complexities, not presented here, involved in every step, but they are all solvable at a level of detail too complex for this proposal at this stage.

Step 1. Utility Analytic Effort. The utility surveys its risk sources, over all five risk types listed earlier, develops a database of them, surveys how best to reduce those risks with risk reduction measures, assesses the risk reduction performance of each measure and its costs (effective NPV cost-burden to the ratepayer) and does the (standard) calculations to assemble cost-effective (efficient) suites of risk reduction measures. Many challenges are involved in that (completeness of risk sources, completeness of measures considered, risk reduction assessment and aggregation over measures, cost estimation, time sequences of risk reductions and costs, over the five very different risk sources listed previously), but it is all analytically quite manageable, though much of it will be legitimately arguable and subject to cross examination. Then the utility submits one or more "packages" of risk reduction measure suites, each described by its summed (aggregated) risk reduction and summed cost-burden metrics, with all supporting calculations. Though as discussed previously, measure suites can be divided up by the type of risk managed. There are complexities involving the five different risk types, and involving the quite common situation where a single risk reduction measure reduces more than one type of risk, but those complexities are analytically manageable. Whether proposing one proposed suite or several, the utility establishes/maintains that all proposed suites are efficient, in terms of generating the most risk reduction possible for its cost.

Step 2. CPUC Analytic Effort. The utility's proposal(s) are subject to cross examination by other parties, with particular attention to completeness (both types) and efficiency. The result of that process is a CPUC-agreed-upon accepted one or more proposals, where each proposal is deemed to be efficient, and has either point estimates or range estimates of risk reduction and cost. Our understanding/proposal is that this step is the "RAPP" part of the process. One matter not discussed here: The degree to which this Step 2 might involve iterations involving adjustments to the lists of risk measures and risk reduction and cost calculations, including time taken to perform adjusted calculations.

Step 3. GRC Policy Decisions. The GRC process than makes the policy decision involved in each proposal, assuming the CPUC Analytic Effort is correct in terms of determination of efficiency. The policy decision to be made: Does each proposal represent a policy-acceptable combination of risk reduction and cost-burden, and if more than one proposal does, which is the policy-preferable proposal. The process could find that a proposal delivers (efficiently) too little risk reduction, or involves

(efficiently) too much cost-burden, or represents a policy-acceptable (efficient) combination of risk reduction and cost-burden. If more than one proposal is in the range of policy-acceptable combinations, the GRC process determines which is the policy-preferable combination.

Three special issues are involved in those three steps:

Special Issue 1: Division of Labor. Steps 1 and 2 involve technical judgments and analysis and "no" policy judgments. Step 3 involves policy judgments and "no" technical judgments. The quotes are because those are slightly naïve statements, in that there are concealed policy-related judgments involved in the choice of data and assumptions in Steps 1 and 2, and there are concealed technical judgments in the underlying bases for the policy judgments of Step 3, but the two types of judgments are separated as much as possible in the structure of the three steps.

Special Issue 2: No determination of "Acceptable Risk." Notice that the first mention of "Acceptable Risk" was twelve words ago. The concept of "Acceptable Risk" is highly problematic, almost always misunderstood, and has no place in the proposed structure. We won't digress into the extensive discussions involved in that issue. We will only point out that, in the current environment of risk and operations as experienced in California over the past several decades, the only judgments called for are determinations of efficiency (technical, Step 2) and then policy-acceptable and/or policy-preferable judgments as to where the proposal sits on the efficient frontier (policy, Step3). That is, again, the GRC process can determine that an (efficient) proposal reduces risk too little (and the utility should efficiently reduce risk more, with a larger budget), or an (efficient) proposal involves too high a cost-burden (and the utility should be operating in a less costly, less risk-reduced way). No deep moral judgments as to "Acceptable Risk" are called for. And, again, if more than one proposal is found to be on the policy-acceptable region of the efficient frontier, then there is a policy judgment to be made as to which proposal represents the policy-preferred point on the efficient frontier.

Special Issue 3: Uncertainty. All judgments involved here, regarding risk reduction, aggregation of risk reduction over several risk reduction measures, cost estimation and both risk reduction and cost time series, all of those judgments typically involve a great deal of uncertainty. With elaborate models, that uncertainty can be assessed and propagated through to error bars on all final estimates of risk and cost. That is analytically feasible, but frankly problematic. Perhaps we should consider error bars in future years, but they would almost certainly cause more problems than they are worth in the early years of implementation of this process.

3. Further Special Issues

There are five other special issues which bear on the Risk Assessment section of this proposal. We list them here because they should be considered in the revision of this proposal. Two of them have been touched on previously, but are included again here to present the desired emphasis and explanation.

Special Issue 4: Maintain Fairness. This is a central concern. The utilities are the only parties with adequate analytic capability, access to databases, and with the historical awareness of their operations and legacy infrastructure, to perform the risk management analyses called for. So the utilities must be the place where the bulk of the risk management, and associated analysis, is performed. But this

proposal is centrally a move toward a more analytically oriented GRC process. As an (unintended) consequence, parties other than the utilities are placed at a decided disadvantage. That must be offset by either extensive funding of analyses by other parties, or a third party review structure. But note that if this concern is addressed simply by funding analyses of other parties, the net effect will be to put the CPUC in the position of "refereeing" two or more analyses that may very well substantially contradict each other. That refereeing can only be done with a large degree of analytic capability. Risk assessments are not like voltmeters. Two responsibly conducted risk assessments can differ markedly in results. As an example, of two terrorism risk assessments, one placed the probability of a nuclear terrorism success at 29% over ten years, another assessed the probability of a nuclear terrorism success at one per million attempts. One solution is an analytically astute third party to review the proposals, and the intervener counter-proposals, and then to advise Steps 2 and 3 presented above in terms that work effectively in the non-analytic arenas of Steps 2 and 3.

Special Issue 5: Red Teams. Another way to address the "Fairness" issue is to commission "Red Teams," i.e. teams of astute analysts that are "prodding" and aggressive, pushing hard for completeness in seeking out risk sources, completeness in risk reduction measures, and generally challenging all data and assumptions. An in-house Red Team, in each utility, would push other in-house analysts outside of any "business as usual" orientation. They would also help the utility in-house analysts to prepare for the Steps 2 and 3 cross-examinations. A third party Red Team, outside of any utility, would review and challenge the utility submissions in an aggressive and analytically astute manner, test for both types of completeness, test for defensibility, aggressively represent other parties in "Show Me" mode, and do transparency tests. They could also systematically test utility submissions against Requirements 1 through 10 listed earlier.

Special Issue 6: Unanticipated Scenarios. We repeat our discussion here, simply so it does not get lost in the mass of preceding pages: One of the key findings of the field of risk assessment is that it is essentially impossible to anticipate all accidents, all scenarios. So a sound risk management process must include ways to manage incidents that were not anticipated. That involves four processes:

- Inherent robustness, such that the failure of any one element has a natural "backup" to minimize the consequences of that failure;
- fail-safe, such that if a system does fail, it fails into a damage-limiting state;
- Incident management and recovery, even from incidents "not on the list;"
- Learning from those incidents, and learning from "near misses," with Corrective Actions and Corrective Action Tracking.

Special Issue 7: Subject Matter Experts. Many elements of the analyses called for in the risk management steps listed here call for elicitations of judgments of subject matter experts (SMEs). There are books written on the unreliability and overconfidence of SMEs. For example there is Tetlock's book, Expert Political Judgment: How good is it? How can we know? (Princeton University Press, 2005). In that book Tetlock investigates why SMEs are so often so wrong in their judgments. So yes, SME judgments must be used, but they must be elicited using well documented, third-party reviewable, advanced elicitation methods, and large disagreements among different SME panels can only be interpreted by astute third party analysis.

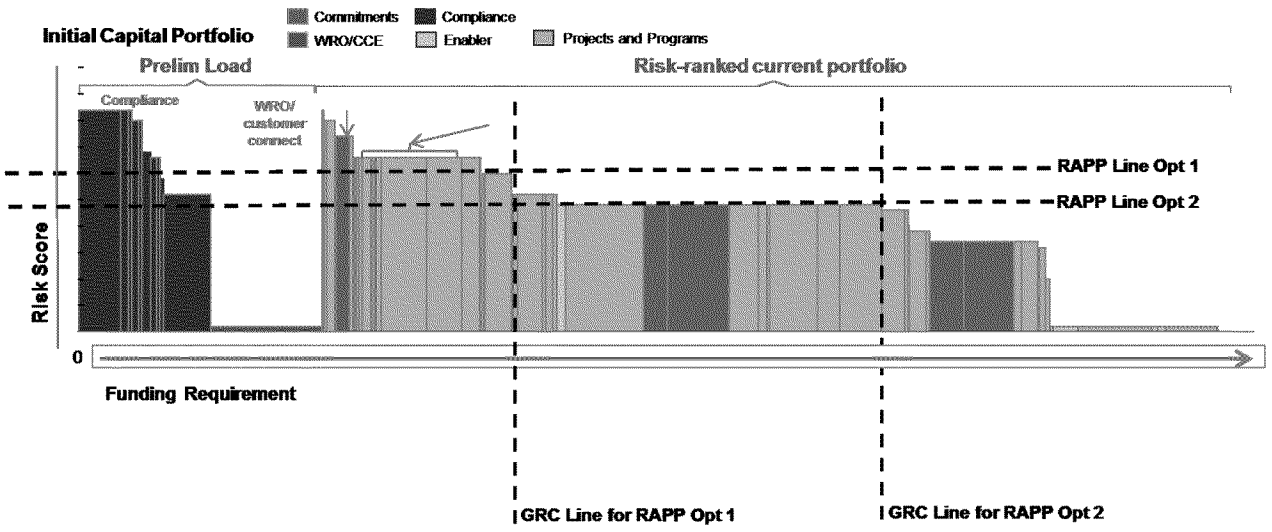
Special Issue 8: Modeling and Analysis Quality. In a process of the complexity and importance of the risk management of utility risk proposed here, and given the nine challenges listed in Section I.a, basically, the effectiveness of the entire process hangs on modeling quality. Human judgment unsupported by sound modeling falls far short of the task at hand. You can't hope for either type of completeness to be actually complete. You can't hope to address the missing data problem in a fully satisfactory way, and so on for all nine listed challenges. Yet this process is to advise decisions of high stakes and high differential costs. As such, the modeling in this process should be subject to at least as much review and standards as national models. So … the Department of Defense has a rule (Instruction 5000.61, 2009) requiring that any model supporting a significant decision must be "Verified, Validated and Accredited." Then of course the DOD has a MIL-STD (-3022, 2008) specifying how to do that. We should behave as if that Instruction applies here. Outside of DOD, important national models are Third-Party-Reviewed by the National Academy of Sciences, examining for methodological defensibility from data collection through analysis through presentation of results. The process proposed here should be conducted "as if" it will be reviewed by the National Academy of Sciences.

~~***1. Portfolio segmentation & ranking graphic***~~

~~In order to make an evaluation of the full portfolio of requests made by an IOU, we can segment and then potentially rank a program based on the desired criteria. These criteria can be any of the estimated values used in the previous program evaluation phase. Since each program has already been identified and the impacts to safety, resiliency and cost have been agreed on in program summary phase, we can now segment and then within each of those segments rank each of the programs. The segments can be based on a number of criteria and chosen based on whatever the stakeholders believe is most appropriate. This segmenting also identifies the risk classification, so that each type of program is identified and minimum standards and compliance issues can be assured.~~

~~Once it is classified whether it is high frequency or low severity, we can then begin to rank each program within that classification/segmentation. Comparing across segmentation the stakeholders would then need to determine the risk cut-off (RAPP line) for all programs – see the figure below. This level of risk acceptance balances all the concerns and implicitly selects projects to be adopted.~~

~~With the risk level established the budget constraint would be established within the GRC process.~~



III. Incorporating the Results of Risk Assessment into the General Rate Case (GRC)

General rate cases are a traditional form of regulatory proceeding, in which, a utility files a revenue requirement request based on its estimated operating costs and revenue needs for a particular test year and the Commission determines a just and reasonable revenue requirement. These cases aim to strike a proper balance between risks the utilities take and reasonable opportunity for returns, taking into account changing economic conditions. The GRC sets the baseline for utility costs to provide reliable, safe, environmentally sound service at just and reasonable rates. Therefore, regardless of where the system safety and security plans will be reviewed and approved, the implementation costs must be reviewed in GRCs.

Essentially, the GRCs are entirely cost driven. The GRC approves the revenues and rates for the test year that was litigated. Year 1 is the test year, and for years 2 & 3 an attrition or rather post-test year ratemaking is also litigated and decided in the GRC. The historical practice has been to litigate the post test-year ratemaking within the GRC.

GRCs are typically filed every three years and are staggered to ensure that the Commission and interveners have dedicated staff. A utility's base year under a three-year cycle is actually the utility's test year from the prior GRC. However, if there is a delay, then that could impact the utility's costs in a way different from what was forecast.

This proposal recommends that a four-year rate case cycle be adopted, thereby giving the utility at least one year of actual spend that will become the base year for the next GRC. It should be understood that the further into the future we forecast the more likely it is that we will be wrong in one direction or another. Therefore, extending our forecast to a four-year GRC cycle will require the Commission to be

flexible in dealing with the differences between forecast and actual results. One possibility could be that the utility would be required to file annual advice letters updating top line cost information.

The real question is which GRC cycle will be able to incorporate a new risk-analysis process. To answer this question we will highlight the GRC cycles of the three large utilities and make a recommendation that is reasonable considering timeliness and completeness of the RAPP record.

Current GRC cycles:

- PG&E's GRC = filed in Nov 2012 for test year 2014. The next cycle begins with an application that will be filed in Nov 2015 for test year 2017 (this will commence the 4 year GRC cycle for PG&E of 2017 – 2020.)
- PG&E's Gas Transmission and Storage (GT&S) = filed December 2013 for test year 2015. We will propose that the current GT&S cycle continue as a 4 year cycle.[4] This is consistent with the last PG&E GT&S proceeding in which the Commission adopted a 4 year cycle. Under the 4-year (2015 – 2018) cycle, the next filing will be in December 2017 for test-year 2019.
- Edison GRC = filed in Nov 2013 for test year 2015. The next cycle begins with application that will be filed in Nov 2016 for test year 2018. (This application will commence the 4 year GRC cycle for Edison of 2018 - 2021)
- Sempra GRC = the next filing is an application filed in Nov 2014 for test year 2016. This should be a 4 year cycle (2016 – 2019). This is consistent with the last Commission D.13-05-010 which adopted a 4 year (2012 – 2015) GRC time frame.

If the first option – a separate RAPP proceeding – is determined to be the best choice, there is an additional consideration of providing sufficient time to conduct a proceeding (however expedited) and giving the utility enough time to incorporate results in its subsequent GRC.

To make sure the information used in risk assessment is not out of date by the time the GRC is filed and to make sure the utility has had sufficient time to incorporate the risk assessment developed in a RAPP proceeding into its GRC, we think the RAPP proceeding should be scheduled to conclude 12 months before the GRC is filed. Alternatively, the risk assessment phase of the GRC should conclude 12 months before the next phase of the GRC addressing costs is filed.

With this in mind, we envision that the RAPP will be incorporated in the GRC first time beginning with Sempra's GRC test year 2020 which Sempra will file in November 2018. Working back from that date, the RAPP proceeding will need to be concluded 12 months before November 2018 which is Nov 2017. We envision that this proceeding will take 12 months to process from filing to the issuance of the RAPP decision. So the RAPP proceeding will need to be filed in Nov 2016. We need the parties' input on the how to coordinate the timing of the RAPP with the GRC for best use of the risk assessment.

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[4] PG&E has proposed a three year cycle in its application.

As we move along this process, the Commission may want to consider expanding this process to include the smaller utilities that are subject to the Commission's jurisdiction.

IV. Verification

As stated above, the Commission should require a uniform and simple verification system. We note the existence of PU Code 958.5; however, this is different and much simpler. PU Code 958.5 reporting requirement focuses mainly on the review requirement. The verification report that we're looking for is for specific projects – for instance 2000 poles were authorized for upgrade at the authorized cost of $200 million. The utility when they file their NOI will also have to separately file a simple table that has five columns:

- Column 1 = what was authorized (replacement of 2,000 poles)
- Column 2 = the cost authorized ($200million)
- Column 3 = what was actually replaced (as an example let's say 1,900 were replaced)
- Column 4 = how much did it actually cost ($200 million actual spend)
- Column 5 = a narrative as to why there is a discrepancy

The Commission's Safety & Enforcement Division (SED) will be required to draft an independent verification and safety report for each utility prior to their GRC filing. The report will be based on the information that the utility provides and SED's own independent field assessment.

This proposal would require that the utility file a report at the same time it files its NOI. The report will simply be in the form of a table or chart. It should include a list of items that were approved in the prior GRC along with the cost/budget that was approved for; and a corresponding column that shows what was actual spend and actual build/upgrade. If approved does not match spend then the utility must include a narrative to explain the discrepancy otherwise no other narrative is required or preferred. The report functions more like an audit of what the utility was approved for and what they actually spent on.

SED is not asked to testify as part of the next GRC. It will verify what the utility has claimed, issue a report detailing the verification, and provide its assessment of the existing safety-related programs.

This proposal for verification and assessment could be put into place as part of PG&E's next GT&S filing in December 2017. Given that the GT&S proceeding has no formal NOI process, it is proposed that PG&E will file its GT&S Verification Report in August 2017.

V. Next Steps

This proposal in whole is and will be an iterative process. We ask the utilities to file case studies using the RAAP process described above. The Commission will hold a three-day workshop to get stakeholder feedback and revise the proposal accordingly, or to incorporate new ideas. Once staff revises the proposal it will be re-issued and that's when we will ask for formal opening and reply comments which

will be included as part of the record of this proceeding. We are not asking for comments prior to the workshop.