PACIFIC GAS AND ELECTRIC COMPANY

ENGINEERING & OPERATIONS
GAS TRANSMISSION AND DISTRIBUTION
GAS ENGINEERING
GAS SYSTEM INTEGRITY

Risk Management Instruction
Instruction No. RMI-04A

Gas Transmission Rainfall Plan
And Response Instruction

[redacted]

Prepared By: [redacted] 5/28/09

Prepared By: [redacted] 6/1/09

Approved By [redacted] 6/1/09

[redacted]ontrol

Approved By [redacted] 6/1/09

William Manegold, Supervisor, Integrity Management

Approved By: _____ Date: 6/2/09

Robert Fassett, Director, Integrity Management

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material redacted

1. Scope

This plan applies to PG&E's Gas Transmission system and describes our response to significant rainfall within the PG&E service territory. It relies on the use of Geographic Information System (GIS) based products to enhance our response following a significant rainfall event.

- Computer based models utilizing new internet-based technologies (i.e., Nation Weather Service (NWS) NEXRAD radar storm totals, and PG&E's Map Server) and the development of improved digital geohazards maps, for Northern and Central California encompassing the PG&E service territory, have enabled the development of decision support tools to prioritize emergency response activities after severe rainfall events. Used as a screening tool, this information helps to rapidly identify potential gas transmission lines in potential landslide problem areas, prior to receipt of initial damage reports from the field. The storm totals are near real-time estimates based on NWS NEXRAD equipment and new volume coverage patterns. The rainfall volumes are continuously updated, since the last one-hour break in precipitation. The radar data may not be 100% accurate but with calibration using rain gauge data and the ability to import quickly into GIS, and sum with past storms, the maps provide a window on the cumulative effects of multiple storms.

Storm-related slope failure is estimated using existing slope susceptibility classifications that incorporate slope, rock or soil type, and density of mapped slides and overlain rainfall totals. The slope failure estimate instruction is somewhat crude, and does not consider the time factor (i.e. infiltration vs. runoff and degree of saturation), but respects the geological and elevation input as well as the amount of rain at any location along the gas transmission system. Post rainfall response will be based on two factors: 1) the summation of past storm precipitation totals; and 2) the qualitative estimates of slope failure per "Procedure for Precipitation-Induced Landslide Susceptibility Model" (Ref. 1).

Ref. 1: Procedure for Precipitation-Induced Landslide Susceptibility Model – William Lettis Associates Letter Dated: August 1, 2008. (PG&E Precip LS forecast model 080108.pdf)

2. Purpose

This instruction is part of PG&E's Pipeline Integrity Management Program supplementing RMP-06 sections 5.2, 9.2 and 9.6, and its purpose is to mitigate any weather related ground movement threats to our pipelines by:

1) documenting the methodology of the development of the rainstorm critical pipeline segments,
2) describing the rainfall response ; and
3) describing the post-rainfall initial damage evaluation guidelines.

3. Rainfall Response

After a major rain storm reaches the established thresholds in PG&E's service territory, William Lettis and Associates (WLA) will notify PG&E Geosciences and Gas System Integrity. Geosciences and Gas System Integrity (GSI) will review the information and determine the need of generating the rainfall emergency response information. When the need is confirmed the following sequence of events will likely occur:

3.1 A GIS map (See example in attachment 1) will be generated by WLA showing cumulative precipitation and associated slope failure potential at gas transmission pipeline locations. The pipeline segments will be color coded from black (minimal risk of storm related hazard) to purple (very high risk - areas of possible significant slope failures). A critical pipeline segments list will also be generated.
3.2 Geosciences and GSI will review the GIS maps and collectively determine if an immediate response is warranted. This is a qualitative assessment based on experience gained through looking at the results of previous storm events.

3.3 If an immediate response is warranted, Gas System Integrity will then send out an e-mail notification of affected locations to the local Gas Operations and Maintenance personnel including: Gas Control at Brentwood, Pipeline Engineers, Senior Gas Engineers, M&C Superintendants and GTM&C Area Superintendants. The e-mail notification will include a list of affected gas transmission lines and specific locations where the potential for slope failure is highest.

3.4 Following the critical pipelines list and local knowledge of the area, the Gas Operations and Maintenance personnel will proceed with the field inspections and communicate with Gas Operations and Maintenance supervisor on field inspection results. See Section 4 of this instruction for inspection guidelines.

3.5 Depending on the severity of the rainfall storm and duration, if pipeline damage is confirmed, the maintenance organization shall consult Pipeline Engineering in developing a response and repair plan. If necessary, the Pipeline Restoration Center (PRC) can be activated.

3.6 The Gas Operations and Maintenance/PRC will continue the process of reviewing and updating the response plan until the condition is stabilized.

4. Initial Damage Evaluation (IDE) Guidelines

4.1 Scope and Purpose

Immediately after a significant rainfall event and after receiving notification from GSI, Gas Operations and Maintenance personnel (GOMP) will be responsible for performing an IDE inspection of critical gas transmission pipelines locations in very high risk areas of rainfall. This initial reconnaissance may be performed by any mode of transportation. If ground movement areas are noted during the initial reconnaissance, the GOMP shall perform an IDE inspection on gas transmission pipelines identified for inspection. Landslides (See photos in attachment 3) often occur sometime after the rainfall event and so an IDE may be performed significantly later (e.g., months) after the rainfall(s). More frequent (or Monthly) pipeline patrol of these areas is warranted for the remaining raining season (typically ends in June). The IDE is the first inspection a gas pipeline will receive after the event. The IDE inspectors should, where possible, take digital photos of all earth movement the inspector finds that he/she considers significant. If the inspector believes the situation to be urgent, these photos should be sent immediately to the Gas Operations and Maintenance Supervisor and Pipeline Engineering/PRC for evaluation. If the inspector believes the situation to be less urgent, the photos can be sent as time permits.

The objectives of the IDE are to obtain and report to the Gas Operations and Maintenance Supervisor, the extent of nearby ground movement; i.e. slope failure, and visible gas pipeline damage.

4.2 Responsibility and Authority of Inspectors

The responsibility of the IDE Inspectors is to inspect the assigned gas pipeline and report the results to the Gas Maintenance Supervisor. The Gas Maintenance Supervisor will communicate the report results to the Pipeline Engineering/PRC and authorize required mitigating actions.

Authority to order evacuation of a damaged gas pipeline area is the responsibility of whoever determines the situation represents an imminent threat to the public or company personnel. This includes the IDE Inspectors, local supervision or PRC/Pipeline engineers. In ordering an evacuation, efforts should be made to coordinate that response with other emergency responders who may be on scene including local police, fire departments and other company personnel.

4.3 Evaluation Criteria

In an IDE, gas pipelines shall be evaluated using the criteria listed in Table 1. These criteria specify that the gas pipeline should be mitigated e.g. reducing line pressure, shut-in the line, or exposing and inspecting the pipeline, if: (a) a visual inspection indicates there is significant damage to the gas

pipeline or (b) there are other hazards present which would make the gas pipeline unsafe, e.g. significant areas of ground movement. Generally, minimal amounts of ground deformation are not sufficient cause to shutdown a gas pipeline.

4.4 **Step-by-Step Inspection Instruction**
The following is a step-by-step Instruction to be used in performing an IDE.

Report any Gas Leaks: In case of pipeline rupture or having gas leaks, the inspector shall report to the PRC/Pipeline Engineer, request immediate engineering evaluation and follow UO Standard S4110 to mitigate the leak.

Examine the Site for Ground Movements: If there are no gas leaks that require immediate action, inspect the ground for signs of slope failure. If any new, significant ground movements are observed, the inspector shall request immediate follow-up engineering review, whether these have damaged the pipeline or not. If the IDE is uncertain whether he or she is observing something significant, they should assume that it is significant.

4.5 Deal with Unsafe Areas: If suspected hazards are encountered in the area of the gas pipeline segment, the hazardous area shall be closed to public access using barricades, tape, or other means to prevent public exposure.

4.6 Communicate Results: After completing the IDE, the Inspector shall communicate results to the Gas Maintenance Supervisor who shall communicate those results to the PRC/Pipeline Engineer.

4.7 Personal Safety: The following tips shall be followed to ensure safety while making an IDE.

- Be alert for ground movement and stay out of an area where the ground is moving.
- Be alert for overhead falling hazards.
- Do not smoke, light matches, or cause sparks.
- Avoid all areas where a hazardous material release is suspected or confirmed.
- Treat any spill of an unknown substance as a potential hazardous material spill.

4.8 Field Equipment: The following is a list of equipment that each IDE inspection team should have during an inspection

- GIS Post-Storm Summary Map
- Hard hat
- Eye protection
- Hard soled shoes
- Clipboard, paper, pen
- Site Maps, Plat Sheets
- IDE Instructions
- Flashlight
- Phone Numbers of PRC
- Communication Equipment – Cell Phone, PG&E 2-way radio, etc.
- Caution tape
- Digital camera
- Tape measure

Table 1
Initial Damage Evaluation Criteria

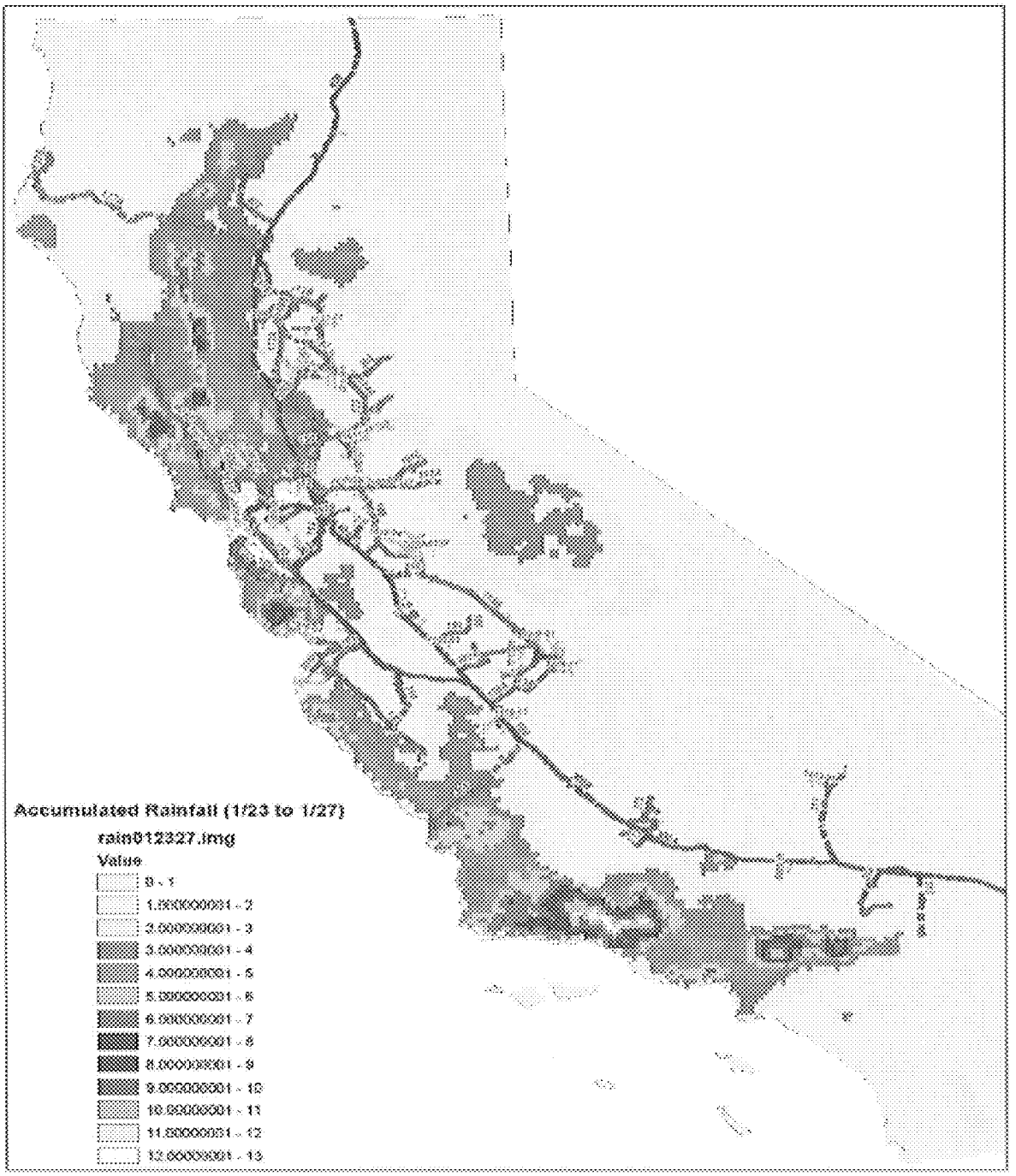
Condition	Action
1. There is smell of gas	Follow UO Standard S4110 to mitigate the leak and request immediate engineering evaluation
2. The gas pipeline is exposed and there is significant deformation to the pipeline.	Request immediate engineering evaluation
3. There is new ground cracking or movement (vertical or horizontal) of several inches or more in the vicinity of the gas pipeline.	Request immediate engineering evaluation
4. There is slope failure where large amounts of soil, rocks, etc. have deposited on top of the pipeline segment.	Request immediate engineering evaluation

5. Distributions: (PRC, OM&C, District, Division, GAS-GSI, ED-Pipeline,)

The Gas Transmission Rainfall Emergency Plan and Response Instruction will be distributed to PRC, OM&C, District, Division, GAS-GSI and ED-Pipeline Engineering.

Attachments:

1. Example of Rainfall Plot
2. Example of Potential Landslide Pipelines List
3. Examples of Landslides Photos



Gas Transmission & Distribution
System Integrity
Geographic Information Services

by CHL3 at 01/28/2003
North Bay

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MAINT ORG	ROUTE	PLAT_NO	MP1	MP2	Landslide Susceptibility	W THICK	OD	MOP	CLASS [illegible]	SEGMENT NO	LOCATION
DCCO	1816-15	3598-E5	6.01	6.04	High	-0.156	8.625	300		340	Graham Hill Rd @ Felton Reg Sta
DCCO	1816-15	3598-E5	5.97	5.98	High	-0.203	12.750	300		331C	Graham Hill Rd, SPRR xing
DCCO	1816-15	3598-G8	3.07	4.65	[redacted]	-0.172	8.625	300	3	320	Graham Hill Rd to Felton Reg Sta
DCCO	1816-15	3599-I1	3.04	3.07	High	-0.172	8.625	300	3	319	Graham Hill Rd to Felton Reg Sta
DCCO	DCUST1977	3675-A1	0.00	0.02	High	-0.113	1.050	-300	3	502	Graham Hill Rd to Ocean St
DCCO	DCUST1978	3675-A1	0.00	0.02	High	-0.113	1.050	-300	3	503	Graham Hill Rd to Ocean St
DCCO	DCUST2015	3599-I1	0.00	0.02	High	-0.113	1.050	-300	3	529	Graham Hill Rd
DCCO	DCUST2016	3599-I1	0.00	0.02	High	-0.113	1.050	-300	3	522	Graham Hill Rd
DCCO	DCUST2016	3599-I1	0.00	0.02	High	-0.113	1.050	-300	3	523	Graham Hill Rd
DCCO	DCUST2020	3598-G8	0.00	0.02	High	-0.113	1.050	-300	3	533	Graham Hill Rd
DCCO	DCUST2022	3598-F5	0.00	0.02	High	-0.113	1.050	-300		536	Graham Hill Rd
DCCO	DCUST2023	3598-F5	0.00	0.05	High	-0.113	1.050	-300		667	Graham Hill & Roaring Camp Rd
DCCO	DCUST2024	3598-F5	0.00	0.02	High	0.000	0.840	-300		637	Graham Hill Rd
DCCO	DCUST2024	3598-F5	0.00	0.03	High	0.000	0.840	-300		638	Graham Hill Rd
DCCO	DCUST2025	3598-F5	0.00	0.02	[redacted]	0.000	1.050	-300		538	Graham Hill Rd
DCCO	DCUST2026	3598-F5	0.00	0.02	[redacted]	-0.113	1.050	-300		647	Graham Hill Rd
DCCO	DCUST2026	3598-F5	0.00	0.03	[redacted]	0.000	0.840	-300		648	Graham Hill Rd
DCCO	DCUST2027	3598-F5	0.00	0.02	High	-0.113	1.050	-300		537	Graham Hill Rd
DCCO	DCUST2027	3598-F5	0.00	0.02	High	-0.113	1.050	-300		538	Graham Hill Rd
DCCO	DCUST2028	3598-E5	0.00	0.03	High	-0.113	1.050	-300		540	Graham Hill Rd
DCCO	DCUST2029	3598-E5	0.00	0.02	High	-0.140	1.660	-300		541	Graham Hill Rd

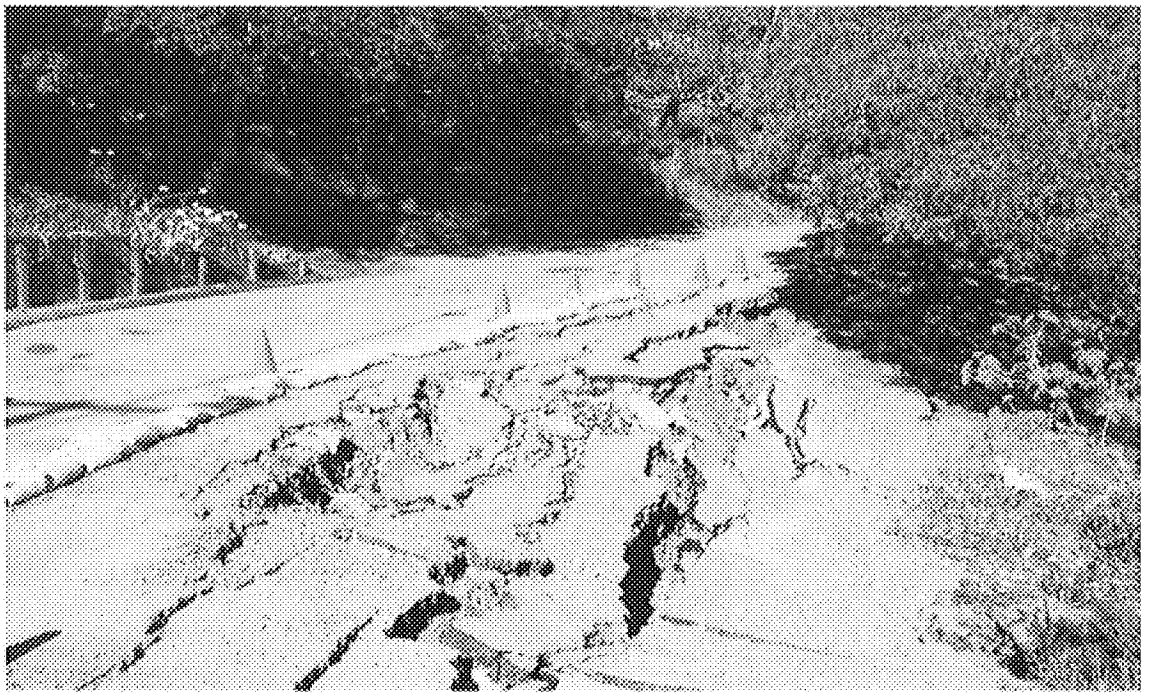

Figure 1 Lateral spreading Caused by Landslide

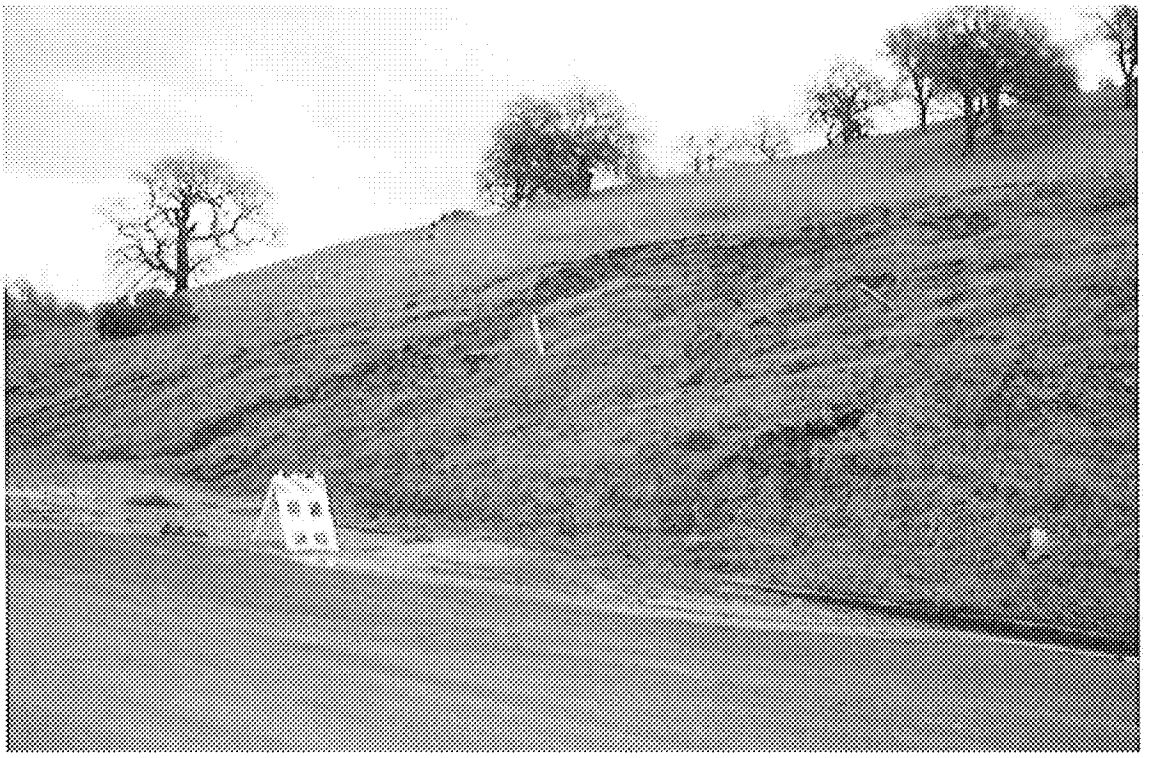

Figure 2 Landslide