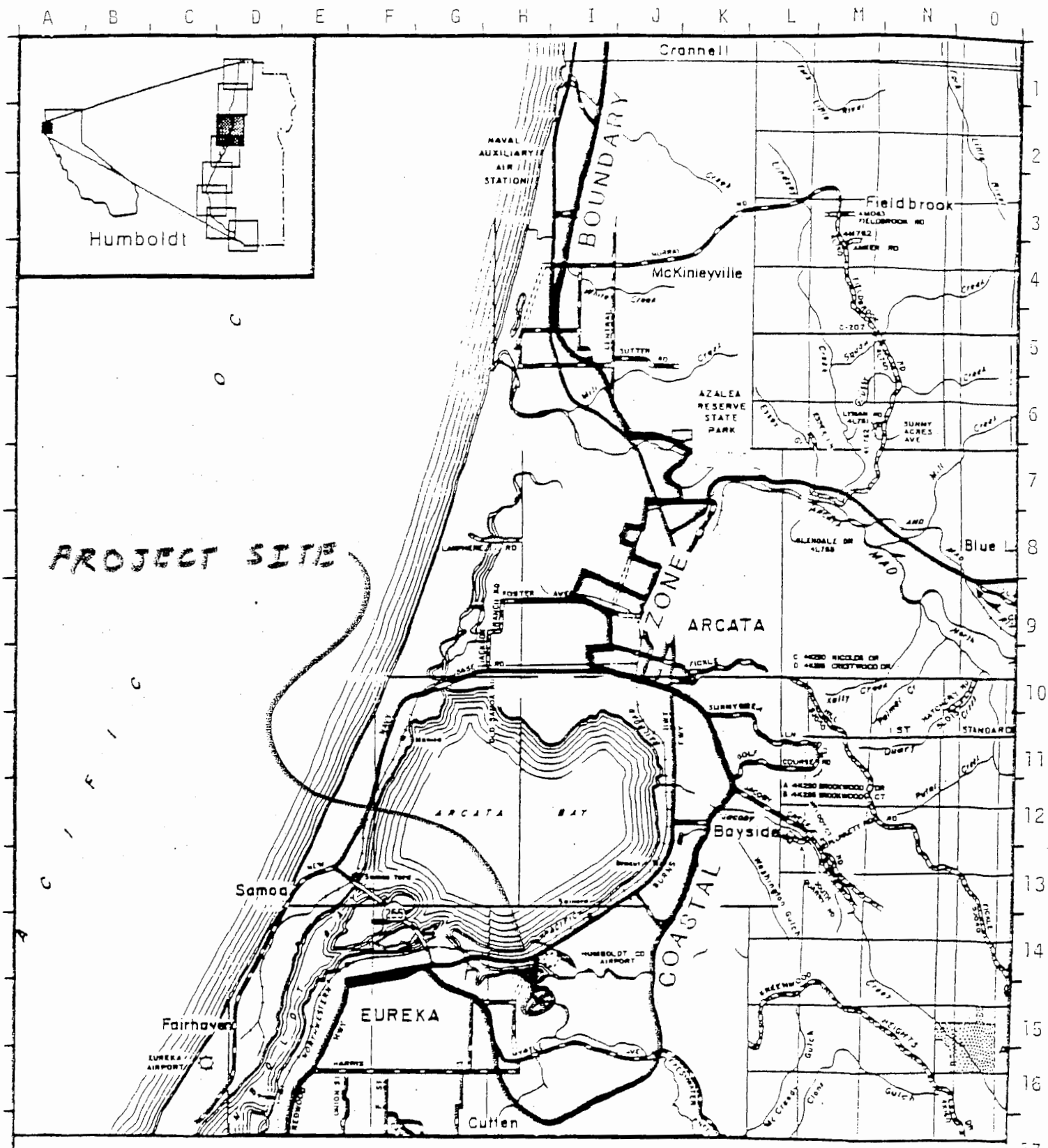


LOCATION MAP

California Coastal Commission

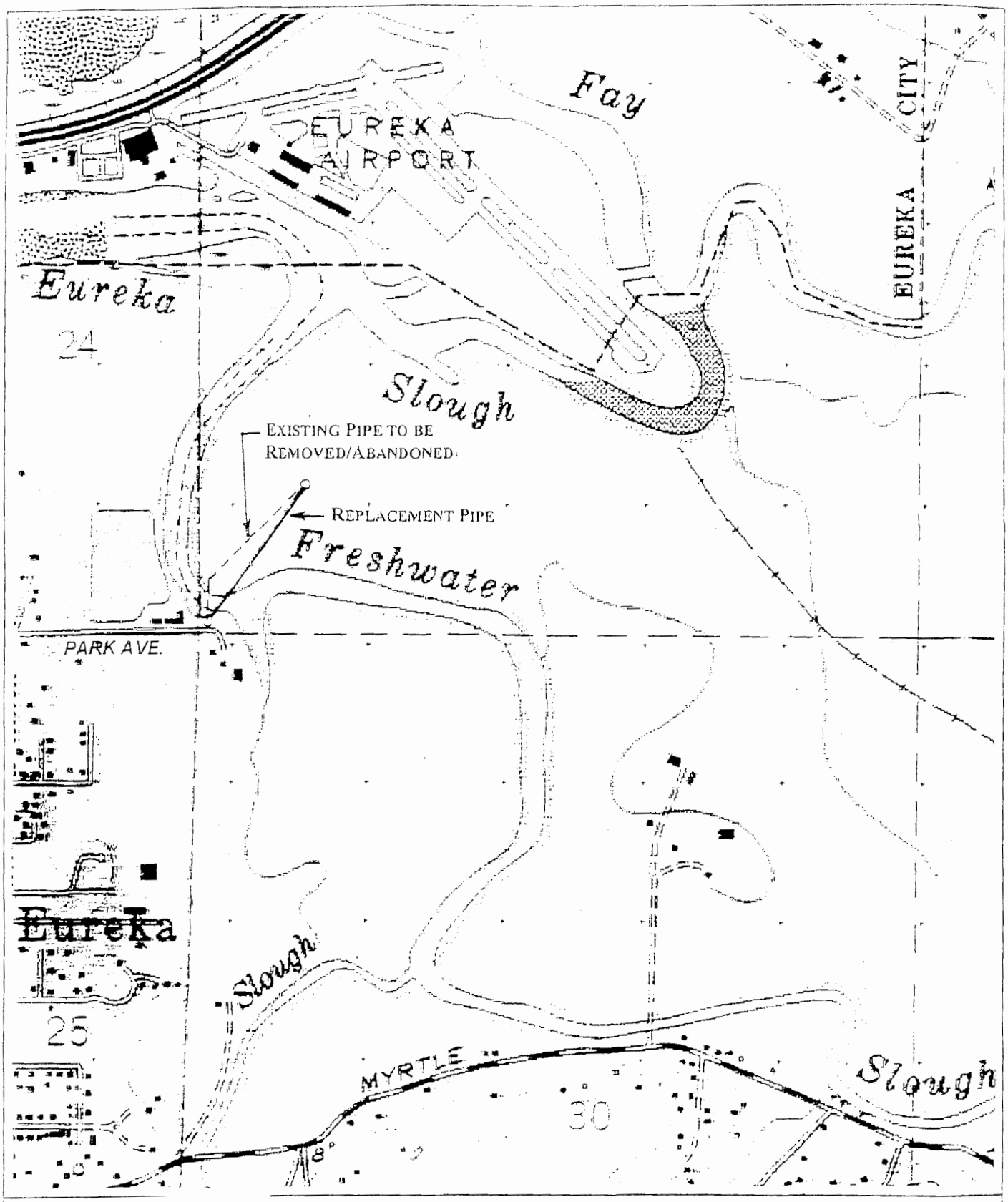
County of Humboldt

EXHIBIT NO. 1

APPLICATION NO.
1-04-010-A1

PACIFIC GAS & ELECTRIC

REGIONAL LOCATION MAP



Vicinity Map

PG&E Gas Pipeline L137-B Replacement Project

Planning – Feb04 | Arcata South USGS 7.5' Quad

EXHIBIT NO. 2

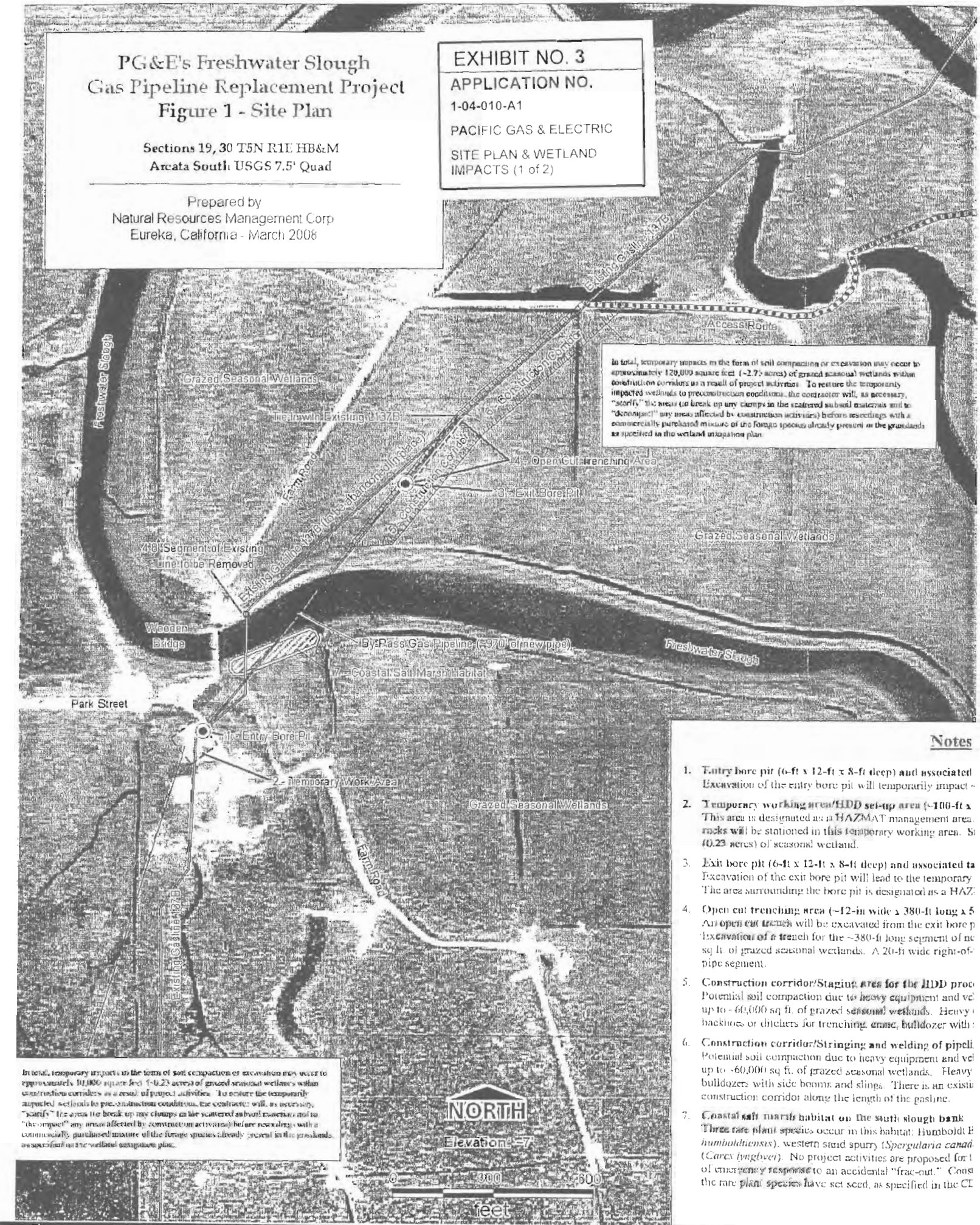
APPLICATION NO.
1-04-010-A1
PACIFIC GAS & ELECTRIC
VICINITY MAP

PG&E's Freshwater Slough Gas Pipeline Replacement Project
Figure 1 - Site Plan

Sections 19, 30 T5N R1E HB&M
Arcata South USGS 7.5' Quad

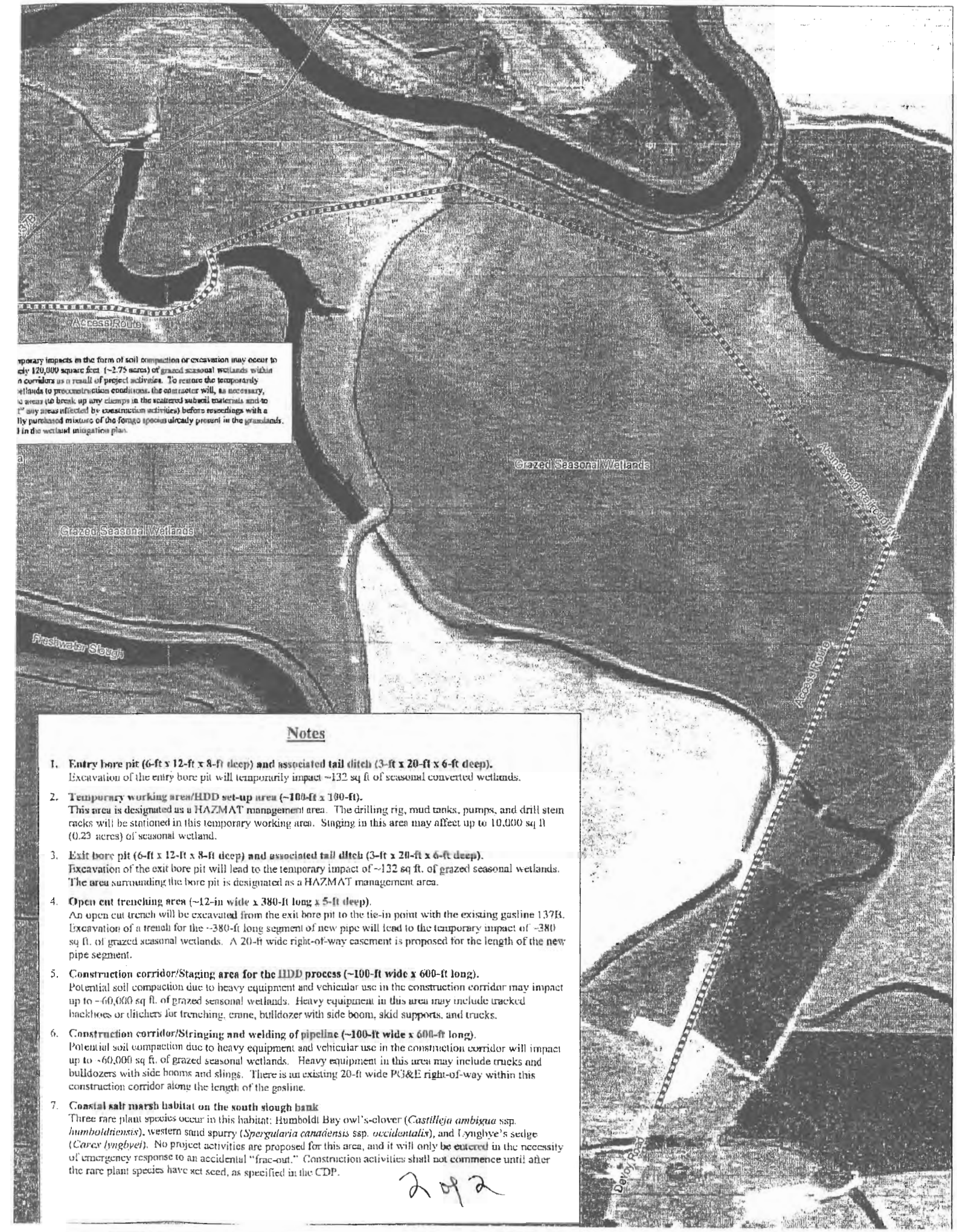
Prepared by
Natural Resources Management Corp
Eureka, California - March 2008

EXHIBIT NO. 3
APPLICATION NO.
1-04-010-A1
PACIFIC GAS & ELECTRIC
SITE PLAN & WETLAND IMPACTS (1 of 2)



Notes

1. **Entry bore pit (6-ft x 12-ft x 8-ft deep) and associated** Excavation of the entry bore pit will temporarily impact ~
2. **Temporary working area/HDD set-up area (~100-ft x** This area is designated as a HAZMAT management area. racks will be stationed in this temporary working area. Si (0.23 acres) of seasonal wetland.
3. **Exit bore pit (6-ft x 12-ft x 8-ft deep) and associated ta** Excavation of the exit bore pit will lead to the temporary The area surrounding the bore pit is designated as a HAZ
4. **Open cut trenching area (~12-in wide x 380-ft long x 5** An open cut trench will be excavated from the exit bore p Excavation of a trench for the ~380-ft long segment of ne sq ft. of grazed seasonal wetlands. A 20-ft wide right-of- pipe segment.
5. **Construction corridor/Staging area for the HDD proc** Potential soil compaction due to heavy equipment and ve up to ~60,000 sq ft. of grazed seasonal wetlands. Heavy backhoes or ditchers for trenching, crane, bulldozer with
6. **Construction corridor/Stringing and welding of pipeli** Potential soil compaction due to heavy equipment and ve up to ~60,000 sq ft. of grazed seasonal wetlands. Heavy bulldozers with side booms and slings. There is an existi construction corridor along the length of the gasline.
7. **Coastal salt marsh habitat on the south slough bank** Three rare plant species occur in this habitat: Humboldt B *humboldtiensis*), western sand spurry (*Spergularia canad* (*Carex lyngbyei*). No project activities are proposed for t of emergency response to an accidental "frac-out." Const the rare plant species have set seed, as specified in the CI



porary impacts in the form of soil compaction or excavation may occur to ely 120,000 square feet (~2.75 acres) of grazed seasonal wetlands within n corridors as a result of project activities. To restore the temporarily etlands to preconstruction conditions, the contractor will, as necessary, e areas (to break up any clumps in the scattered subsoil materials and to t" any areas affected by construction activities) before reseedings with a lly purchased mixtures of the forage species already present in the grasslands. l in the wetland mitigation plan.

Notes

1. **Entry bore pit (6-ft x 12-ft x 8-ft deep) and associated tail ditch (3-ft x 20-ft x 6-ft deep).**
   Excavation of the entry bore pit will temporarily impact ~132 sq ft of seasonal converted wetlands.

2. **Temporary working area/HDD set-up area (~100-ft x 100-ft).**
   This area is designated as a HAZMAT management area. The drilling rig, mud tanks, pumps, and drill stem racks will be stationed in this temporary working area. Staging in this area may affect up to 10,000 sq ft (0.23 acres) of seasonal wetland.

3. **Exit bore pit (6-ft x 12-ft x 8-ft deep) and associated tail ditch (3-ft x 20-ft x 6-ft deep).**
   Excavation of the exit bore pit will lead to the temporary impact of ~132 sq ft. of grazed seasonal wetlands. The area surrounding the bore pit is designated as a HAZMAT management area.

4. **Open cut trenching area (~12-in wide x 380-ft long x 5-ft deep).**
   An open cut trench will be excavated from the exit bore pit to the tie-in point with the existing gasline 137B. Excavation of a trench for the ~380-ft long segment of new pipe will lead to the temporary impact of ~380 sq ft. of grazed seasonal wetlands. A 20-ft wide right-of-way easement is proposed for the length of the new pipe segment.

5. **Construction corridor/Staging area for the HDD process (~100-ft wide x 600-ft long).**
   Potential soil compaction due to heavy equipment and vehicular use in the construction corridor may impact up to ~60,000 sq ft. of grazed seasonal wetlands. Heavy equipment in this area may include tracked backhoes or ditchers for trenching, crane, bulldozer with side boom, skid supports, and trucks.

6. **Construction corridor/Stringing and welding of pipeline (~100-ft wide x 600-ft long).**
   Potential soil compaction due to heavy equipment and vehicular use in the construction corridor will impact up to ~60,000 sq ft. of grazed seasonal wetlands. Heavy equipment in this area may include trucks and bulldozers with side booms and slings. There is an existing 20-ft wide PG&E right-of-way within this construction corridor along the length of the gasline.

7. **Coastal salt marsh habitat on the south slough bank**
   Three rare plant species occur in this habitat: Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*), western sand spurry (*Spergularia canadensis* ssp. *occidentalis*), and Lyngbye's sedge (*Carex lyngbyei*). No project activities are proposed for this area, and it will only be entered in the necessity of emergency response to an accidental "frac-out." Construction activities shall not commence until after the rare plant species have set seed, as specified in the CDP.

Pacific Gas and Electric Company

245 Market Street
San Francisco Ca 94105
Mailing Address
Mail Code N10A
P.O. Box 770000
San Francisco, Ca 94177

PG&E Gas Line 137B
Horizontal Directional Drill (HDD) Crossing of Freshwater Slough
Revised Project Description
February 2008

This Revised Project Description is submitted in compliance with Special Condition 2.D of Coastal Development Permit No. 1-04-010 ("CDP") for the replacement of a 1,200-foot-long section of an 8-inch diameter high-pressure natural gas pipeline beneath Freshwater Slough and adjoining pastureland (the "Project"). Special Condition 2.D requires that, following discovery of a spill or accidental discharge of drilling fluids, or a "frac-out", a revised project and restoration plan shall be submitted to the Executive Director, which provides for necessary revisions to the project to avoid another frac-out and restoration of areas affected by the frac-out to pre-project conditions.

This Revised Project Description describes the need for the Project, implementation methods employed for the Project, and how changes to the Project are being incorporated and all feasible measures are being implemented to reduce the likelihood of a future frac-out. PG&E is concurrently submitting to the Executive Director a Wetlands Restoration Plan, as required under Special Condition 2.D. In addition, this document explains why, in the unlikely event of another frac-out, it is more protective of coastal resources to allow the completion of the drilling following clean-up and the receipt of approvals to recommence from the California Department of Fish and Game (CDFG) and National Oceanic Atmospheric Administration (NOAA), instead of requiring work to stop pending Coastal Commission review and approval of these revised plans.

This information is provided in support of PG&E's request, as detailed in the accompanying transmittal letter, that the Coastal Commission staff approve this Revised Project Description and concurrently submitted Wetland Restoration Plan, and interpret Special Conditions 2.C and 2.D not to require the resubmittal of such revised plans in the unlikely event that another frac-out should occur Should the Executive Director determine, however, that these plans and/or the requested interpretation of Special Conditions 2.C and 2.D require an amendment to the CDP, the accompanying transmittal letter requests concurrence from the Executive Director that such amendment may be processed as an immaterial amendment.

Background

PG&E's natural gas pipeline 137B crossing of Freshwater Slough, in its present configuration, is at risk of failure. The pipeline was installed circa 1958 using the open trench method. Over the years the levee on the east bank has sloughed off into the slough, exposing the pipeline, thus putting it at risk of failure. Line 137B is the primary natural gas pipeline that feeds the Arcata and McKinleyville area. If this pipeline were to fail, this area would be without natural gas until the pipeline could be repaired. Rupture of the line also would increase the risk of fire and explosion, threatening public safety. In approving the CDP for the Project, the Coastal Commission found that Project expressly serves a public service purpose consistent with Coastal Act Section 30233(a)(4).

1999

The need to replace or repair the Freshwater Slough crossing was identified in 1998 and a project was established in 1999. Two alternatives were considered:

1. Install an Ercon mat system to support and protect the pipeline.
2. Replace the Freshwater Slough crossing with an HDD crossing.

PG&E determined that the Ercon mat system was not a suitable long term solution and was less protective of coastal resources. First, the pipeline may be damaged as evidenced by a slight twist to the exposed section of pipe. Second, the Ercon solution requires significant disturbances within the levee area. Third, this would not be a permanent solution, as the adjacent soils are soft and will continue to consolidate with time causing the Ercon mats to eventually fail and require replacement every five to ten years.

PG&E concluded that the HDD solution was the better alternative since it would provide a long-term solution and would be more protective of coastal resources. The HDD solution has a much longer life (sixty to one hundred years), as the pipe is installed in stable soils below the soft surface deposits. It also is more protective of the environment because it does not disturb the slough area, since it does not require direct surface disturbance (trenching, channel dewatering, etc.) of the waterway. In addition, the HDD will be installed much deeper than the existing pipeline crossing, eliminating the possibility of damage due to waterway bank erosion, waterway debris flow impact, or levee failure.

2003-2005

Internal funding to begin engineering, soils investigations and permitting activities was obtained in 2003. These activities were completed in July of 2005. Permits were received from U.S. Army Corps of Engineers, CDFG,

NOAA, Regional Water Quality Control Board and the California Coastal Commission. To ensure the protection of sensitive fish species, CDFG and NOAA limited work to a narrow window during August and September to avoid impacts to migrating adult/rearing juvenile salmon and steelhead.

2005

In August 2005, PG&E awarded the project to Southwest Contractors. Approximately 700 feet of the pipeline to be relocated involved an HDD. During drilling of the pilot hole of the HDD bore, when the pilot hole was approximately 50% completed, Southwest had an uncontrolled release of drilling mud to the surface. This is commonly termed a "frac-out". At the time the drill tip was approximately 55 feet below grade – a depth at which it is extraordinarily uncommon for a frac-out to occur. As soon as the frac-out was witnessed drilling and circulating activities were stopped and the appropriate agencies (CDFG, NOAA and the Coastal Commission) were notified immediately. The site immediately was cleaned that same day in accordance with the Coastal Commission-approved HDD Fluid Release Contingency Plan. Representatives from CDFG and NOAA Fisheries inspected the clean up later that day and were satisfied with PG&E's clean up effort. CDFG and NOAA Fisheries gave PG&E their permission to proceed that day.

Although CDFG and NOAA authorized recommencement of the project, special Conditions 2.C and 2.D of the CDP required PG&E to stop the project, cease all work and submit for approval of the Executive Director of the Coastal Commission a revised project work plan and restoration plan prepared by a qualified professional. Following consultations with Coastal Commission staff, PG&E understood that it would not have been possible to obtain Coastal Commission approval of these plans and complete the work within the narrow late summer construction window allotted by the resource agency permits. PG&E therefore opted to stop the project and demobilize the crew from the site. Mobilizing and then shutting down the project mid-construction cost PG&E approximately $300,000.

2006

While the project was demobilized, PG&E re-investigated alternative approaches for replacing the pipeline crossing of Freshwater Slough. As described below, replacing the crossing using HDD remains the most environmentally protective alternative that provides a long-term solution for the safety and security of the pipeline.

Description	Comments
1. Install an Ercon mat system to support and protect the pipeline	The Ercon mat would be a temporary fix that would likely have to be replaced every 5 to 10 years. The soils in the slough area are soft and

	do not supply a stable foundation for the Ercon mat. Over time, the mat will settle and require repair or replacement. This work would take place on the water side of the levee and would cause significant disturbance to the slough.
2. Replace the pipeline crossing using the direct burial method.	This would require extensive trenching through the slough to provide sufficient cover for the pipeline. The slough would have to be dammed upstream and downstream with a number of large conduits installed in the slough bed, with potential to impact migrating adult/rearing juvenile salmon and steelhead. These conduits would allow water to continue to flow on both the ebb tide and the slack tide. The trench across the slough would be 75 feet long, 15 to 20 feet wide and 8 feet deep. This is not acceptable due to the massive disturbance of the slough.
3. Build a pipeline suspension bridge.	This would create an attractive nuisance, as it is an above ground structure that will have to be protected from public access. It also would not insure the pipeline's safety, since being above ground, it is subject to vandalism. It also would not be consistent with coastal visual resources policies.
4. Replace the crossing using HDD.	HDD addresses all issues in a manner that provides a long term solution, which is most protective of coastal resources. The pipeline will be out of harm's way in a more stable soil condition. It will involve the least risk to the environment, and soil disturbance within the environmentally sensitive slough is minimal. It assures the pipeline's safety and security by

being buried and out of sight.

Project Revisions Proposed to Reduce Likelihood of a Frac-Out

PG&E has determined that HDD remains the best engineering option for crossing of Freshwater Slough. A detailed description of the project, including proposed revisions to reduce the possibility of another frac-out and to minimize potential impacts in the unlikely event of another fact-out, is included at Attachment A. As described in Attachment A, PG&E is proposing the following additional protective measures:

- Although the drilling contractor's personnel are trained to implement the HDD without the need for a drilling engineer, and while the presence of a drilling engineer on-site is not required by standard industry practice, as a further precautionary measure, an experienced drilling engineer, which is expert in the HDD process, will be present, on site, at all times during the drilling process, from mobilization, through demobilization and site restoration, including pilot bore, pre-reaming, reaming, and pullback, to ensure appropriate drilling methodology techniques are used. The drilling engineer will be familiar with the soil conditions, possess a thorough understanding of the ground and groundwater conditions at the project site, be capable of making important observations and assessing HDD Contractor practices in real time, and will advise the driller on the best practices for the conditions encountered. Important observations will be recorded and will include measurement and observation of drilling fluid properties, drilling speed, pump capacity, drilling fluid quantities and pressures, and any circulation losses.

- The drilling contractor will use a down-hole pressure monitoring tool, which was not previously available for use during the 2005 HDD attempt that will provide additional information regarding bottom hole pressure that can be compared against calculated maximum allowable drilling fluid pressure. The on-site drilling engineer will compare the measured down-hole pressures to the maximum allowable pressures and minimum required pressures calculated from a hydrofracture risk evaluation prior to commencement of the bore. If actual down-hole pressures approach maximum allowable values, the drilling engineer will advise the contractor. The contractor may use this information to modify drilling practices, and therefore further minimize the chances of a frac-out.

- Two piezometers will be installed between the entry and Freshwater Slough. The piezometers will be monitored regularly when the drill head is within 50 feet of the piezometers locations to evaluate drilling fluid excess pressures. The piezometer tips (screened interval) will be set 10 to 15 feet above the HDD bore, offset 5 feet from the centerline. If the

piezometers indicate increasing pressures, the drilling engineer will advise the HDD contractor. The contractor will adjust drilling speed, drilling fluid properties, or other drilling operations as necessary to reduce excess pressures.

- The HDD will go at least thirty feet deeper than the previous attempt to avoid possible soil disturbances caused by the prior bore and thereby decrease the likelihood of another frac-out. Entry and exit angles will be increased and set back distances will be increased to allow the HDD bore to be deepened. A deeper bore will increase the overburden so that, if there is a frac-out, it would be less likely to reach the surface and cause any environmental damage.

- The HDD Contractor will have on-site tools, equipment, and personnel that are trained and experienced for rapid containment, clean-up, and removal of any drilling fluid surface spills or frac-outs to reduce the consequences of any incident.

- The HDD Contractor selected for the Line 137B Freshwater Slough crossing will be selected from a list of pre-qualified HDD Contractors. The prequalification criterion will focus on successful bores in wetlands areas and will have demonstrated good practices that avoided adverse impacts to sensitive river or wetlands habitat.

With the implementation of the above measures, PG&E believes that it is taking all reasonable steps to reduce the likelihood of a frac-out from reoccurring to the extent feasible. PG&E has requested and obtained third party independent review of the proposed plan, by Dr. David Bennett, a well known nationwide HDD expert. Dr. Bennett concurs with PG&E's assessment that the proposed plan represents the best practices to minimize the risk of hydrofracture and inadvertent drilling fluid returns, as demonstrated by the attached letter.

Coastal Resources Best Protected if Work Stoppage Not Required Following a Frac-Out

PG&E is taking all feasible measures available to reduce the likelihood of another frac-out occurring. However, should a frac-out occur, PG&E believes, based on its experience with the prior frac-out and HDD at other locations, that it is more protective of coastal resources to allow completion of the drilling following clean-up and receipt of approvals to recommence from the CDFG and NOAA, instead of requiring work to stop pending Coastal Commission review and approval of revised plans in accordance with Special Condition 2.D.

The approvals issued by CDFG & NOAA, which have the primary regulatory authority in protecting sensitive species, permit work to recommence after a frac-out following their review of the clean-up work and implementation of the frac-out contingency measures. These agencies are equipped with the staff resources, expertise and other resources necessary to respond immediately in the event of a frac-out to ensure that all feasible measures are being undertaken to protect and minimize impacts to sensitive plant and aquatic species. Apart from implementing required contingency measures immediately following a frac-out, CDFG and NOAA did not determine that any additional environmental benefits would result from delaying recommencement of work. Moreover, PG&E believes that delaying recommencement of work would be less protective of the environment, while not offering any additional environmental benefits.

NOAA and CDFG require that the HDD occur during a brief window during the August and September to avoid impacts to migrating adult/rearing juvenile salmon and steelhead. In the absence of Special Conditions 2.C and 2.D., if another frac-out were to occur, completion of the HDD could occur immediately after NOAA and CDFG sign-off, within this brief window. However, if Special Conditions 2.C and 2.D were interpreted to require review and approval by Coastal Commission staff of a second revised project and restoration plan, such an interpretation likely would not permit PG&E to complete the HDD within this short window, given the time necessary either to obtain an amendment to the CDP or obtain an administrative review and approval by Coastal Commission staff. (Indeed, PG&E was required to shut down the project following the 2005 frac-out because, based on discussions with Coastal Commission staff, it determined that it could not satisfy the requirements of Special Condition 2.D during this window). As a result, the work again would be postponed another year, which would expose the pipe to further risk of failure and require the drilling of another bore, which would subject the slough to an increased risk of another potential frac out. Moreover, because wetland monitoring and restoration efforts are ongoing within the slough in response to the 2005 frac-out, it would be more protective of the wetlands to avoid the additional disturbance within these areas that would result if another HDD attempt were required.

In addition, there is limited space within PG&E's easement within the slough for PG&E to conduct the HDD. If another frac-out were to occur, and PG&E were required to stop work, there likely would be, at most, one alternative location that PG&E could conduct the HDD in compliance with the strict, environmental protection measures imposed by CDFG, NOAA and the Coastal Commission. As a result, PG&E's ability to repair the gas pipeline using HDD, the most environmentally protective method, would be severely jeopardized.

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In addition to being less protective of coastal resources for the reasons above, PG&E does not believe that interpreting Special Conditions 2.C and 2.D to require a second revised project description and restoration plan provides substantial environmental benefits. As required by Special Condition 2.D, PG&E is modifying its project, as described herein, to reduce the likelihood of a future frac-out. In addition, PG&E has prepared, in consultation with CDFG, a wetlands restoration plan, which provides for comprehensive monitoring and restoration efforts to address impacts resulting from the 2005 frac-out. In the unlikely event of another frac-out, interpreting Special Conditions 2.C and 2.D to once again require PG&E to submit additional revised plans would have no environmental benefits. This is because PG&E believes that it is now proposing all feasible measures to prevent a frac-out and PG&E does not believe it could revise the project any further to provide even greater protections. Similarly, now that CDFG and NOAA have approved of the wetlands monitoring and restoration program that PG&E has proposed, PG&E expects that the same or substantially similar plan would be implemented in the event of another frac-out.

PG&E therefore is requesting that, should another frac-out occur, work be permitted to recommence immediately following review and signoff by the Coastal Commission, NOAA and CDFG of the clean-up work and implementation of contingency measures.

Attachment A
2008 Proposed Project Description[1]

Pacific Gas and Electric Company's (PG&E) project involves replacing a 1,350-foot section of 8-inch diameter high pressure natural gas transmission pipeline (Line 137B) in Eureka, California. PG&E is proposing to install approximately 970 feet of 8-inch pipeline beneath Freshwater Slough using the horizontal directional drilling (HDD) method. The estimated depth of the new alignment will be approximately 85 feet beneath the channel of the slough. The remaining 380 feet of pipeline will be installed on the north side of the slough using an open cut trench method. As discussed further below, the pipe installation plan has been revised to obtain the 30 feet in added depth of the HDD without overstressing the new pipe section involved with the HDD. To accomplish that goal, the bore entry location has been moved back (farther away from Freshwater Slough) and the entry angle increased. As a result, the length of the pipe relocation has increased from 1,200 feet to 1,350 feet. An updated site plan, which illustrates these minor modifications to the location of the entry and exit bore pits shown on the site plan approved under the CDP, is attached at Exhibit 1. In addition, an updated survey profile, survey plan and reference details that show the end points and path of the proposed directional bore and the trajectory and depth of the bore below the surface are attached at Exhibit 2. The new alignment will remove a dog-leg in the existing alignment and provide the correct configuration and position to string the pipe for pullback under the slough. Once the new pipe is tied in, PG&E will remove a section (4 to 8 feet) of the existing pipe (exposed pipe) extending out from the channel (north end of bridge). The remainder of the line will be filled with concrete slurry and abandoned in place. The removal of the pipe (4 to 8 feet) from the channel would take place during the late summer, at low tide, and would be done by boat from the bank of the slough. No disturbance to the bank or removal of any material from the slough is expected. Access to the south bank (entrance pit) will be via Park Street and for access to the north tie-in point/exit bore pit will be via Myrtle Road to Devoy Road through private property to the site.

Preparation

To accomplish this task the following preparatory tasks and action items are to be completed:

- Verify the temporary work areas, proposed alignment along with the entry and exit points.
- Locate and identify existing utilities within the work areas.

[1] This preliminary project description is based upon current information and subject to minor changes in response to additional information and resource agency recommendations. Any material changes would be incorporated into a revised project description and immediately resubmitted to Coastal Commission staff.

- Develop a proposed drill path working profile and submit for approval
- Establish Survey points
- Notify Underground Service Alert.

HDD Staging and Process

Once the temporary work areas have been established the drill rig and its ancillary equipment will be moved on site and rigged up. To insert the new pipeline, a bore or pilot hole will be created with a variable-angle drilling rig which will be adjusted to the proper angle. The pilot hole will be drilled with a Drilling Rig with adequate compactly, utilizing 3.5-inch drill stem and a "Quick-Steer Bit". The decision to use the quick-steer bit is due to the subsurface conditions which do not appear to contain rock or hard-pan that would otherwise require the use of a motor. The "Entry" or Rig Side shall be located at the South-West End of the drill (Sta. 00+00).

The path of the pilot hole will be monitored by a state-of-art AC magnetic guidance system. The actual path of the pilot hole is monitored during drilling by taking periodic readings of the inclination and azimuth of the leading edge. The readings, in conjunction with measurements of the distance drilled since the last survey, are used to calculate the horizontal and vertical coordinates along the pilot hole relative to the initial entry point on the surface. Readings are taken every joint (normally a 15-ft. length).

The first and smallest of the cutting heads will begin the pilot hole at the surveyed entry point in a small pit on the surface. The first section of drill stem has an articulating joint near the drill cutting head that can be controlled by the bore operator. Successive drill stem sections will be added as the drill head makes its way under the creek crossing. The drill head is articulated slightly by the operator to follow a designed path under the waterway and upward climb toward the exit point. When the bit assembly penetrates the surface at the exit point, the pilot hole is complete and the assembly along with the guidance probe will be removed from the drill pipe. Once the pilot hole is completed, a reamer will be pulled and pushed through the bore hole to achieve the appropriate size for the pipeline. The proposed reaming passes are as follows:

1st pass 12-inch

The hole openers/centralizers will be attached to the drill pipe at the entry point rotated and pushed toward the (exit point) by the HDD rig (80 X 100 Capacity). By reaming with the hole openers in this manner, we can ensure that all drilling fluid returns and cuttings exit at the lower elevation of the entry point. As the hole opener is rotated and pushed by the rig toward the exit point, drilling fluid will be pumped from the rig side through the drill pipe to the hole opener at approximately 200 gallons per minute. The drilling fluid will suspend the cuttings and carry them out of the hole to the surface at the original entry point. Once the reaming passes are complete an analysis of the reamed hole and its

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condition will be performed and a decision made on the need for a hole lubricating swab pass. If required, the swab pass will consist of pulling a small barrel reamer through the entire length of the reamed hole to insure that all of the cuttings have been removed and that the hole is completely open.

During the entire pilot hole and reaming process, drilling mud is normally pumped under high pressure through the drill stem to stabilize the hole and return the soil cuttings to the small pit at the surface entry point. The mud is pumped from this pit to a processing unit where the soil cuttings are removed and the mud reused. This drilling method was employed for the first attempt.

For this second HDD crossing attempt, the drill will be performed with Bentonite and water mixture. The Bentonite slurry will lubricate the drill pipe and help maintain the integrity of the enlarged hole by forming a wall cake along the walls of the hole. The wall cake will reduce the amount of ground water that may seep into the hole and cause collapse.

As part of the bore design process, geotechnical surveys of the subsurface conditions are conducted to determine the underlying geologic strata along the bore path. Infrequently, the geologic strata above the bore may be weaker than anticipated and/or unconsolidated and the high pressure of the drilling mud results in a fracture of these strata, allowing drilling mud to rise to the surface. The boring operation is stopped immediately if this occurs. This situation is termed a "frac-out" and is usually resolved by reducing the mud system pressure or decreasing the mud viscosity. In 2005, the drilling process had proceeded to approximately 350 feet and was 55 feet below the surface. The driller experienced a loss of returning fluids back to the drilling rig. The driller stopped drilling and pumping. He pulled approximately 105 feet of drill pipe back out of the hole and re-established drilling fluid circulation back to the drill rig. The driller then began to add drill pipe to the drill string and push back into the previously drilled hole. During the push back process the frac-out occurred. All work stopped to clean up the frac-out material. After the clean up, the crew implemented the contingency plan to clean-up the site and minimize the extent of impacts and then waited for approval from the resource agencies to proceed. In the event that another frac-out occurs, all construction activity again would cease, appropriate agencies would be contacted, and the crew would mobilize to contain and clean up any spilled drilling mud. As discussed above, the likelihood of a frac-out occurring during this second attempt is reduced because an experienced drilling engineer will closely monitor the drill, conduct calculation, graph results, and the contractor will go deeper, use piezometers and use a down-hole pressure monitor.

Pipeline Stringing and Pullback

While the bore is occurring, the new pipe sections to be pulled through the crossing will be strung on pipe supports (roller cradles) along the north side of the slough. The pipe sections are welded together, examined with x-ray

technology, and a final protective epoxy is applied to the joints. The entire pipeline string is then hydrostatically tested to ensure its integrity. Once the bore hole is the correct diameter, a pulling head will be welded on the end of this pipeline string and then a barrel reamer will be attached to the drill pipe followed by a swivel. The swivel will then be attached to the pull head on the pipeline pull section. The barrel reamer is used to help cut and remove any material left in the hole or that may have fallen in after the final ream pass and/or swab pass. In addition the swivel prevents any torsional stress from reaching the pipeline pull section during the pull back. The Drill Rig will be connected to the drill string with the use of a cross-over sub. As the pipeline pull section is drawn towards the rig, drilling fluid will once again be pumped down the drill pipe to the reamer at approximately 100 gpm. A bulldozer with side booms and slings, in conjunction with the roller cradles, will support and help the pipeline string along as it is slowly pulled through the bore hole. Once the pipeline pull section reaches the surface at the rig, the barrel reamer and swivel will be removed and the drilling rig with its ancillary equipment will be rigged down and moved off the site. The completed bored crossing will then be connected to the existing pipeline and the entry and exit points will be backfilled.

Once the tie-in of the new pipeline is complete, the entire length of the bypassed pipeline will be pigged to remove any trapped liquids. The bypassed pipeline sections between the north tie-in and the exposed section within the slough and the section beneath the slough to the tie-in point will be retired in place. Removal of the segment within the slough channel will be conducted in two steps. First, the pipe will be cut off and capped where it exits the north bank. Then at low tide, the other end will be cut off and capped at water level. The welder will be positioned in a small boat along the shore, with the leads running from a welding truck up on the bank. Prior to capping, the two segments of bypassed pipe to be left in the ground will be filled with concrete slurry from the bank side to preclude any spills into the slough. In this manner, the banks and the channel bottom of the slough will not be affected. Appropriate erosion and sediment control BMP's will be installed between the work area and the north edge of the waterway to ensure sediment from the removal does not enter the slough.

Pipeline Trenching

The project work area will include approximately 380 feet of trenching approximately 1 ft wide by 5 ft deep for installation of the new pipe. Stockpiles or windrows of topsoil and subsoil excavated from the trench are all temporary.

Equipment

The HDD process utilizes a large hydraulically-powered horizontal drilling rig. The drilling rig is usually transported on a lo-boy trailer pulled by a semi-trailer

truck. New pipeline segments will also be transported to the project site on tractor-trailer flatbeds. The pipeline segments will be offloaded using a small crane, backhoe, or excavator. Additional HDD support equipment and vehicles include a drilling mud tank, a power unit for the hydraulic pumps, mud pumps, back-hoe or excavator, forklift, bulldozer with wide boom, 2-ton dump truck, 1500 gallon water truck, welder, 3200 gallon self contained vacuum unit, and various utility and crew vehicles.

Project Area

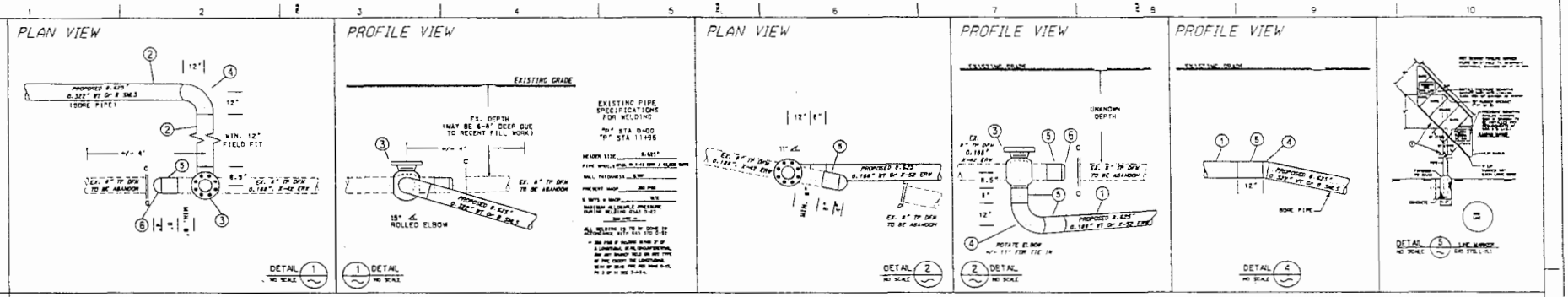
The project area encompasses approximately 4.5 acres along both sides of Freshwater Slough. The project area includes: 1) the HDD staging and bore entrance area; 2) the temporary work area; 3) the exit bore pit; 4) Open cut trenching area 5 & 6) construction corridor 7) the 4-8 feet of old pipeline section to be removed 8) Existing Line 137B to be abandon in place; and 8) all access routes. These project features are shown on attached Site Plan.

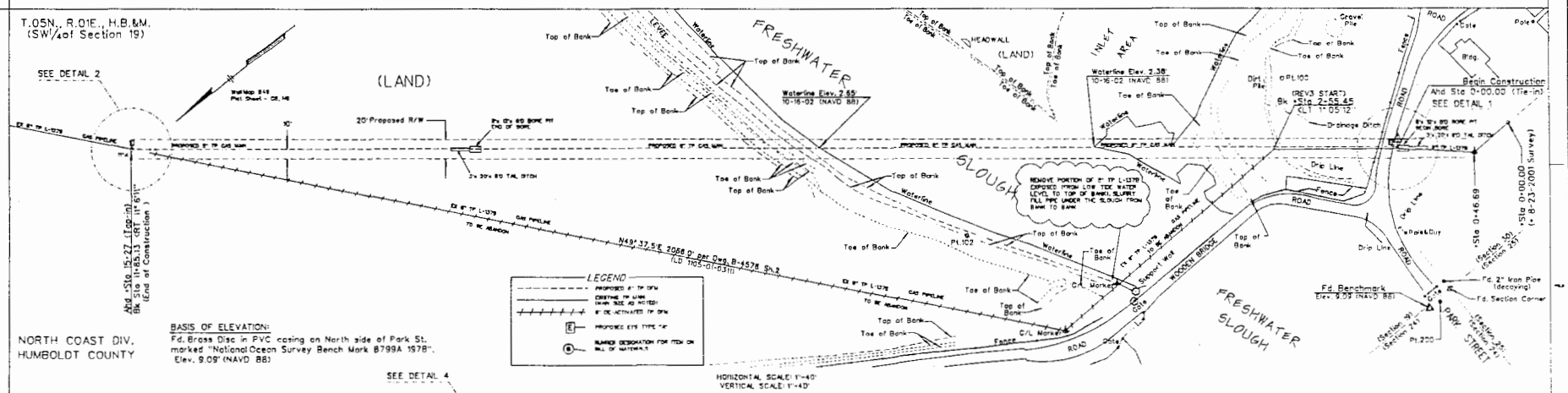
Work Area and Access Area

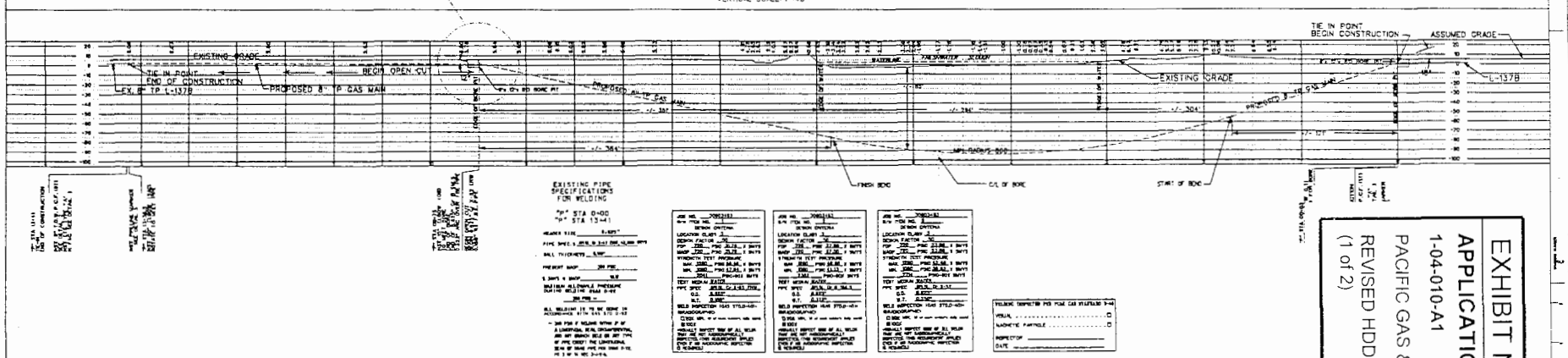
All proposed project activities (including material lay-down and equipment/vehicle mobilization) are expected to remain within the project area. An HDD set-up area adjoining the entrance pit will be approximately 100 ft. by 100 ft to accommodate the drilling rig (0.23 acres) – this area includes the entrance pit and soil stockpiles). This work area exits onto a private gravel road. At the north end of the project area, the exit pit will be approximately 100 ft by 100 ft. Most of this area is included the 100 ft. by 600 ft. to accommodate the construction corridor/staging area for the HDD process.

Schedule and Duration

Construction would begin in early August and be completed by October 15, 2008, before the beginning of the typical rainy season and during the summer/late fall period of inactivity for salmonid migrations in the region. Total project construction time from crew mobilization to clean-up and site restoration would take approximately one month.







WELDING REQUIREMENTS
ALL GAS WELDING IS TO BE PERFORMED IN ACCORDANCE WITH CAS STANDARD D-32.

WELDING VALVES AND FITTINGS
BRASS VALVES AND FITTINGS ARE WELDED TO EACH OTHER OR TO PIPE, THE JOINT SHALL HAVE A TWO PASS WELD ON THE INSIDE, IN ADDITION TO THE OUTSIDE WELD. THIS REQUIREMENT APPLIES TO ALL WELDS NPS DIAMETER AND LARGER AND TO SMALLER DIAMETERS WHEN PRACTICAL.

HYDROSTATIC TEST REQUIREMENTS
HYDROSTATIC TESTING SHALL MEET PRESSURE AND DURATION REQUIREMENTS OF GAS STANDARD A-34 AND SHALL BE CONDUCTED IN ACCORDANCE WITH GAS STANDARD A-37.

NOTES:
1. CALL USA AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION (811).
2. LOCATION OF EXISTING SUBSTRUCTURES ARE APPROXIMATE BEFORE POWER OR HEAVY EQUIPMENT IS USED FOR EXCAVATION. THE EXACT DEPTH AND LOCATION OF SUBSTRUCTURES SHALL FIRST BE DETERMINED BY HAND EXCAVATION (IF NECESSARY).
3. ALL BENDS ARE SMOOTH FIELD BENDS EXCEPT WHERE ELBOWS ARE NOTED. FIELD BEND SHALL BE MADE IN ACCORDANCE WITH GAS STANDARD A-36 SECTION 4-C.
4. ALL ANGLES SHOWN IN THE PLAN AND PROFILE ARE APPROXIMATE SHALL BE CUT TO SUIT FIELD CONDITIONS.
5. THIS PIPELINE MUST BE INSTALLED WITH AT LEAST 12 INCHES OF CLEARANCE FROM ANY OTHER UNDERGROUND STRUCTURE NOT ASSOCIATED WITH THE PIPELINE.

WRAP REMOVAL
BEFORE REMOVING THE PIPE COATING OR PRE-1973 PIPE DOES NOT INCLUDE PLASTIC TAPE OR FUSION-BONDED EPOXY COATINGS THE FOLLOWING STEPS SHALL BE TAKEN:
•FOR ALL NON-EMERGENCY WORK PRE-1973 PIPE WRAP MUST BE EVALUATED TO DETERMINE IF IT CONTAINS ASBESTOS PRIOR TO REMOVAL.
•FOR EMERGENCY WORK ON PRE-1973 PIPE, ASSUME THE WRAP CONTAINS 1% ASBESTOS UNTIL THE WRAP CAN BE TESTED.
•OBTAIN SAMPLES OF THE WRAP, AND HAVE SAMPLES TESTED FOR ASBESTOS IN ACCORDANCE WITH 8F 479.
•TEST RESULTS ARE TO BE INCLUDED WITH M-IRA FS.
•FOLLOW PROCEDURE IN 8F 479 FOR REMOVAL OF PIPE WRAP.

DEACTIVATION PROCEDURE FOR EXISTING 8" PIPE
1. CITY STANDARD 9X09 SHALL BE FOLLOWED.
2. THE EXISTING 8" GAS MAIN SHALL BE KEPT PURGED WITH NON GAS AS PER STANDARD A-38.
3. RE THE INTERVALS OF APPROXIMATELY TWO BLOCKS OR A MAXIMUM OF APPROXIMATELY 1000 FT., THE 8" MAIN SHALL BE CUT AND PLUGGED.
4. AT EACH SUCH LOCATION NOTED ABOVE, A PIECE OF PIPE AT LEAST 10' LONG SHALL BE REMOVED. THE OPEN ENDS OF ABANDONED MAIN SHALL BE SEALED BY THE MOST APPROPRIATE METHOD OUTLINED IN 8TD STD 9A12B. BACKFILL MUST BE THOROUGHLY COMPACTED IN PLACE OF THE REMOVED SECTION OF PIPE.
5. REPAVE CONNECTIONS TO BE ABANDONED AS INDICATED ON THE DRAWINGS SHALL BE CUT AND PLUGGED.
6. VALVES AND CURB BOXES MAY BE ABANDONED AND BURIED IF THE COST OF REMOVAL IS ABATED, THE OPEN ENDS OF PIPE SHALL BE SEALED AS NOTED ABOVE.

PAINTING AND COATING REQUIREMENTS
ALL EXPOSED PIPE AND FITTINGS ARE TO BE PAINTED IN ACCORDANCE WITH CAS STANDARD E-30.

ALL COATING ON BURIED PIPE AND FITTINGS ARE TO BE APPLIED IN ACCORDANCE WITH CAS STANDARD E-35.

FOR COATING SELECTIONS ON BURIED PIPE SEE DIRECT BURIAL SELECTIONS TABLE.

DIRECT BURIAL SELECTIONS

TIE-IN WELDS:	PROTAL 7200, PCU, DEVTAR 247
MAIN LINE COATING:	PROTAL 7200, PCU
GIRTH WELD COATING:	PROTAL 7200, PCU, DEVTAR 247
FITTING COATING (SIZES, ELS.):	PCU, PROTAL 7200, DEVTAR 247
FITTING COATING (MISCELLANEOUS):	WAX TAPE
MINOR REPAIRS:	PROTAL 7200, PCU, DEVTAR 247
TRANSITION ZONES:	N/A

CALL 811
NOTIFIED U.S.A.
DATE TICKET NO. 81

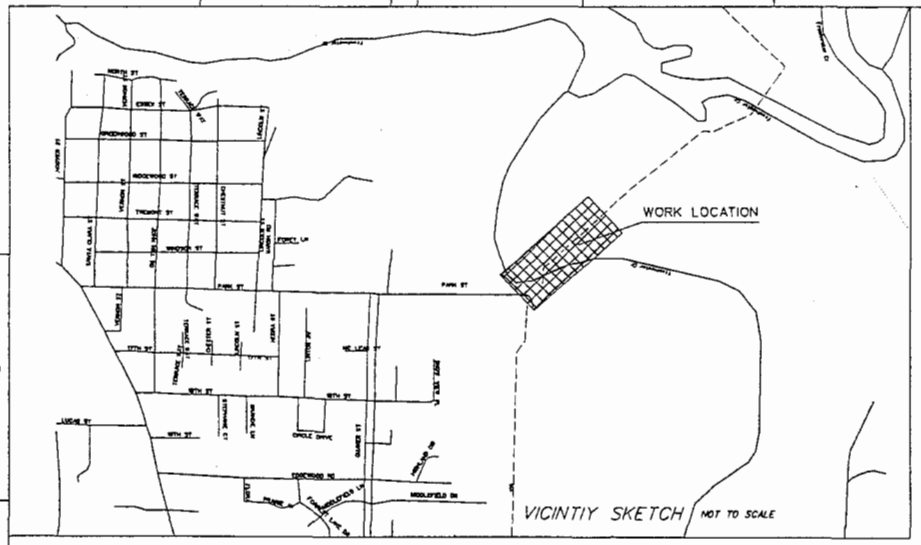
NO.	DATE	DESCRIPTION	BY/INSPECT	CHKD	SUPV	APPD BY
2		LONGER BORE, MOVED BORE PITS	30903483			
1	05/31/04	ISSUED FOR CONSTRUCTION	70270291	VMC	CMV	

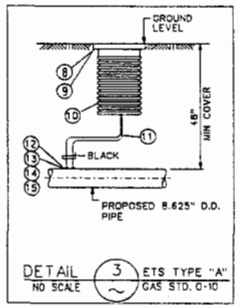
DRAWING NO. 30903483
SURV LM
DSGN PWD
DWN RBC (12/01)
CHKD VMC
APPD CM
DATE 02/26/08
SCALE AS SHOWN

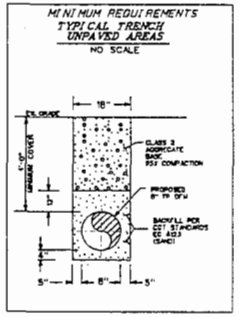
EXHIBIT NO. 5
APPLICATION NO. 1-04-010-A1
PACIFIC GAS & ELECTRIC
REVISED HDD BORING PLANS (1 of 2)

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

30603493







POGE CODE	ITEM NO.	QUANTITY	ORDER NO. ——— DESCRIPTION	CATALOG OR DRAWING REFERENCE
01-0718	1	353'	PIPE,STL,API 5L Gr X-52 ERW. 8.625" OD. 0.188" WT COATED W/16 MILS FUSION BONDED EPOXY	CS&S A-15
01-0849	2	980'	PIPE, STL,API 5L,GR-B,SMLS, 0.322" W.T.,BEVELED ENDS. COATED W/ A.R.C. PER C.S. & S. E-35 OVER 16 MILS F.B.E.	CS&S A-15
02-0987	3	2	FITTING, W-STOPP, STL 8" ANSI 300, 740 PSI CWP TD WILLIAMSON # 06-5623-0000-02. LINE STOPPER WITH SIDE OR BOTTOM CONNECTION 8"	CS&S C-63
02-2083	4	3	ELBOW, STL, 0.322" W.T. Gr B 90° 8" STD LONG RADIUS. WELD ENDS BEVELED TO MATCH MUST BE SUITABLE FOR SEGMENTING	CS&S B-20
01-0797	5	4'	PIPE,STL,API 5L Gr X-52 ERW. 8.625" OD. 0.250" WT. BARE	CS&S A-15
02-2080	6	6	CAP, WELD, STD. Gr B 0.322" W.T. 8" ASTM A-234 GRADE B.	CS&S B-20
02-2287	7	4	NIPPLE, SAVE-A-VALVE, MUELLER # H-17491 1" 3" LG W/STL CAP. 1200 PSI CWP 1440 MAXIMUM	CS&S C-14
04-3225	8	2	COVER BOX CONCRETE CAST IRON CHRISTY # CS-CI75 - 11-1/16" DIAMETER	CS&S K-41
04-3271	9	2	BODY CONCRETE BOX TRAFFIC CHRISTY # CS. 10-3/8" DIA X 12"	CS&S K-41
01-6063	10	2	PIPE, VALVE BOX EXT PLASTIC, 8" IPS, PART NUMBER 851. BLACK ABS CORRUGATED. 10' L	CS&S K-41
29-4991	11	60'	WIRE, ELECTRICAL INSL. COPPER 600V 10 AWG 47 MIL PVC. SOLID 1-CONDUCTOR. BLACK	CS&S C-10
15-9260	12	8	CARTRIDGE BRAZING, CADWELD # CA-15 THERMOWELD # 15P. ERICO PRODUCTS COMPANY	CS&S C-10
30-3755	13	8	SLEEVE SPLICING #14 TO #10. COPPER CADWELD CADWELD # CAB-133-1H. THERMOWELD # A-200	CS&S C-10
56-2324	14	4	TAPE HANDY CAP 4" X 4". ROYSTON	CS&S E-27
13-0850	15	1 CAN	PRIMER ROYBOND. ROYSTON # 747	CS&S E-27
01-8566	16	2	SIGN MARKER, FOR UNDERGROUND GAS FACILITIES COATED ALUMINUM. WITH PIPE SUPPORT AND HARDWARE	CS&S L-11.1
01-8565	17	2	PLATE MARKER, FOR UNDERGROUND GAS FACILITIES ALUMINUM 12 GAUGE	CS&S L-11.1
01-8704	18	4	U-BRACKET ASSEMBLY, CLAMP-ON GALV STEEL WITH NUTS FIBER WASHER	CS&S L-11.1

NOTES:

1. CALL USA AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION (811).
2. LOCATION OF EXISTING SUBSTRUCTURES ARE APPROXIMATE. BEFORE POWER OR HEAVY EQUIPMENT IS USED FOR EXCAVATION, THE EXACT DEPTH AND LOCATION OF SUBSTRUCTURES SHALL FIRST BE DETERMINED BY HAND EXCAVATION IF NECESSARY.
3. ALL BENDS ARE SMOOTH FIELD BENDS EXCEPT WHERE ELBOWS ARE NOTED. FIELD BEND SHALL BE MADE IN ACCORDANCE WITH GAS STANDARD A-36 SECTION 4-D.
4. ALL ANGLES SHOWN IN THE PLAN AND PROFILE ARE APPROXIMATE SHALL BE CUT TO SUIT FIELD CONDITIONS.
5. THIS PIPELINE MUST BE INSTALLED WITH AT LEAST 12 INCHES OF CLEARANCE FROM ANY OTHER UNDERGROUND STRUCTURE NOT ASSOCIATED WITH THE PIPELINE.

WELDING REQUIREMENTS

ALL ARC WELDING IS TO BE PERFORMED IN ACCORDANCE WITH GAS STANDARD D-22.

DEACTIVATION PROCEDURE FOR EXISTING PIPE

1. GTS STANDARD S4129 SHALL BE FOLLOWED.
2. THE EXISTING 8" GAS MAIN SHALL BE 100% PURGED WITH INERT GAS AS PER STANDARD A-38.
3. AT THE INTERVALS OF APPROXIMATELY TWO BLOCKS OR A MAXIMUM OF APPROXIMATELY 1000 FT., THE " MAIN SHALL BE CUT AND PLUGGED.
4. AT EACH SUCH LOCATION NOTED ABOVE, A PIECE OF PIPE AT LEAST 18" LONG SHALL BE REMOVED. THE OPEN ENDS OF ABANDONED MAIN SHALL BE SEALED BY THE MOST APPROPRIATE METHOD OUTLINED IN GTS STD S4129. BACKFILL MUST BE THOROUGHLY COMPACTED IN PLACE OF THE REMOVED SECTION OF PIPE.
5. SERVICE CONNECTIONS TO BE ABANDONED AS INDICATED ON THE DRAWINGS SHALL BE CUT AND PLUGGED.
6. VALVES AND CURB COCKS MAY BE REMOVED AND SALVAGED IF THE COST OF REMOVAL IS JUSTIFIED. THE OPEN ENDS OF PIPE SHALL BE SEALED AS NOTED ABOVE.

COATING REMOVAL

BEFORE REMOVING THE PIPE COATING ON PRE-1972 PIPE (DOES NOT INCLUDE PLASTIC TAPE OR FUSIONBONDED EPOXY COATINGS) THE FOLLOWING STEPS SHALL BE TAKEN:

-FOR ALL NON-EMERGENCY WORK, PRE-1972 PIPE WRAP MUST BE EVALUATED TO DETERMINE IF IT CONTAINS ASBESTOS PRIOR TO REMOVAL.
-FOR EMERGENCY WORK ON PRE-1972 PIPE, ASSUME THE WRAP CONTAINS > 1% ASBESTOS UNTIL THE WRAP CAN BE TESTED.
-OBTAIN SAMPLES OF THE WRAP, AND HAVE SAMPLES TESTED FOR ASBESTOS IN ACCORDANCE WITH RP 4711.
-TEST RESULTS ARE TO BE INCLUDED WITH AS-BUILTS.
-FOLLOW *PROCEDURE IN RP 4711 FOR REMOVAL OF PIPE WRAP.*

WELDING VALVES AND FITTINGS

WHEN VALVES AND FITTINGS ARE WELDED TO EACH OTHER OR TO PIPE, THE JOINT SHALL HAVE A TWO PASS WELD ON THE INSIDE, AS WELL AS THE OUTSIDE WELD, IF THE INTERNAL MISALIGNMENT EXCEEDS 3/32", BACK WELDING IS NOT REQUIRED IF THE VALVES AND FITTINGS ARE SUPPLIED ALREADY SHOP-WELDED TO PIPE OF THE SAME WALL THICKNESS AS THE LINE PIPE.

HYDROSTATIC TEST REQUIREMENTS

HYDROSTATIC TESTING SHALL MEET PRESSURE AND DURATION REQUIREMENTS OF GAS STANDARD A-34 AND SHALL BE CONDUCTED IN ACCORDANCE WITH GAS STANDARD A-37.

SEQUENCE OF OPERATIONS

1-INST 8" TP DFM BY OPEN CUT AND HORIZONTAL DIRECTIONAL DRILL. ALL OPEN CUT AND BORE PITS TO BE LOCATED WITHIN THE DIRT AREAS.

2-HYDROTEST PROPOSED 8" TP DFM

3-TO ISOLATE 8" TP DFM FOR TIE-IN:
VERIFY TAPS EXISTING ON THE LINE AND MONITOR

INST 8" P.C.F. T.D.W. W-STOPP FITTING (ST) @ "P" STA 0+00
INST 1" SAVE A VALVES TO CAUGE (AS NECESSARY)
INST 8" P.C.F. T.D.W. W-STOPP FITTING (BT) @ "P" STA 13+41

4-TAP AND PURGE 8" PIPELINE. PACK LINE TO 100 PSIG. SOAP TEST ALL WELDS. AFTER WELDS TEST "OK", RETURN PIPING TO NORMAL OPERATING PRESSURE.

5-BLOW DOWN 8" LINE TO BE DEACTIVATED THROUGH TAPPING MACHINE AND SAVE A VALVES.

6-WHEN PIPE TO BE DEACTIVATED IS FLAT. CUT OFF SECTION OF PIPE AND INSTALL 8" CAPS. DEACTIVATE THE MAJORITY OF THE 8" STL IN PLACE WITH THE EXCEPTION OF THE 8" EXPOSED PIPE IN THE CHANNEL. CUT OFF EXPOSED PIPE IN THE CHANNEL AT THE LOW TIDE WATER LINE AND REMOVE ALL PIPE THAT WAS PREVIOUSLY EXPOSED. SLURRY FILL DEACTIVATED PIPE CROSSING UNDER THE SLOUGH.

PROPOSED WORK

1-INSTALL +/- 1341' OF 8" TP L-137B
2-DEACTIVATE +/- 1313' OF 8" TP L-137B

PLANT TO BE DEACTIVATED

1313' OF 8" L-137B - GM 137218 - 1958

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	- -	LONGER BORE, MOVED BORE PITS	30603493				
1	03-25-04	ISSUED FOR CONSTRUCTION	7027029		VMC		GMV

REVISIONS

APPROVED BY 30603493
SUPV LDN
DSGN RWD
DWN RWD (CDB)
CHKD VMC
DR
DATE 02/28/08
SCALES AS NOTED

REPLACE +/- 1341' OF 8" TP L-137B
M.P. 0.61 - M.P. 0.95
CROSSING FRESHWATER SLOUGH
HUMBOLDT COUNTY
CALIFORNIA GAS TRANSMISSION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. 1 OF 2 SHEETS
30603493 REV 2

FILENAME: .DGN - -03

292

BENNETT
trenchless engineers

90 Blue Ravine, Suite 165
Folsom, CA 95630
Phone: 916-294-0095
Fax: 916-294-0098

April 3, 2008

Mr. David Goldberg
Latham and Watkins, LLP
633 West Fifth Street, Suite 4000
Los Angeles, CA 90071-2007

Subject: PG&E Freshwater Slough Line 137B: Response to Questions by Bob Merrill, California Coastal Commission

Dear Mr. Goldberg:

I have reviewed the questions from Mr. Merrill contained in your e-mail of April 2, 2008. Mr. Merrill's questions focused on measures that could be taken to reduce the risks of hydrofracture on the proposed Line 137B HDD crossing of Freshwater Slough, if the downhole pressure monitoring device or the piezometers indicate that drilling fluid pressures are increasing. My response follows:

1. First, the maximum allowable and minimum required drilling fluid pressures must be calculated and plotted continuously along the bore path before drilling begins. The calculations and graphs establish the baseline for comparison with actual measured pressures. These calculations were recommended in our February 22, 2008 letter.
2. If actual pressures approach maximum allowable pressures, the Contractor has several mitigation measures available that can be implemented to reduce the pressures and risks of hydrofracture. These measures include:
    a. If drilling fluid weights have been increasing, as determined by frequent observations and measurements as drilling proceeds, and reach or exceed levels of 9.5 pounds per gallon or higher, reduce drilling speed and allow the mud pump and cleaning plant to catch up. Excessive drilling fluid weights are an indication that solids are remaining in the fluid being recirculated back to the face of the excavation. Excessive drilling fluid weights cause high pumping pressures and can lead to pressurizing of the formation surrounding the bore.
    b. If reducing drilling speed as described in step a. above is ineffective, stop and dilute drilling fluid by pumping out the thickened fluid and adding fresh drilling fluid to return fluid weights to 8.5 to 8.7 pounds per gallon.
    c. If mud weights again approach unacceptable levels, repeat steps a. and and/or b. above

d. If circulation has been lost, as confirmed by the absence of returns at the entry or exit locations, attempt to regain circulation. Measures to regain circulation will depend on the known or suspected cause. For example, if the formation has collapsed around the bore, the annulus that provides the conduit for transport of the slurry and cuttings will be blocked. Indications may include increased rotary torque and thrust if the formation has collapsed onto the drill pipe. In this case, the drill pipe should be retracted beyond the location where the problem was first observed, the gel strength of the drilling fluid should be increased, filtration losses should be decreased through the addition of specialty fluid products, and the drill should slowly advance back through the problem zone. If rotary torque is relatively constant, but thrust increases, the formation may have collapsed onto the product pipe during pullback. Usually this will result only in loss of circulation to the exit location, and will not cause loss of circulation back to the entry. If circulation is not restored by the drilling fluid additives, retract again, mix a slug (100 to 1,000 gallons) of very high viscosity drilling fluid with circulation loss material. Pump the slug downhole as drilling advances slowly through the trouble zone. Retract and repeat if necessary, until recirculation is regained.
e. If the measures described in steps a. through d. above are ineffective, it may be necessary to drill a relief well at an accessible location near the problem zone to vent or relieve the excessive drilling fluid pressures. A vacuum truck or trailer should be staged near the relief well to pump out drilling fluids as the pressures are relieved. Before proceeding to this step, the actual increase in pressures should be carefully compared against the maximum allowable pressures as construction of a relief well is an intrusive step. It is important to remember that the maximum allowable pressures include an appropriate factor of safety, so even if actual drilling fluid pressures approach the maximum, hydrofracture to the surface will not necessarily occur.
f. If a frac-out actually occurs, use best practices to contain, remove, and clean-up, the drilling fluid, before adverse consequences occur. Adverse consequences can usually be avoided by having an approved contingency plan and simple tools and trained personnel on-site to quickly respond to the incident. The plan's implementation should result in rapid containment, removal, and clean-up in the affected area, documentation, and notification of appropriate agencies and individuals of the incident.

The measures available for managing drilling fluid pressures, maintaining circulation, and avoiding hydrofractures discussed above are well-understood by competent experienced drillers. One recommendation repeated from our earlier letter is to establish appropriate technical qualification criteria for the Line 137B Freshwater Slough crossing and select an HDD contractor that meets the prequalification criteria.

I trust that my response to the concerns raised by Mr. Merrill address how the proposed downhole pressure measurements and piezometer observations can help reduce risks of hydrofracture to acceptable levels. Please call or e-mail me if you have additional questions or wish to discuss.

Sincerely,

David Bennett

David Bennett, PhD, PE

BENNETT
trenchless engineers

90 Blue Ravine, Suite 165
Folsom, CA 95630
Phone: 916-294-0095
Fax: 916-294-0098

June 12, 2008

Mrs. Patricia Sanchez
PG&E
245 Market Street, N10A
San Francisco, CA 94105-1702

Subject: Addendum to Bennett Trenchless Engineers letter of April 3, 2008, describing measures that should be taken if inadvertent fluid return or hydrofracture occurs during Freshwater Slough HDD bore

Dear Mrs. Sanchez:

Subsequent to our teleconference call earlier today with Ms. Melissa Kraemer, California Coastal Commission, and Mr. Pat Mullins, PG&E, I have prepared the following supplemental recommendations for measures that should be implemented if a hydrofracture occurs during the HDD bore beneath Freshwater Slough. Referring to my letter of April 3, 2008, these recommendations essentially elaborate on specific details contained in my letter and should be inserted after paragraph 2.f.

2.g. After a frac-out incident, the measures described in paragraphs 2.d. and 2.e. should be followed. Specifically, compare properties of drilling fluid being pumped downhole to properties of returning fluids. The fluids may be diluted by groundwater flowing into the bore. Retract the drill string 30 to 60 feet behind the frac-out location, mix a slug of 100 to 1,000 gallons of high-viscosity circulation loss material, and inject it into the bore. Wait approximately one hour or more, depending on circulation loss material manufacturer's recommendations, and proceed to slowly re-drill through the reach where the fracture occurred. Suitable circulation loss materials are made by a number of manufacturers, including Poly Seal, or Kem Pak ULV, by Cetco, Tru-Bore by WyoBen, Diamond Seal by Baroid, FSF Liquid Pac Plus, by Federal Summit. Other circulation loss materials that the contractor has used successfully in similar situations may be used. Reduce drilling fluid volume and pumping rate to avoid washing out the circulation loss material. Drill in and out of the fluid loss area, monitoring circulation, thrust, and torque. Adjust drilling fluid properties as necessary by dilution or mixing new fluids to ensure that mud weights are less than 9.5 pounds per gallon and viscosity is satisfactory. When drilling resumes, use thinner fluid but with high value of filtration control.

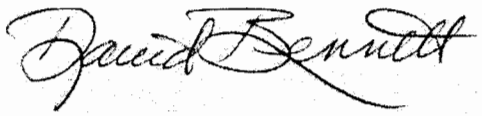
2.h. Monitor fluid levels in tanks, returns at entry and exit, and continue to visually monitor for recurrence of hydrofracture. Repeat step 2.g. if necessary. Wait 2 hours or

longer for circulation loss material to set before drilling, as necessary. If fluid losses continue, continue drilling slowly without full circulation, using only calculated volumes of hole and carefully monitoring thrust and torque.

2.i. If measures described in steps 2.g. and 2.h. are ineffective, it may be necessary to drill a relief or "burp" hole at an accessible location near the frac-out to relieve excessive formation pressures. The relief well should extend to within 5 to 10 feet vertically of the bore to provide a preferential pathway for drilling fluid. The relief well should be cased with HDPE pipe that extends a few feet above ground surface. A vacuum trailer or truck should be staged near the relief well to pump out fluids from the relief well casing and frac-out area to the truck or trailer tank. The relief well should be properly abandoned after the bore is completed, by grouting the hole as the casing is removed.

These measures are well-understood and used by competent experienced drillers. I remain convinced that the measures described in the PG&E Freshwater Slough Revised Project Description and Plans, and my recommendations contained in my letters of February 12, 2008, April 3, 2008, and these supplemental recommendations will provide the highest level of assurances for satisfactory completion of the Freshwater Slough HDD bore with minimum risks of hydrofracture and adverse consequences. Please call or e-mail me if you have questions or desire further discussion.

Sincerely,



David Bennett, PhD, PE

BENNETT
trenchless engineers

90 Blue Ravine, Suite 165
Folsom, CA 95630
Phone: 916-294-0095
Fax: 916-294-0098

February 12, 2008

Mr. Rand Unverferth
PG&E
245 Market Street
San Francisco, CA 94105

Subject: Review of PG&E Line 137B, HDD Crossing of Freshwater Slough
Revised Project Description and Plans, dated February, 2008.

Dear Mr. Unverferth:

As you requested, I have reviewed the Freshwater Slough Revised Project Description and Plans, dated February, 2008. In addition to our review, you will recall that Matthew Wallin, Senior Project Engineer with our firm, visited the site with you in July 2007, and that Matthew and I reviewed an earlier draft of the revised description and plans dated June 2007. Both Matthew and I discussed our suggestions for improving the project and reducing risks of hydrofracture with you and provided written comments on your draft and verbal comments via teleconference to you. My review of the revised project description and plans dated February 2008 reveals that PG&E has adopted our recommendations, and has substantially improved the project plan by adopting best practices to reduce risks of hydrofracture during the proposed HDD bore. In my opinion, PG&E's revised project description and plans incorporate all feasible best management practices both for reducing risks of hydrofracture and minimizing potential impacts should it occur. My specific comments follow.

1. I concur with PG&E's conclusion that an HDD crossing remains the best engineering option for crossing Freshwater Slough. I believe the HDD crossing can be completed successfully, without adversely impacting the sensitive environment of Freshwater Slough.
2. I concur with PG&E's proposed practices to reduce risks and consequences of potential hydrofracture, summarized below:
    a. An on-site drilling engineer shall be present during all HDD operations, from mobilization, through demobilization and site restoration, including pilot bore, pre-reaming, reaming, and pullback. The drilling engineer shall be an expert in the HDD process, possess a thorough understanding of the ground and groundwater conditions at the project site, and be

capable of making important observations and assessing HDD Contractor practices in real time. Important observations shall be recorded and shall include measurement and observation of drilling fluid properties, drilling speed, pump capacity, drilling fluid quantities and pressures, and any circulation losses.

b. Down-hole pressure monitoring should be conducted during the pilot bore. The on-site drilling engineer should compare the measured down-hole pressures to the maximum allowable pressures and minimum required pressures calculated from a hydrofracture risk evaluation prior to commencement of the bore. If measured down-hole pressures approach calculated maximum allowable pressures, the drilling engineer should consult with the contractor and use the information to modify practices and reduce hydrofracture risks.

c. Entry and exit angles shall be increased to provide for a deeper bore, with increased earth cover between the bore and the ground surface. Increased earth cover reduces the risk of hydrofracture, and reduces the risk that localized hydrofracture would result in drilling fluids reaching the surface.

d. The proposed bore shall be at least thirty feet deeper than the previous attempt to avoid possible disturbances caused by the previous bore and to further decrease the likelihood of hydrofracture.

e. Two piezometers shall be installed between the entry and Freshwater Slough, and shall be monitored frequently during the HDD activities to supplement the down-hole pressure measurements and provide an additional method for evaluating effects of fluid pressures on the soil formation.

f. The HDD Contractor shall have on-site tools, equipment, and personnel that are trained and experienced for rapid containment, clean-up, and removal of any drilling fluid surface spills or hydrofractures to reduce the consequences of any incident.

g. The HDD Contractor selected for the Line 137B Freshwater Slough crossing will be selected from a list of pre-qualified HDD Contractors. The prequalification criterion shall focus on successful bores in wetlands areas and shall have demonstrated good practices that

avoided adverse impacts to sensitive river or wetlands habitat.

The best management practices summarized above and proposed for implementation by PG & E are consistent with the HDD Good Practices Guidelines (2001, 2004), and, in my opinion, will result in substantial risk reduction. No risk reduction practices of strategies have been overlooked or rejected by PG & E in their revised project description.

In addition to my concurrence with PG & E's proposed practices to reduce hydrofracture risks, I concur with PG&E that stopping the project, in the unlikely event that hydrofracture does occur, to allow re-design would not be in the best interests of the public, and would not result in additional protection of the environment. To the contrary, further postponement of the HDD would expose the pipe to further risk of failure and require the drilling of another hole, even if the work could be recommenced within the same construction window, which would subject the slough to an increased risk of another potential hydrofracture.

I firmly believe that if all of the proposed best management practices are followed, and hydrofracture still occurs, that the bore should continue after containment and clean-up. No public benefit or additional environmental protection would be realized by stopping the project for Costal Commission review and approval of revised plans in accordance with Special Condition 2.D. Rather, the bore should be completed after containment and clean-up in accordance with resource agency requirements without delay.

Sincerely,

David Bennett, Ph. D., P.E.
Bennett Trenchless Engineers, Inc.

NRM
NATURAL RESOURCES MANAGEMENT
CORPORATION

1434 Third Street • Eureka, CA • 95501-0682
707 442-1735 • fax: 707 442-8823
Email: nrm@nrmcorp.com
Web: www.nrmcorp.com

Wetland Restoration Plan for Coastal Salt Marsh Habitat Affected by Pacific Gas and Electric Company's Freshwater Slough HDD G/L 137B Project

Submitted to: Jesus Viscarra, Terrestrial Biologist
Pacific Gas and Electric Company
350 Salmon Street
Chico, CA 94928

Prepared by: Melissa Brooks, Staff Botanist & Wetland Specialist
Phone: (707) 269-1382
E-mail: mbrooks@nrmcorp.com

Submitted: October 18, 2005

By: _____

Attachment A

Contents

Figures, Tables, and Attachments

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1. Summary

On August 29, 2005 a "frac-out" (i.e., leakage of drilling mud into the environment) occurred in a coastal salt marsh adjacent to Freshwater Slough. The frac-out took place during horizontal directional drilling (HDD) operations for a gas pipeline replacement project by PG&E (G/L 137B). Approximately 2880 square feet of the approximately 5940 square feet salt marsh (roughly half) was affected by the frac-out and subsequent clean-up activities. Impacts include direct spillage of drilling mud (made from bentonite, water, and a drilling mud additive) onto salt marsh vegetation as well as heavy trampling of vegetation by foot traffic, sand bags, and other clean-up materials. The majority of the affected area is dominated by dense-flowered cordgrass (*Spartina densiflora*), a nonnative, invasive weed that forms dense, nearly monotypic stands with poor habitat value for wildlife. The remainder of the affected area (630 square feet), including the point where the frac-out occurred, is occupied by the relatively diverse "mixed marsh community" harboring two rare plant species, Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*) and western sand spurry (*Spergularia canadensis* var. *occidentalis*), both of which had set seed prior to project operations. Population estimates of the two rare species had been recorded in 2003, 2004, and 2005, so it is possible to compare future population numbers with past years to determine if the species have been negatively impacted by the drilling mud and/or trampling. The distribution and abundance of dense-flowered cordgrass on the salt marsh at the time of the frac-out was also documented to monitor future species invasion into the relatively *Spartina*-free mixed marsh community. Monitoring is recommended for up to five years. If future population estimates of the rare plant species show that either species may have been directly or indirectly impacted (e.g., from subsequent *Spartina* invasion) by the frac-out, remedial actions, such as reseeding and/or manual *Spartina* removal, should be employed.

2. Location

a. PG&E Project Area

The Freshwater Slough HDD Gas Line 137B project area is located near the northeastern edge of Eureka on and around Freshwater Slough, which flows into Eureka Slough, which flows into Humboldt Bay in Humboldt County, California. The legal description of the project area includes Sections 19 and 30 of Township 5N and Range 1E (HB&M) on the Arcata South U.S. Geologic Survey 7.5-minute quadrangle map. The topography is more or less flat, and the elevation is approximately 7 feet on average (see Site Plan, attached).

b. Wetland Restoration Area

The wetland restoration site is located on the south side of Freshwater Slough within coastal salt marsh habitat. The coastal salt marsh area is a small peninsula (approximately 5940 square feet, or 0.14 acre) bordered by Freshwater Slough to the north, a small inlet to the southeast, and a dike to the southwest (see Figure 1). The wetland restoration area is restricted to the relatively species-rich "mixed marsh community" (per Eicher 1987) adjacent to the dike (approximately 630 square feet in size) since it is within this zone that the rare plants Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*) and western sand spurry (*Spergularia canadensis* var. *occidentalis*) occur, whereas the remainder of the affected marsh is occupied by dense, nearly monotypic stands of the invasive weed dense-flowered cordgrass, *Spartina densiflora* (classified as *Spartina* marsh per Eicher 1987). Thus, although approximately 2880 square feet of coastal salt marsh habitat was heavily trampled during emergency frac-out clean up activities, the majority of the affected area is dominated

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by dense-flowered cordgrass, which is not worthy of restoration efforts due to its non-native status, poor habitat value, and affinity for disturbance (Clifford 2002).

Figure 1
Sketch Map
PG&E's HDD G/L 137B Crossing of Freshwater Slough Project
Frac-Out Containment/Clean-up
Wetland Restoration Site

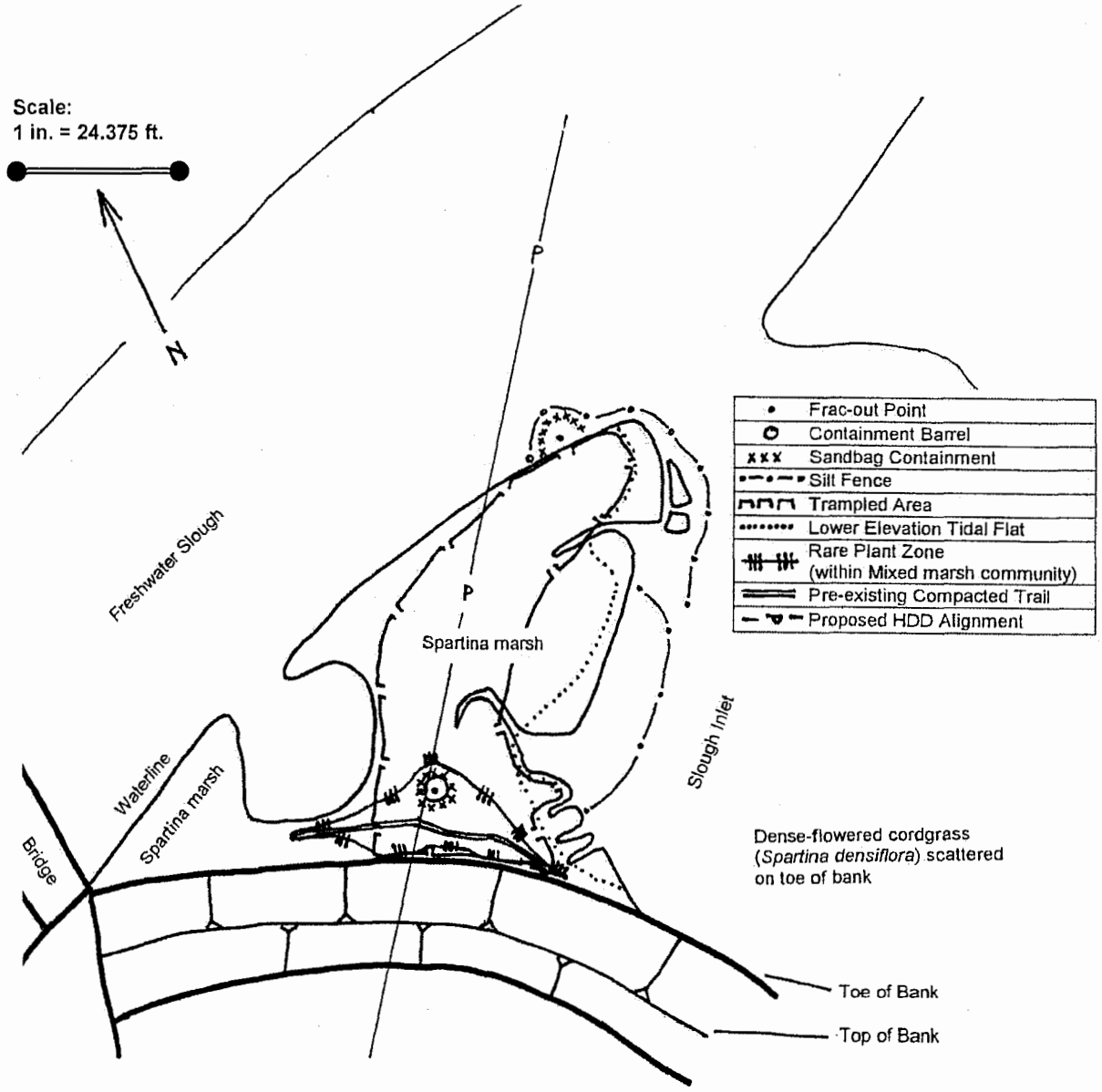

Figure 1. Sketch map of the coastal salt marsh within the project area showing frac-out site, placement of containment/clean-up materials, and the rare plant zone within the mixed marsh community. Note that while the majority of the overall trampled area is within the *Spartina* marsh community, the majority of the rare plant zone was impacted both by drilling mud leakage and trampling (see Table 2). Silt fences delineate the approximate extent of drilling mud spillage in the tidal flat zone.

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3. Purpose of Wetland Restoration Plan

a. Description of Disturbance

On August 29, 2005 at approximately 10:00 a.m., while HDD operations were in progress on the south side of Freshwater Slough, the on-site biological monitor (Elaine Nolan of NRM Corp., Eureka, CA) spotted a frac-out (i.e., leakage of drilling mud into the environment) in the salt marsh near the dike (see Figure 1). Boring operations were immediately halted (and have been ever since) and spill clean-up procedures began (following PG&E 2005a), including strategically placing 50-gallon barrels, sand bags berms, and silt fences for containment of drilling mud, and vacuuming it up. Drilling mud did not dissolve or widely disperse into the water, but instead "gelled" or coagulated into a mass that sank to the mudflat and stayed in place. The mud did not move with the tide, and did not get suspended in the water and mobilize out past the silt fences. The fact that it gelled and stayed in place allowed it to be vacuumed up so completely. It is estimated that up to 200 gallons of drilling mud leaked into the environment and that 80 to 90 percent of it was cleaned up by the time of final vacuuming, at around 2:30 p.m. (see Biological Monitor's data forms for 8/29/05, attached). Photos of the frac-out area and clean up activities are attached (Appendix).

b. Regulatory Requirements

The affected wetlands fall under the regulatory jurisdiction of the U.S. Army Corps of Engineers (Section 404 of the Clean Water Act and Section 10 of the River and Harbors Act), the U.S. Department of Commerce, NOAA (Section 7 of the Endangered Species Act and Section 402 of the CWA), California Coastal Commission (Chapter 3 of the Coastal Act), the California Department of Fish and Game (Section 1603 of the Fish and Game Code), and the California Regional Water Quality Control Board (Section 401 of the Clean Water Act, Water Quality Certification).

The Coastal Development Permit for the project (#1-04-010) specified the following:

> *"Following discovery of the spill or accidental discharge of drilling fluids, the permittee shall submit to the Executive Director a revised project and restoration plan prepared by qualified professional(s) that provides for...restoration of the area(s) affected by the spill or accidental discharge to pre-project conditions. The revised...restoration plan shall be consistent with any applicable requirements of the...California Department of Fish and Game..."*

4. Description of Affected Wetlands Pre-Disturbance

The wetland restoration area (i.e., "Rare Plant Zone" in Figure 1) is located in coastal salt marsh habitat, specifically within the "mixed marsh community" (Eicher 1987), which also may be classified as Salt Grass series and/or Pickleweed series (Sawyer & Keeler-Wolf 1995). This type of salt marsh is relatively high in elevation and is the most vegetatively diverse, containing up to 22 species with none having more than 25 percent cover (Eicher 1987; Clifford 2002). Species characteristic of the mixed marsh community at the wetland restoration site include pickleweed (*Salicornia virginica*), jaumea (*Jaumea carnosa*), salt grass (*Distichlis spicata*), arrow-grass (*Triglochin maritima*), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*, a CNPS List 1B species), western sand spurry (*Spergularia canadensis* var. *occidentalis*, a CNPS List 2 species), sea lavender (*Limonium californicum*, a species not listed as rare, but it reaches its northern limit in this region), dense-flowered cordgrass, and a suite of other species (NRM 2003).

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Botanical surveys were conducted in the coastal salt marsh in 2003, 2004, and 2005 (see NRM 2003 and memorandums to Jesus Viscarra of PG&E dated 7/19/04 and 7/11/05). Table 1 shows estimates of the number of Humboldt Bay owl's-clover and western sand spurry plants over the past three years.

Table 1. Estimated number of Humboldt Bay owl's clover and western sand spurry plants in the coastal salt marsh at the Freshwater Slough frac-out site from 2003 through 2005.*

Botanical Survey Dates (in coastal salt marsh)	Humboldt Bay owl's-clover (# of inflorescences)	Western sand spurry (# of individuals)
2003 (6/23 & 8/26)	300	75
2004 (5/19 & 6/9)	1200	1000
2005 (5/18 & 7/11)	1200	350

*Note: The variation in population numbers from year to year may be due to either species phenology relative to survey date (i.e., surveys conducted relatively late) or natural fluctuation in population numbers, which is not uncommon for annual species such as these.

The mixed marsh community is restricted to an area of approximately 630 square feet in the higher elevation salt marsh (see Figure 1). The remainder of the salt marsh peninsula (including the additional ~2280 sq. ft. area of salt marsh affected by the frac-out) is classified as *Spartina* marsh (Eicher 1987) or Cordgrass series (Sawyer & Keeler-Wolf 1995), which is dominated by dense-flowered cordgrass with lesser amounts of arrow-grass, salt rush (*Juncus leseurii*), pickleweed, and a few other species. Dense-flowered cordgrass is an invasive weed native to Chile that is believed to have been introduced to the Humboldt Bay region via ship ballast during the lumber trade with Chile in the mid 1800s.

5. Description of Affected Wetlands Post-Disturbance

Immediately following the frac-out and clean up activities, approximately 2880 square feet of the approximately 5940 square feet salt marsh (~48%) had been trampled by foot traffic, sand bags, and other clean-up materials. The majority of the trampling occurred within the *Spartina* marsh community, which is dominated by the highly invasive weed dense-flowered cordgrass (see Figure 1). The remainder of the affected area (~600 square feet), including the point where the frac-out occurred, is within the much more diverse and sensitive mixed marsh community, which was documented as being relatively free of dense-flowered cordgrass (see NRM 2003). Despite vacuuming efforts, drilling mud remains coated on vegetation covering an area of approximately 30 square feet within the mixed marsh community. Table 2 summarizes the different areas affected by the frac-out and clean up activities.

Table 2. Summary of salt marsh types affected by the frac-out and associated clean up activities.

Frac-out area	Size (sq. ft.)	Percent of entire salt marsh area	Notes
Salt marsh peninsula	~5940	100	Composed primarily of *Spartina* marsh, except for ~630 sq ft. of mixed marsh with rare plants
Affected *Spartina* marsh	~2280	~38	Most of the affected area is *Spartina* marsh.
Affected mixed marsh	~600	~10	Most of the mixed marsh area was affected.

6. Wetland Impacts

Direct effects of the frac-out on the coastal salt marsh include spillage of drilling mud (made from bentonite, water, and polymer viscosifier, a drilling mud additive) into the slough inlet and onto vegetation within the mixed marsh community as well as heavy trampling of vegetation (in both the mixed marsh and *Spartina* marsh communities) by foot traffic, sand bags, and other clean-up materials. Aquatic toxicity of the drilling mud ingredients is not known, but according to the Material Safety Data Sheets for bentonite and the drilling mud additive, they appear to be relatively benign (see PG&E 2005b). Furthermore, the relatively small-scale spill followed by rapid containment and clean up of the tidal flat (within a single high-low tidal cycle) is not likely to have changed the pH or other water quality parameters to a significant degree to be harmful to fish (D. Halligan, NRM fisheries biologist, pers. comm., September 6, 2005). However, it is likely that small aquatic organisms such as polychaetes living in the affected tidal flats were harmed or killed either by the drilling mud itself or during clean-up activities (i.e., vacuuming and/or trampling) during low tide. Because these organisms are known to have relatively rapid recolonization rates (Bolam & Whomersley 2003), it is not likely that this impact will have a lasting effect on the benthic ecosystem or greater food web.

The effects of trampling on salt marsh vegetation include disrupting the dense vegetation and root systems, potentially destroying delicate succulents such as pickleweed. Another effect of trampling is the creation of depressions where tidal water can pool. Such pools may form habitat for biting insects (e.g., mosquitoes) or other plant species that are more tolerant of waterlogging and lowered salinity (Laegdsgaard 2005). Trampling also introduces gaps where weeds can establish, which can affect the dynamics of salt marsh communities (e.g., transforming a mixed marsh community to a *Spartina* marsh community). According to one source (Laegdsgaard 2005), in areas where trampling is high, regeneration of salt marsh plants is generally slow.

7. Characteristics, Functions, and Values of Affected Wetlands

The wetlands that were impacted by the frac-out and related clean up activities are classified by the U.S. Fish and Wildlife Service (Cowardin *et al.* 1979) as Estuarine Intertidal Emergent Persistent wetlands (E2EM3, coastal salt marsh/tidal marsh) and Estuarine Intertidal Streambed Mud wetlands (E2SB5, Freshwater Slough). These are tidally influenced areas that, in the latter case are characterized by the presence of erect, rooted, herbaceous hydrophytes, and in the former case are not vegetated due to the effect of regular scouring by moving water.

The value of salt marshes to the estuarine ecosystem is widely recognized, as salt marshes are a part of a larger, complex system that includes brackish marshes at their upland ecotone, mudlfats, subtidal channels, and eelgrass (*Zostera marina*) beds. Freshwater inputs from creeks bring sediments and nutrients, as do ocean waters that circulate through the Humboldt Bay region twice daily during diurnal tidal cycles (see A. Pickart article at http://northcoastcnps.org/saltmars.htm).

Salt marshes in general perform many functions valuable to human beings, including the following:

(1) Salt marshes are a major producer of detritus and provide nursery grounds for numerous commercially and recreationally important species.

(2) Salt marshes serve as filters to remove sediments and toxins from the water; salt marsh plants break down many pollutants into less harmful forms.

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(3) Salt marshes act as buffers for the mainland by slowing and absorbing storm surges, thereby reducing erosion of the coastline.

(4) Salt marshes are habitat for numerous plant and animal species, including many species listed as rare or sensitive.

(5) Salt marshes have scenic and aesthetic value as well.

Rare Plant Species in the Wetland Restoration Area

Humboldt Bay owl's-clover is listed as CNPS as 1B with an R-E-D code of 2-2-3, meaning that it is distributed in a limited number of occurrences in California, is fairly endangered in California, and is endemic to California (CNPS 2001). According to one source (Hickman 1993), the taxon is known from only Humboldt and Marin Counties, but according to another (CNPS 2001) it is also known from Mendocino County. The CNDDB (April 2005) has records for 18 post-1960 occurrences totaling tens of thousands of individuals. The majority of these occur around the coastal salt marsh habitat of Humboldt Bay and the mouth of the Eel River, while one occurrence is recorded for Point Reyes National Seashore. Threats to the species are largely from coastal development (CNPS 2001), but habitat loss to dense-flowered cordgrass may also be a threat (Clifford 2002).

Humboldt Bay owl's-clover plants typically occur in the mixed marsh vegetation type, which is a subtype of coastal salt marsh habitat occurring at average tidal elevations of 7.3 ft MLLW (mean low low-water) (Eicher 1987). The lower tidal elevation vegetation types of *Salicornia* marsh (below 6.9 ft MMLW) and *Spartina* marsh (6.9-7.3 MMLW) tend to harbor less species diversity than the mixed marsh type, and they tend to lack Humboldt Bay owl's-clover (Eicher 1987).

Humboldt Bay owl's-clover is a facultative hemiparasitic annual herb of the snapdragon family (Scrophulariaceae). Hemiparasites produce food through photosynthesis but parasitize additional nutrients from host species by means of root-like haustoria. In the case of Humboldt Bay owl's-clover, it is hypothesized that various species may serve as its host, and plants may even be capable of surviving in the absence of a host (Eicher 1994 as cited in City of Eureka 2001).

Western sand spurry is listed as CNPS 2 with an R-E-D code of 3-3-1, meaning its distribution is highly restricted in California and it is seriously endangered in California, but it is more or less widespread outside of the state (CNPS 2001). In California, it is known only from coastal salt or brackish marsh habitat areas around Humboldt Bay. The CNDDB (April 2005) has three records for the species, but it does not give an estimate of total number of individuals.

Western sand spurry is an annual plant of the pink family (Caryophyllaceae). Given the fact that population size and structure in annual species generally tend to vary from year to year, it is reasonable to assume that the number and/or specific locality of western sand spurry plants (and Humboldt Bay owl's-clover plants) in the area next year will differ from this year's number and/or specific locality of plants (as in Table 1 above).

8. Recommendations

In accordance with specifications outlined in the Coastal Development Permit (see Section 3-b above), the recommendations presented here have been developed in consultation with CDFG (phone consultation between Melissa Brooks of NRM and Craig Martz and Bruce Webb of CDFG, Redding on August 31 and September 23, 2005).

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Monitoring of the rare plant populations (Humboldt Bay owl's-clover and western sand spurry) on the salt marsh peninsula (as shown in Figure 1) is the primary recommendation at this time. Monitoring specifications are as follows:

1. Monitoring shall be conducted by a qualified botanist or plant ecologist and shall occur during peak blooming periods of the two rare plant species (usually April or May for Humboldt Bay owl's-clover and June or July for western sand spurry, but phenology varies from year to year).
2. Field data collected during monitoring shall include the following:
    a. Number of Humboldt Bay owl's-clover inflorescences on the salt marsh peninsula;
    b. Number of western sand spurry individuals on the salt marsh peninsula;
    c. Phenology (% flowering, % fruiting, and % vegetative) of Humboldt Bay owl's-clover and western sand spurry plants at the time of the survey;
    d. Approximate distribution of Humboldt Bay owl's-clover and western sand spurry individuals on the salt marsh peninsula, using Figure 1 as a base map. For example, if rare plants are noted outside of the "rare plant zone" as shown on Figure 1, map their distribution outside of this area. Likewise, if rare plants are restricted to only a portion of the "rare plant zone" as shown on Figure 1, map their distribution within this area;
    e. Estimated percent cover of dense-flowered cordgrass within the rare plant zone (Note: There are no data on this from past years, but it was noted that the rare plant zone, though surrounded by dense-flowered cordgrass on all sides, was itself relatively free of the species at the time of the frac-out.);
    f. Overall list of vascular plant species noted on the salt marsh peninsula;
    g. General description of the vegetation types on the salt marsh peninsula (per Eicher 1987), using Figure 1 as a base. Note whether there has been any change in the general distribution of vegetation types (*Spartina* marsh and mixed marsh), as they are shown on Figure 1, and if so, map the change (e.g., *Spartina* marsh may encroach into mixed marsh community);
    h. Notes on whether the vegetation within the trampled area (as shown on Figure 1) has recovered; include species composition and percent cover within trampled area;
    i. Photo-documentation of the salt marsh area, including the rare plant zone and trampled area, as shown on Figure 1 (and in attached photos);
    j. Name of monitor/surveyor;
    k. Date of monitoring/survey;
    l. Number of field-survey-hours.
3. Monitoring results shall be submitted annually, within 45 days from completion of the annual rare plant surveys, to CDFG (Bruce Webb and/or Craig Martz, or successor(s), at the Streambed Alteration Office of CDFG in Redding), Coastal Commission, and/or other agencies, as applicable.
4. After agency review of annual monitoring results, PG&E (and hired botanical consultant, if applicable) and CDFG (Bruce Webb and/or Craig Martz, or successor(s), at the Streambed Alteration Office of CDFG in Redding) shall meet and confer as to appropriate actions to be taken based on monitoring results (e.g., remedial actions, further monitoring, etc.). This

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meeting shall take place each and every year throughout the monitoring period following agency review of monitoring results.

5. Monitoring shall be conducted annually for up to five years, if necessary, as determined by CDFG, Coastal Commission, and/or other agencies, as applicable.

6. If at least 900 Humboldt Bay owl's-clover inflorescences and at least 475 western sand spurry individuals (Table 1 averages) are estimated to be present during monitoring surveys, only a single additional year of monitoring is required. Notification of monitoring termination shall be given to PG&E, by CDFG, Coastal Commission, and/or other agencies, as applicable, in writing by March 1 of the year immediately following the previous year's final monitoring results.

7. If less than 900 Humboldt Bay owl's-clover inflorescences and/or less than 475 western sand spurry individuals are estimated during any monitoring year, CDFG (and/or other agencies, as applicable) may request that specific remedial actions be taken. Remedial action measures may include either or both of the following (or, potentially other measures not listed here):

   a. **Manual removal of *Spartina densiflora*:** If dense-flowered cordgrass has encroached into the mixed marsh community and potentially affected population sizes of Humboldt Bay owl's-clover and/or western sand spurry, the invasive weed shall be manually eradicated from the mixed marsh community. Appropriate agency personnel and/or experts in *Spartina* removal techniques (e.g., Andrea Pickart, Ecologist, Humboldt Bay National Wildlife Refuge) shall be consulted prior to implementing this remedial action measure.

   b. **Reseeding:** Seeds of Humboldt Bay owl's-clover and/or western sand spurry (as needed) shall be obtained from a local population (Humboldt Bay region) in consultation with CDFG, U.S. Fish and Wildlife Service, and/or other agencies, as appropriate. Appropriate agency personnel and/or experts in salt marsh restoration (e.g., Andrea Pickart, Ecologist, Humboldt Bay National Wildlife Refuge) shall be consulted on all matters pertaining to seed collection site access, seed storage, appropriate seed and seedbed preparation, and sowing techniques prior to implementing this remedial action measure.

8. If after monitoring and remedial actions have been conducted and recovery efforts have still not been successful, it may be necessary to produce a new wetland restoration plan/remedial action plan, developed in consultation with CDFG, Coastal Commission, and/or other agencies, as applicable.

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10. Attachments

- Photos (10) documenting the frac-out and clean up activities (Appendix)
- Biological Monitor's daily data forms (5) for 8/29/05 (Attached)
- Site Plan for PG&E's Freshwater Slough Gas Line Replacement Project (Attached)

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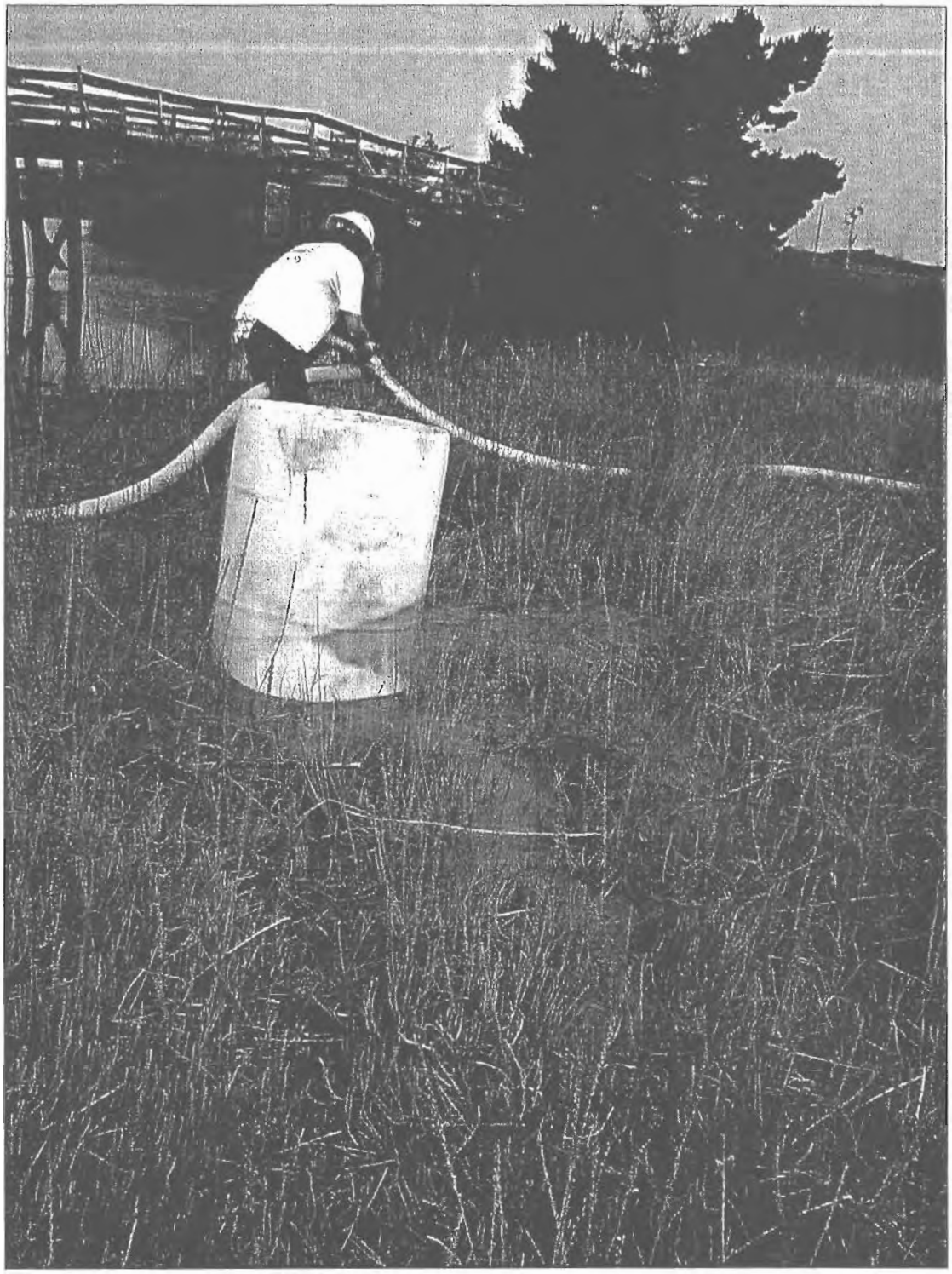

Photo 1. This photo is taken from within the mixed marsh community showing pools of drilling mud, a containment barrel around the frac-out site, and a member of the clean up crew working on vacuuming.

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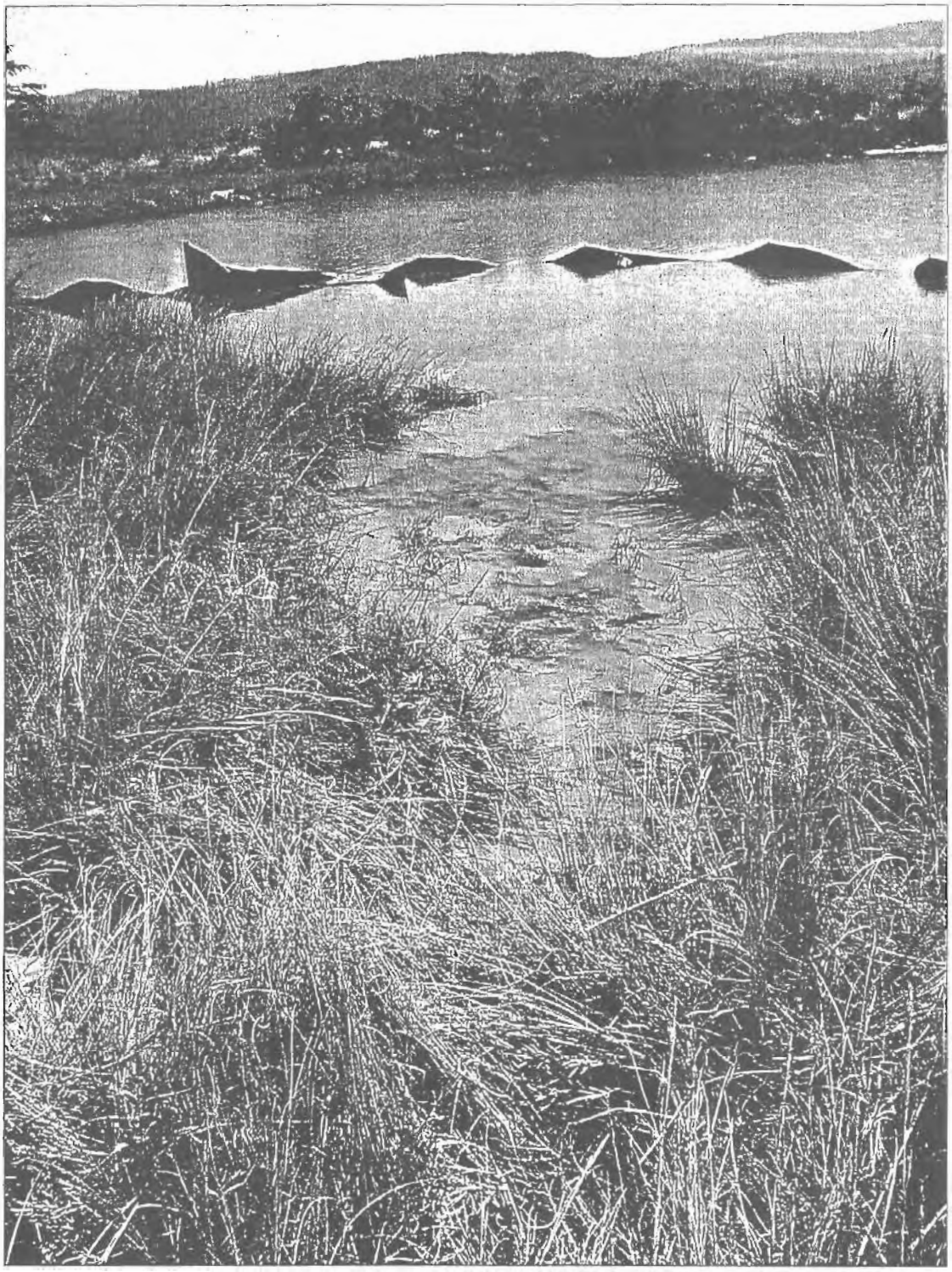

Photo 2. Drilling mud leakage down a small channel through the *Spartina* marsh and out into the slough inlet during high tide (see Figure 1).

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Photo 3. During an early phase of clean up, there is still abundant drilling mud pooled in the rare plant zone.

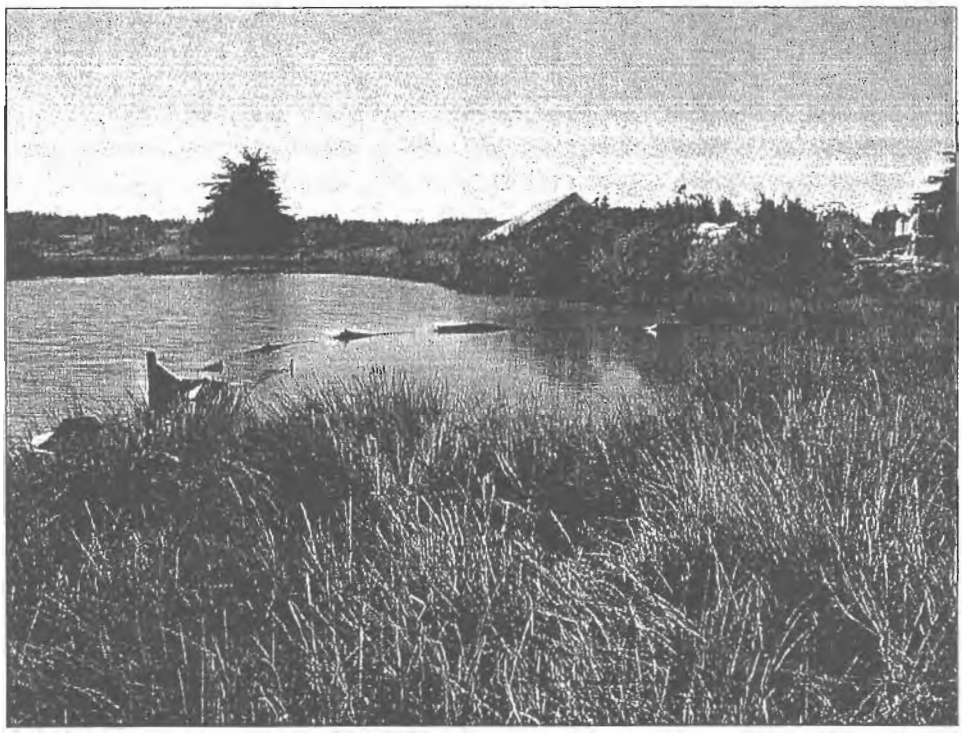

Photo 4. Looking across the *Spartina* marsh (looking south) at the silt fence containment area during high tide.

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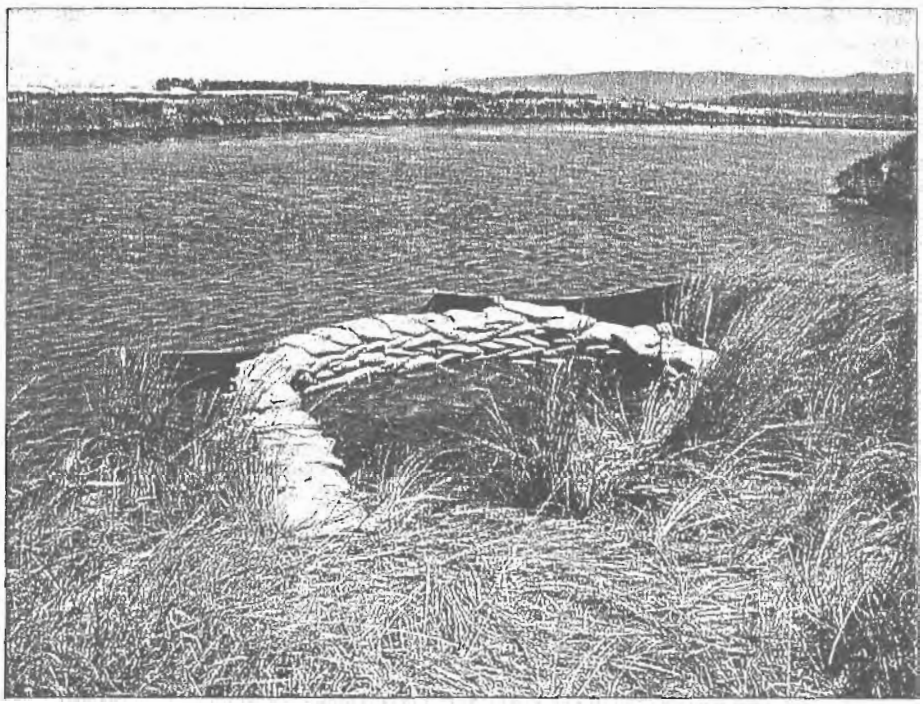

Photo 5. Silt fence and sand bag containment area at the northern tip of the salt marsh peninsula during high tide.

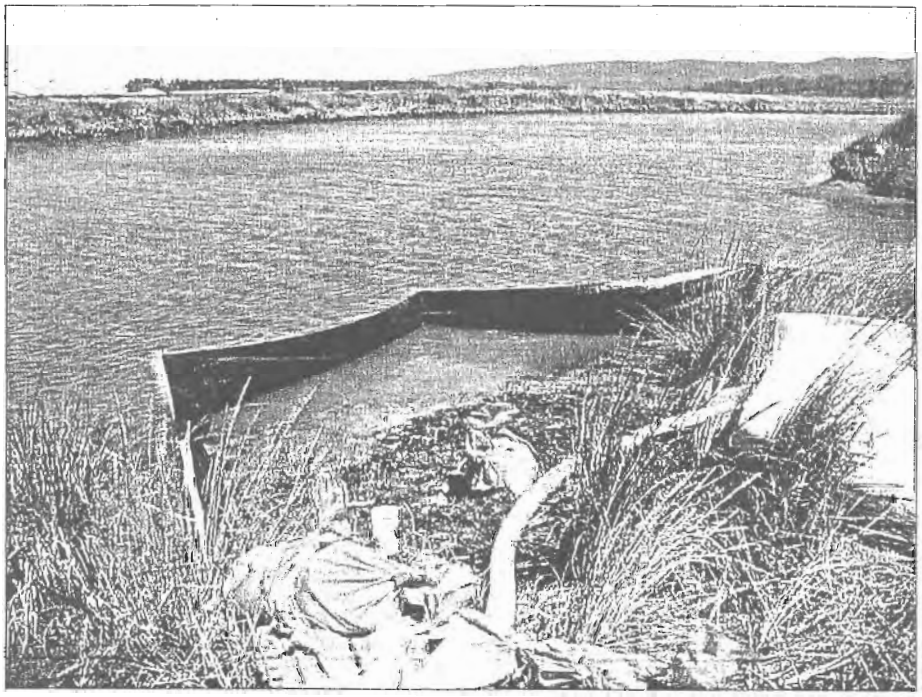

Photo 6. Same area during a lower tide, after vacuuming and clean up (note dark gray Bay mud exposed after vacuuming).

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Photo 7. Vacuuming drilling mud out of the small channel that leads to the slough inlet. Note the trampled "rare plant zone" (from Figure 1) in the foreground with its residual coating of drilling mud.

Photo 7. Detail of drilling mud in small channel.

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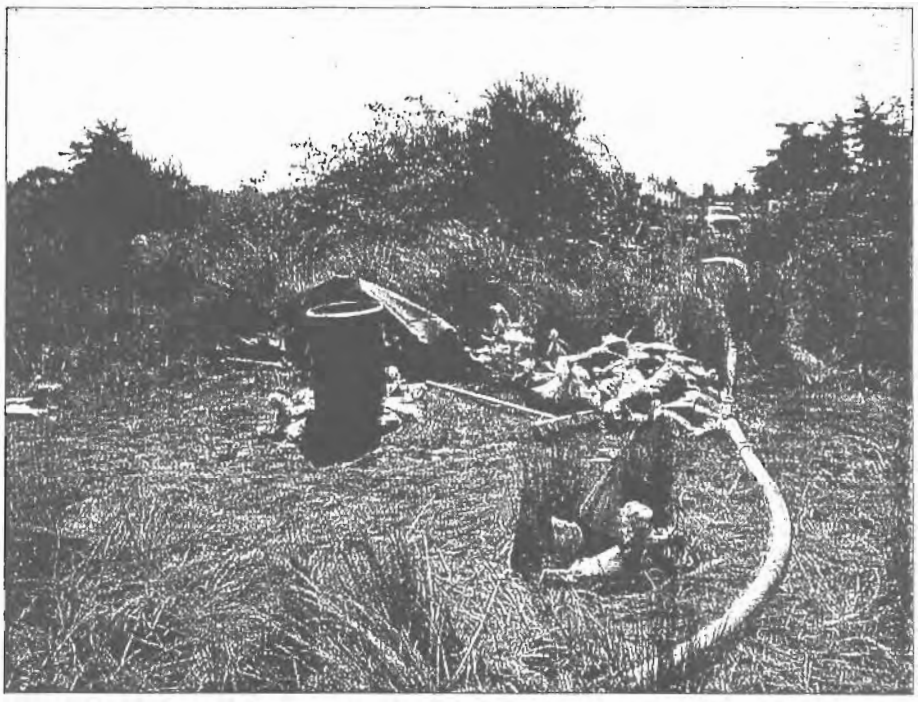

Photo 9. Looking south at the trampled rare plant zone. Containment barrel and sand bags surround frac-out site.

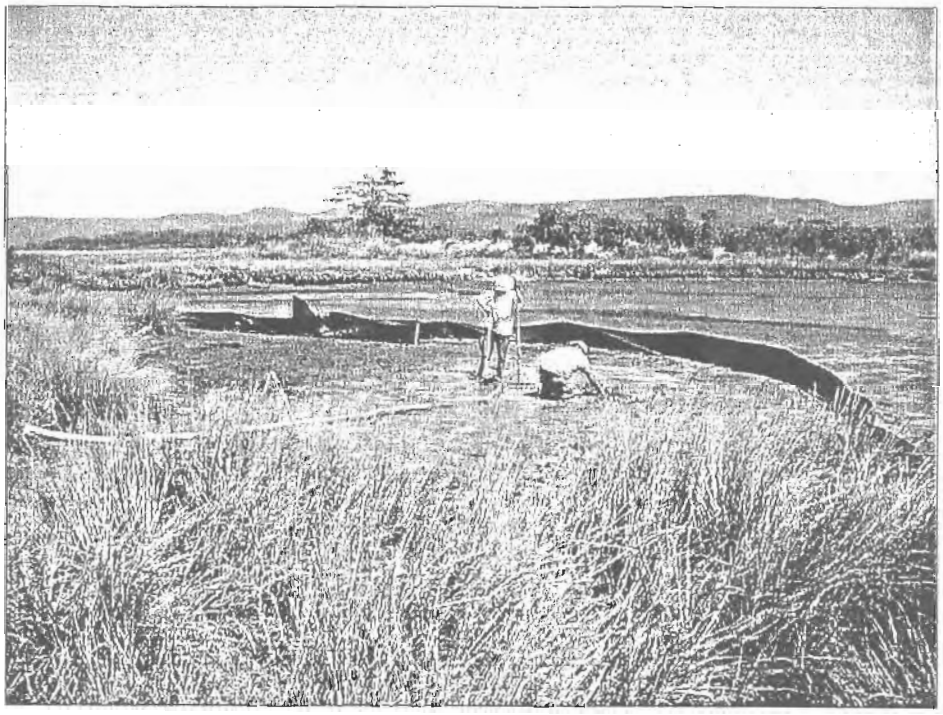

Photo 10. Final vacuuming of the silt fence area on the southeast side of the peninsula at low tide (approximately 2:30 pm.).

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1434 Third Street • Eureka, CA • 95501-0682
707 442-1735 • fax: 707 442-8823
Email: nrm@nrmcorp.com
Web: www.nrmcorp.com

July 20, 2006

Bruce Webb and/or Craig Martz
California Department of Fish and Game
Streambed Alteration Program
Northern California, North Coast Region (R1)
601 Locust Street
Redding, CA 96001

Re: Monitoring results for PG&E's "frac-out" site in coastal salt marsh habitat on Freshwater Slough, Humboldt County, California

Dear Sirs,

This letter summarizes the results of the first year of monitoring following the August 29, 2005 "frac-out" (*i.e.*, leaking of bentonite drilling fluid) that occurred on coastal salt marsh habitat on Freshwater Slough during the Pacific Gas and Electric Company's horizontal directional drilling operations for a gas pipeline replacement project. Per the approved wetland restoration plan prepared for the incident (see NRM October 18, 2005), PG&E is required to conduct multi-year monitoring of the area to assess whether or not the frac-out and its associated cleanup activities negatively impacted occurrences of two rare plant species in the salt marsh - Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*) and western sand spurry (*Spergularia canadensis* ssp. *occidentalis*).

Annual monitoring was conducted on May 30 and July 11, 2006, which corresponded with the blooming times for Humboldt Bay owl's-clover and western sand spurry, respectively. Monitoring data and mapping were collected in accordance with specifications in the wetland restoration plan (NRM 2005).

Monitoring results are presented below as outlined in the wetland restoration plan (NRM 2005), and a sketch map is shown in Figure 1 (Appendix A, attached). In summary, vegetation in the area appears to have mostly recovered from frac-out trampling, but numbers of Humboldt Bay owl's-clover inflorescences and western sand spurry individuals were estimated to be less this year than in 2004 and 2005 (but more than in 2003). Estimated numbers were below target thresholds for each species as specified in NRM (2005). However, evidence of recent cattle grazing was noted in the rare plant zone (see photos, Appendix C, attached), so it is impossible to determine whether numbers of plants were negatively affected by the frac-out, by the grazing, by a combination of both, or simply due to natural fluctuation in population size as is typical of annual plants.

No remedial actions are recommended at this time since (1) no dense-flowered cordgrass (*Spartina densiflora*) removal from the rare plant zone is needed, and (2) no reseeding of the rare species is needed due to the presence of several hundred inflorescences/individuals of each in the area. At least two additional years of monitoring are recommended.

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Attachment C

2006 MONITORING RESULTS

a. Number of Humboldt Bay owl's-clover inflorescences on the salt marsh peninsula: ~650

b. Number of western sand spurry individuals on the salt marsh peninsula: ~325

c. Phenology (% flowering, % fruiting, and % vegetative) of Humboldt Bay owl's-clover (100, 0, 0) and western sand spurry (65, 0, 35) plants at the time of the surveys

d. Approximate distribution of Humboldt Bay owl's-clover and western sand spurry individuals on the salt marsh peninsula, using Figure 1 as a base map. For example, if rare plants are noted outside of the "rare plant zone" as shown on Figure 1, map their distribution outside of this area. Likewise, if rare plants are restricted to only a portion of the "rare plant zone" as shown on Figure 1, map their distribution within this area: Both Humboldt Bay owl's-clover and western sand spurry were well distributed throughout the rare plant zone as they have been in previous years. Additionally, Humboldt Bay owl's-clover was noted in an area where it has not been seen in past years, on the central-western portion of the peninsula. This area probably was not affected by the frac-out or associated clean-up activities. It is possible that plants occurred in this area in past years but were overlooked. The western sand spurry does not appear to have expanded its distribution outside of the rare plant zone. See Figure 1, Appendix A (attached)

e. Estimated percent cover of dense-flowered cordgrass within the rare plant zone (Note: There are no data on this from past years, but it was noted that the rare plant zone, though surrounded by dense-flowered cordgrass on all sides, was itself relatively free of the species at the time of the frac-out.): 10. The dense-flowered cordgrass does not appear to have increased its cover within the rare plant zone.

f. Overall list of vascular plant species noted on the salt marsh peninsula: See Appendix B

g. General description of the vegetation types on the salt marsh peninsula (per Eicher 1987), using Figure 1 as a base. Note whether there has been any change in the general distribution of vegetation types (*Spartina* marsh and mixed marsh), as they are shown on Figure 1, and if so, map the change (e.g., *Spartina* marsh may encroach into mixed marsh community): The only possible change in vegetation may be the additional mixed marsh habitat on the central-western side of the peninsula where approximately 150 Humboldt Bay owl's-clover inflorescences were noted. See Figure 1, Appendix A (attached)

h. Notes on whether the vegetation within the trampled area (as shown on Figure 1) has recovered; include species composition and percent cover within trampled area: Vegetation in the area appears for the most part to have recovered. However, there was some vegetation patchiness in the rare plant zone, which may have been due to recent cattle grazing in the area (see photos, Appendix C), which has not been noted in past years. Cow hoof prints as well as grazed vegetation (*Juncus lesueurii*) were noted in the area.

i. Photo-documentation of the salt marsh area, including the rare plant zone and trampled area, as shown on Figure 1 (and in attached photos): See photos, Appendix C (attached)

j. Name of monitor/surveyor: Melissa Brooks Kraemer, NRM Corp. (Eureka, CA)

k. Date of monitoring/survey: May 30 and July 11, 2006

l. Number of field-survey-hours: ~2

DISCUSSION

For comparative purposes, this year's monitoring data has been added to the below table (Table 1 from NRM 2005):

Table 1. Estimated number of Humboldt Bay owl's clover and western sand spurry plants in the coastal salt marsh at the Freshwater Slough frac-out site from 2003 through 2006.*

Botanical Survey Dates (in coastal salt marsh)	Humboldt Bay owl's-clover (estimated # of inflorescences)	Western sand spurry (estimated #-of individuals)
2003 (6/23 & 8/26)	300	75
2004 (5/19 & 6/9)	1200	1000
2005 (5/18 & 7/11)	1200	350
2006 (5/30 & 7/11)	650	325

*Note: The variation in population numbers from year to year may be due to either species phenology relative to survey date (*i.e.*, surveys conducted relatively late) or natural fluctuation in population numbers, which is not uncommon for annual species such as these. 2006 numbers may also have been affected by the frac-out and/or cattle grazing in the area.

The wetland restoration plan (NRM 2005) specifies threshold values of at least 900 Humboldt Bay owl's-clover inflorescences and at least 475 western sand spurry individuals. If the number of plants estimated during monitoring falls below the target thresholds for either species, remedial actions may be appropriate, as specified in the plan.

Although this year's estimates for each rare species fall below the target thresholds, remedial action measures are not recommended at this time for the following reasons:

1. Both Humboldt Bay owl's-clover and western sand spurry are annual species, and the population sizes of annual species tend to fluctuate from year to year depending on environmental variables. It is possible that the severity of winter weather (both higher than usual rain and flows and colder than usual temperatures) contributed to a "bad" year for the species in the area.

2. There was clear evidence of recent cattle grazing within the salt marsh (specifically within the mixed marsh community where the rare plants occur), so numbers of plants in the area may have been affected by recent cattle grazing rather than (and/or in addition to) last year's frac-out.

3. The remedial measures recommended in the restoration plan (NRM 2005), which include manual removal of *Spartina densiflora* and/or reseeding the rare species, are not applicable or appropriate for the area since the *Spartina* has not noticeably colonized the mixed marsh community since the frac-out (see Figure 1, Appendix A) and since hundreds of inflorescences/individuals of the two rare species are estimated to be present in the area (and thus will continue to reseed the area naturally in future years)

4. It is possible that the survey dates did not capture the peak blooming windows for the species and that more inflorescences/individuals may have been counted at a slightly later date (especially for the diminutive, inconspicuous western sand spurry).

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RECOMMENDATIONS

It is recommended that annual monitoring continue for at least another two years (through 2008). This is consistent with recommendations in NRM (2005). Remedial actions may be deemed necessary at a later date.

As specified in the wetland restoration plan (NRM 2005, page 8),

> *"After agency review of annual monitoring results, PG&E (and hired botanical consultant, if applicable) and CDFG (Bruce Webb and/or Craig Martz, or successor(s), at the Streambed Alteration Office of CDFG in Redding) shall meet and confer as to appropriate actions to be taken based on monitoring results (e.g., remedial actions, further monitoring, etc.). This meeting shall take place each and every year throughout the monitoring period following agency review of monitoring results."*

Please contact either myself and/or PG&E representative(s) listed below as soon as possible to discuss appropriate procedures for the wetland restoration area.

Sincerely,

Melissa Brooks Kraemer
Staff Botanist & Wetlands Specialist
Natural Resources Management Corporation
1434 Third Street, Eureka, CA 95501
707/269-1382 (v); 707/442-8823 (f)
Email: botany@nrmcorp.com

cc:

Jesus Viscarra
Terrestrial Biologist
Pacific Gas & Electric Co.
350 Salmon Street
Chico, CA 95928
530/896-4263 (v); 530/896-4266 (f)
Email: JRV8@pge.com

Patricia Sanchez
Permitting Specialist
Pacific Gas & Electric Co.
245 Market Street, mail-code N10A
San Francisco, CA 94403
415/973-8250 (v); 415/973-9250 (f)
Email: PDS9@pge.com

Reference cited:

NRM. October 18, 2005. *Wetland Restoration Plan for Coastal Salt Marsh Habitat Affected by Pacific Gas and Electric Company's Freshwater Slough HDD G/L 137B Project.* Unpublished technical report prepared for PG&E by NRM. Eureka, CA.

Attachments (Appendices A, B, and C)

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APPENDIX A

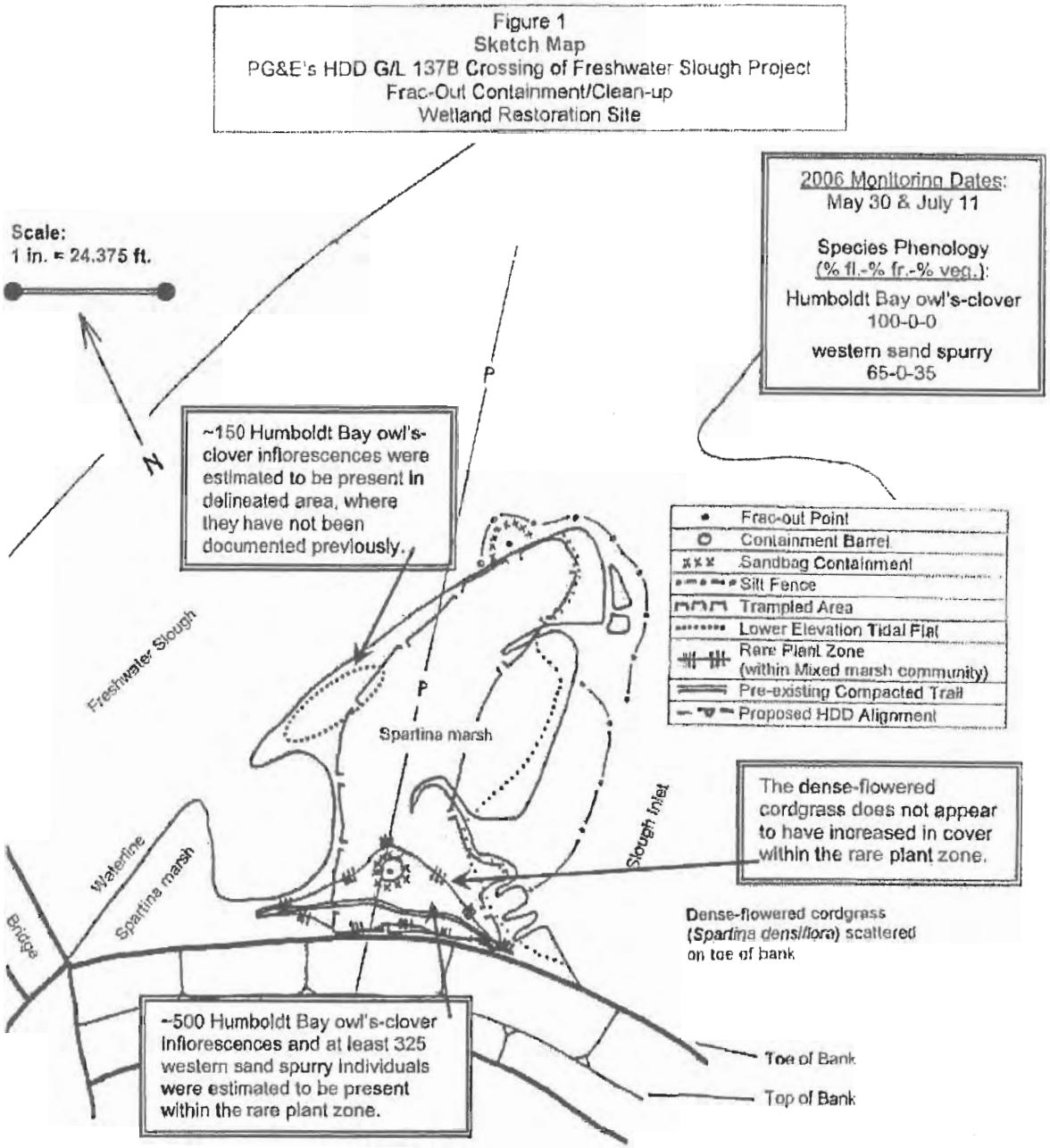

Figure 1. Sketch map of the coastal salt marsh where the frac-out occurred (from NRM 2005) with notes from 2006 monitoring. The vegetation in the trampled area appears to have mostly recovered, though it was difficult to assess whether or not it has fully recovered within the rare plant zone due to recent cattle grazing in the area (see photos, attached).

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APPENDIX B

Overall List of Vascular Plant Species Noted on the Salt Marsh Peninsula (see Fig. 1 above)
Survey Dates: May 30 and July 11, 2006

Shrubs:
Baccharis pilularis coyote brush
Cytisus scoparius Scotch broom
Rubus discolor Himalayan blackberry

Grasses and Graminoids:
Deschampsia caespitosa tufted hair-grass
Distichlis spicata salt grass
Festuca arundinacea tall fescue
Isolepis cernua low bulrush
Juncus effusus common rush
Juncus lesueurii salt rush
Spartina densiflora dense-flowered cordgrass

Other Flowering Herbs:
Castilleja ambigua ssp. *humboldtiensis* Humboldt Bay owl's-clover
Cotula coronopifolia brass-buttons
Jaumea carnosa jaumea
Limonium californicum sea lavender
Plantago maritima maritime plantain
Potentilla anserina silverweed
Salicornia virginica pickleweed
Sonchus oleraceus common sow thistle
Spergularia canadensis ssp. *occidentalis* western sand spurry
Spergularia rubra ruby sand spurry
Triglochin maritima seaside arrow-grass

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APPENDIX C

Photo 1. Site of 2005 frac-out within the mixed marsh community (rare plant zone). Note that the area has revegetated with pickleweed, Humboldt Bay owl's-clover (pink flowers), and other species. But also note the recent evidence of cattle grazing (hoof prints) in the area, which may be responsible for the patchiness of vegetation in some areas. Vegetation in the area also showed evidence of grazing (specifically *Juncus lesueurii*). Also see Photo 5 for a comparison with the same area immediately following the frac-out. Photo taken on May 30, 2006.

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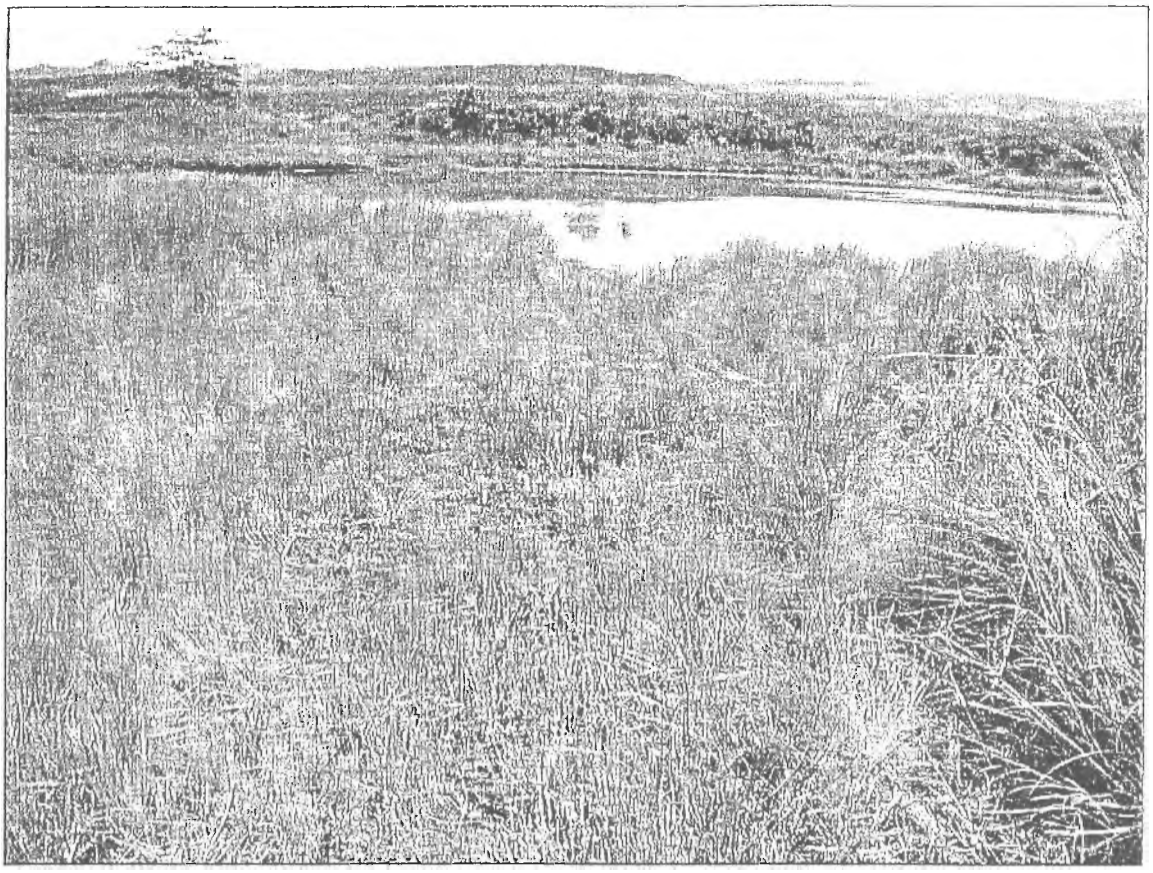

Photo 2. A view, looking approximately east, of the mixed marsh community (rare plant zone) showing several Humboldt Bay owl's-clover flowers (pink) and the recovery of salt marsh vegetation in the area (primarily pickleweed, seaside arrow-grass, salt rush, and salt grass, all of which are native species). The invasive dense-flowered cordgrass does not appear to have increased in cover in the mixed marsh community since the frac-out. Also see Photo 5 for a comparison with the same area immediately following the frac-out. Photo taken on May 30, 2006.

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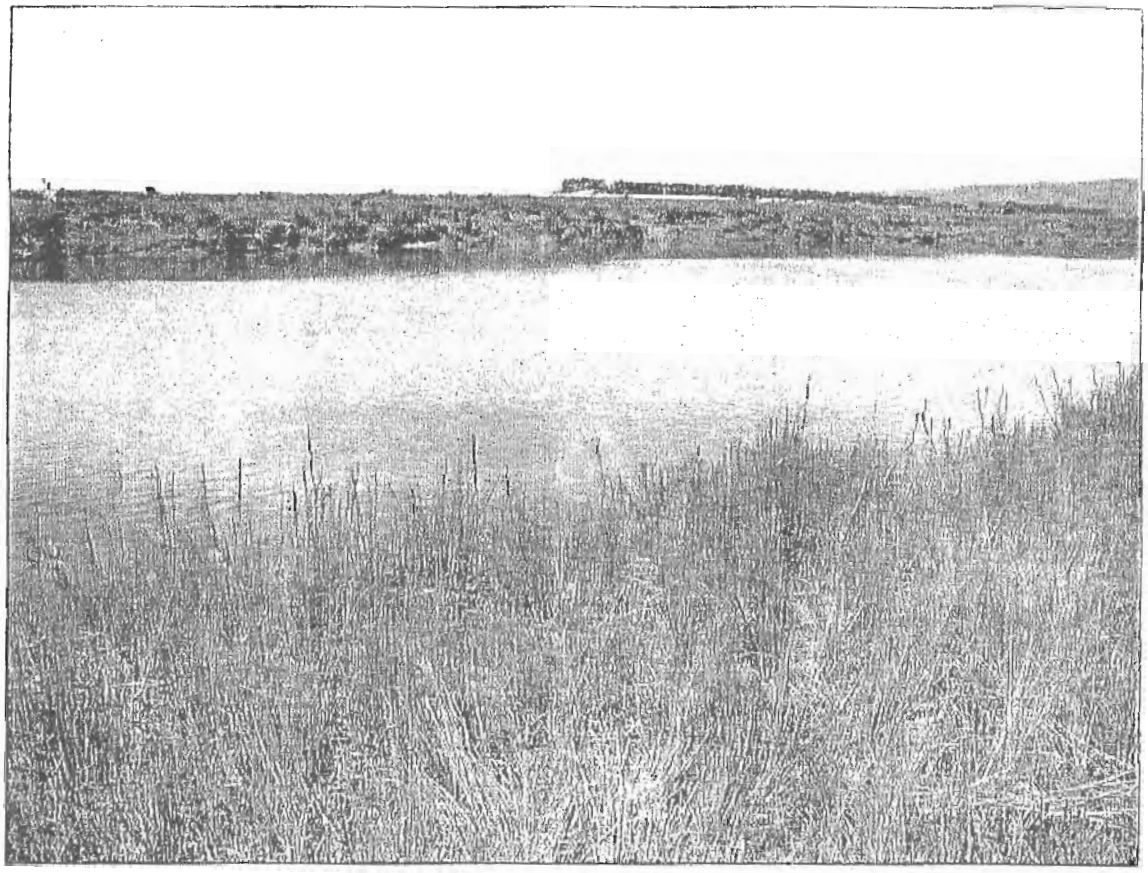

Photo 3. Additional Humboldt Bay owl's-clover plants (pink flowers) occur on the western-central side of the salt marsh peninsula in an area where they have not been documented previously (see Figure 1 for reference). It is possible that the plants were overlooked in the past in this area, or it may be that this is the first year that they have grown in this area (it appears that this area was not trampled during frac-out clean-up activities, but a portion of it may have been at least slightly trampled). Photo taken on May 30, 2006.

Photo 4. Another view (looking approximately southwest) of the mixed marsh community and rare plant zone showing that the frac-out-related trampled vegetation appears to have mostly recovered (compare with Photo 5 below). Photo taken on May 30, 2006.

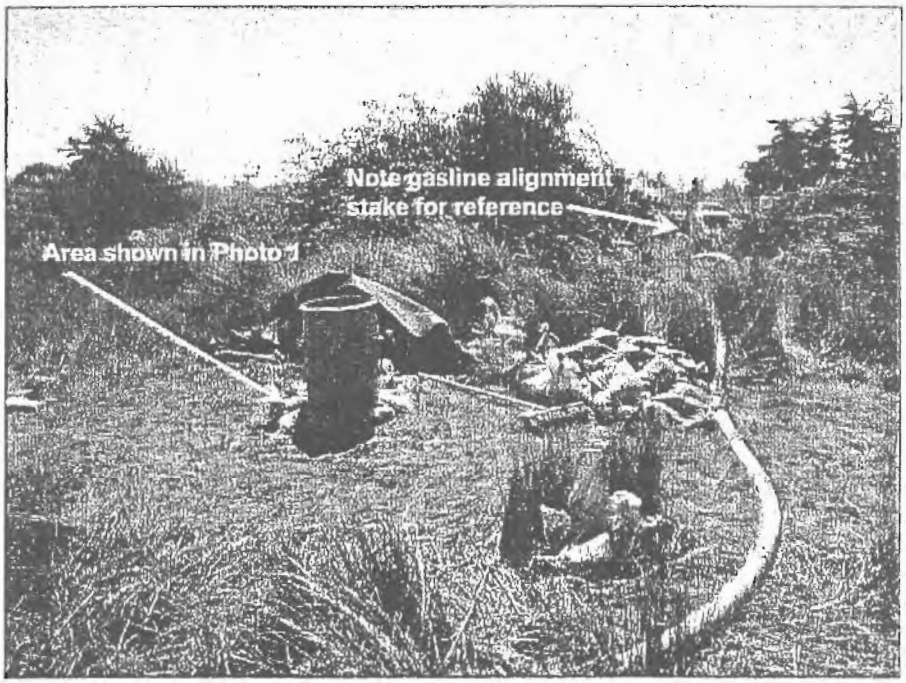

Photo 5. View (looking approximately south) of the mixed marsh community and rare plant zone on the day after the frac-out, August 30, 2005.

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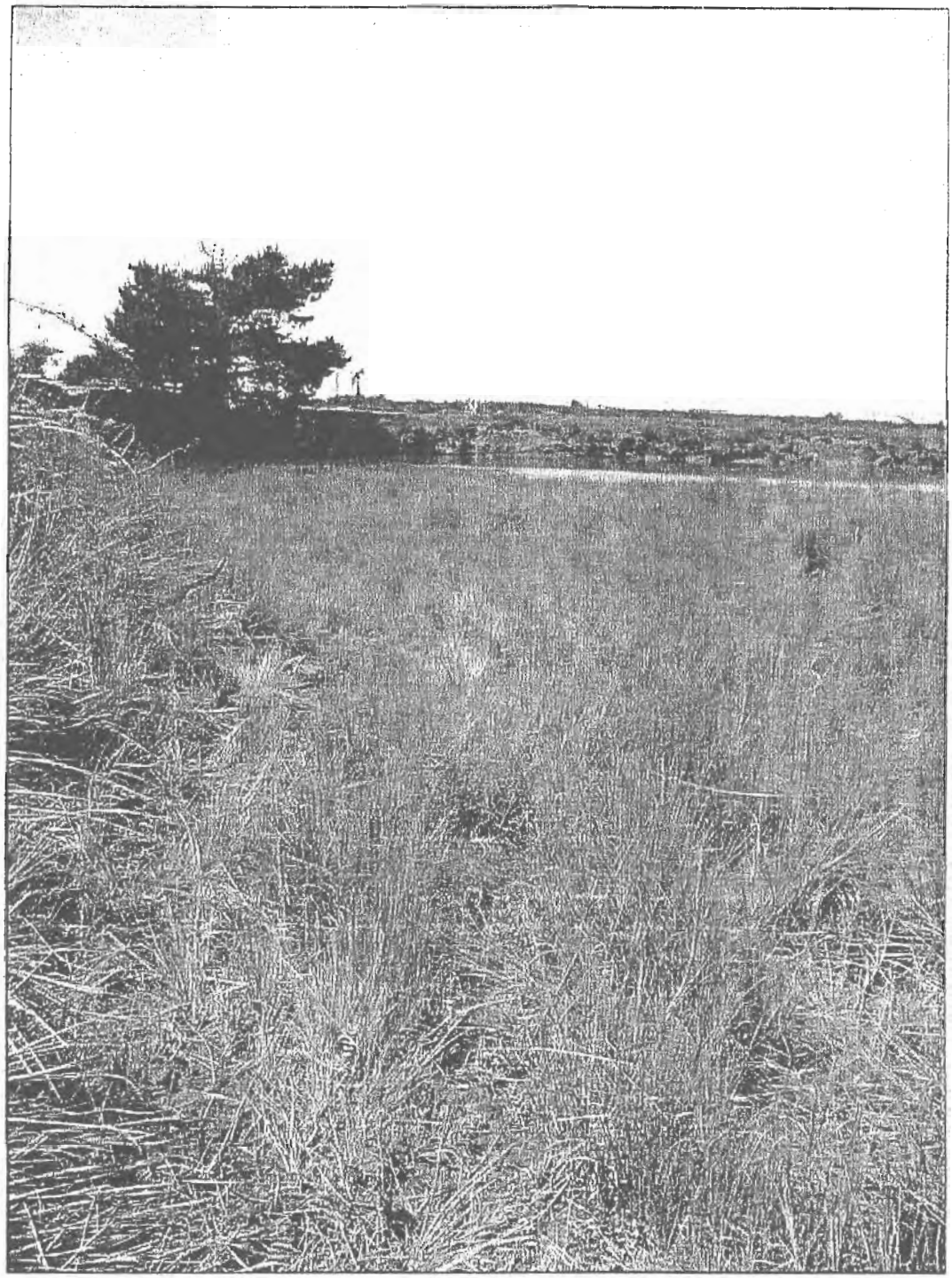

Photo 6. View (looking approximately northwest) across the salt marsh peninsula and rare plant zone. A few Humboldt Bay owl's-clover plants are apparent in the foreground (pink flowers). The vegetation appears to have recovered mostly, as compared to immediately post frac-out as seen in Photo 7 below. Photo taken on May 30, 2006.

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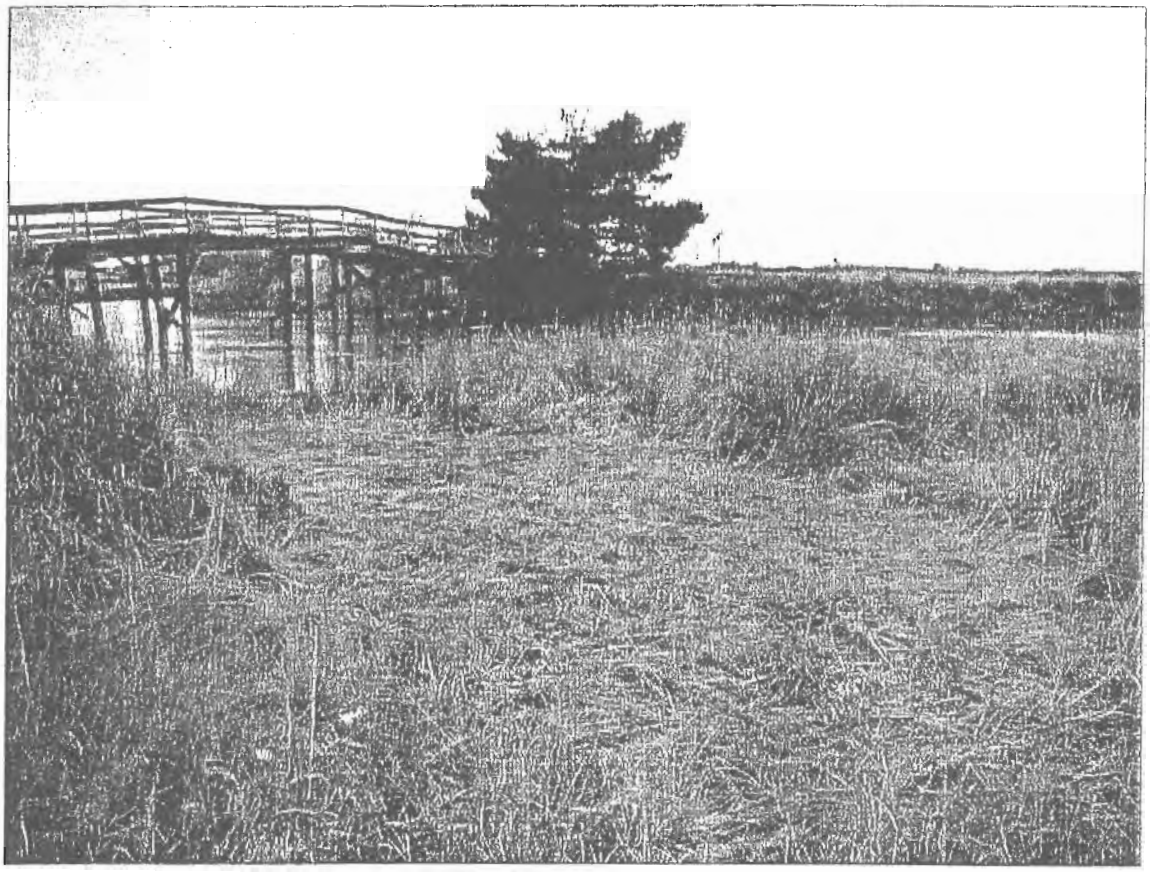

Photo 7. View (looking approximately west-northwest) across the salt marsh peninsula at the trampled rare plant zone resulting from the frac-out and associated clean-up activities. Photo taken on September 9, 2005 (11 days after the frac-out).

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CORPORATION

1434 Third Street • Eureka, CA • 95501-0682
707 442-1735 • fax: 707 442-8823
Email: nrm@nrmcorp.com
Web: www.nrmcorp.com

Attachment C

September 14, 2007

Bruce Webb and/or Craig Martz
California Department of Fish and Game
Streambed Alteration Program
Northern California, North Coast Region (R1)
601 Locust Street
Redding, CA 96001

RE: 2007 monitoring results for PG&E's "frac-out" site in a coastal salt marsh in Freshwater Slough, Humboldt County, California

Dear Sirs,

This letter summarizes the second year's rare plant monitoring results for the PG&E Freshwater Slough frac-out site. The frac-out, or drill fluid spill, occurred on August 29, 2005 during the Pacific Gas and Electric Company's (PG&E) horizontal directional drilling (HDD) operations for the 137B gas pipeline replacement project. The spill and subsequent clean-up activities affected coastal salt marsh habitat that supported two California Native Plant Society (CNPS) listed species. The rare species impacted by the spill were Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*) and western sand spurry (*Spergularia canadensis* ssp. *occidentalis*). Per the wetland restoration plan, which was reviewed and approved by the California Department of Fish and Game (DFG), PG&E is required to conduct annual monitoring of the site to assess impacts to the rare plant populations (NRM 2005).

After reviewing the file for this project, familiarizing myself with the project's history, I visited the site on May 7, 2007 and July 6, 2007. The 2006 monitoring was conducted on May 30 and July 11. Both 2006 and 2007 monitoring visits were within the blooming periods for Humboldt Bay owl's-

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clover and western sand spurry, respectively. Monitoring data were collected according to the specifications of the wetland restoration plan (NRM 2005).

In summary, the impacted salt marsh vegetation appears to have recovered from the trampling associated with the clean-up efforts. Though all of the data collected to date have been ocular estimates, which do not provide very accurate data across multiple observations and observers, the region identified as mixed marsh community in the 2006 report appears to have expanded its aerial cover and the rare plant populations are apparently vigorous (Appendix C & Table 1). The Spartina Marsh community was relatively diverse, containing many of the species found in the area designated as the Mixed Marsh community; though density of other species was less in the Spartina Marsh than in the Mixed Marsh community. Both rare plant species were found within, as well as outside, the "rare plant zone" as delineated in previous reports (Figure 1, Appendix A). And the rare plant populations were present at or above pre-disturbance numbers (Table 1).

The target thresholds for each species were specified in NRM (2005). These thresholds were the average number of individuals, based on ocular estimates, over the three years prior to disturbance. However, the thresholds are neither biologically nor statistically supportable. As noted in previous monitoring reports, both subject species are annuals. Annual plant species population numbers can fluctuate yearly and seasonally because of abiotic factors. Since the population estimates are based on a single day's visit, we do not know the degree to which seasonal variation affected our results. Furthermore, lacking a reference population with which to compare the variation in the population of interest, we cannot separate causes related to the impacts from background or regional variation. Since sampling did not occur, statistical tests cannot be brought to bear on the data to compare pre- and post-disturbance populations. In short, there is no control population in this study.

Statistically, using the mean average as the threshold number is not well supported. The implicit assumption is that the mean represents natural annual variability of the population, and from these data, population change related to the impact can be measured. However, the averages are based on three data points (annual ocular estimates of the entire population from 2003-2005), which do not provide sufficient statistical power to compare across years. This is evidenced by the variation in the measures; the standard deviation of the calculated means for Humboldt Bay owl's clover (μ=900) and western sand spurry (μ=475) are 519 and 475, respectively. Because the sample size was small, the mean is not reliable and is not, therefore, a statistically relevant threshold.

Lacking a repeatable design for collecting and comparing data, we are left with asserting a biological opinion based on observer experience. My ocular estimates from this season's monitoring were 1,600 and 206, respectively for *Castilleja* and *Spergularia*. The owl's-clover plants have showy inflorescences, and I observed several populations around the bay in full bloom in early May 2007. I feel fairly confident that I visited the site in the height of blooming. My count of the owl's clover plants was a rounded figure based on counting several clumps of plants. I confirmed with Melissa Brooks Kraemer that there was no established sampling protocol and that the previous years' counts were based on ocular estimates. I did not have a reference population for the sand spurry; however, I visited the site during the range of previous visits. Though my estimates were not very precise, I believe they were low estimates of each population in 2007.

Cover of the dense-flowered cordgrass (*Spartina densiflora*) population was the same or less than in 2006; however, this parameter is subject to the same sampling limitations mentioned above.

2007 MONITORING RESULTS

Number of Humboldt Bay owl's-clover inflorescences on the salt marsh peninsula: **~1,600**
Number of western sand spurry individuals on the salt marsh peninsula: **~206**
Phenology (% flowering, % fruiting, and % vegetative) of Humboldt Bay owl's-clover **(90, 0, 10)** [1] and western sand spurry **(75, 0, 25)** plants at the time of the surveys
Approximate distribution of Humboldt Bay owl's-clover and western sand spurry individuals on the salt marsh peninsula, using Figure 1 as a base map (Appendix A). For example, if rare plants are noted outside of the "rare plant zone" as shown on Figure 1, map their distribution outside of this area. Likewise, if rare plants are restricted to only a portion of the "rare plant zone" as shown on Figure 1, map their distribution within this area: **Both species were distributed over much of the peninsula. Owl's-clover was well distributed both within and outside of the "rare plant zone" (see Figure 1). Unlike previous reports for sand spurry, this plant was distributed over the entire peninsula. There were no fewer sand spurry plants outside of the rare plant zone than there were inside the zone.**
Estimated percent cover of dense-flowered cordgrass within the rare plant zone (Note: There are no data on this from past years, but it was noted that the rare plant zone, though surrounded by dense-flowered cordgrass on all sides, was itself relatively free of the species at the time of the frac-out.): **10%. The dense-flowered cordgrass does not appear to have increased its cover within the rare plant zone.**
Overall list of vascular plant species noted on the salt marsh peninsula: **See Appendix B**
General description of the vegetation types on the salt marsh peninsula (per Eicher 1987), using Figure 1 as a base. Note whether there has been any change in the general distribution of vegetation types (*Spartina* marsh and mixed marsh), as they are shown on Figure 1, and if so, map the change (e.g., *Spartina* marsh may encroach into mixed marsh community): **No change.**
Notes on whether the vegetation within the trampled area (as shown on Figure 1) has recovered; include species composition and percent cover within trampled area: **The vegetation does seem to have recovered. As noted in previous reports, there are trails through the peninsula that are likely largely the result of cattle use. However, other animals (including the rare plant investigators) likely impact the area and maintain these trails.**
Photo-documentation of the salt marsh area, including the rare plant zone and trampled area, as shown on Figure 1 (and in attached photos): **See photos, Appendix C (attached)**
Name of monitor/surveyor: **David Loya, NRM Corp. (Eureka, CA)**
Date of monitoring/survey: **May 7 and July 6, 2006**
Number of field-survey-hours: **~2**

DISCUSSION

For comparative purposes, this year's monitoring data has been added to the below table (Table 1 from NRM 2005):

[1] It should be noted that the threshold was based on counting inflorescences – the phenology of inflorescences is by definition 100% flowering. I counted both vegetative plants and inflorescences during my field visit.

Table 1. Estimated number of Humboldt Bay owl's clover and western sand spurry plants in the coastal salt marsh at the Freshwater Slough frac-out site from 2003 through 2006.*

Botanical Survey Dates (in coastal salt marsh)	Humboldt Bay owl's-clover (estimated # of inflorescences)	Western sand spurry (estimated # of individuals)
2003 (6/23 & 8/26)	300	75
2004 (5/19 & 6/9)	1,200	1,000
2005 (5/18 & 7/11)	1,200	350
2006 (5/30 & 7/11)	650	325
2007 (5/7 &7/6)	1,600	206

*Note: The variation in population numbers from year to year may be due to either species phenology relative to survey date (*i.e.*, surveys conducted relatively late) or natural fluctuation in population numbers, which is not uncommon for annual species such as these.

The wetland restoration plan (NRM 2005) specifies threshold values of at least 900 Humboldt Bay owl's-clover inflorescences and at least 475 western sand spurry individuals. For the reasons discussed above, these thresholds are not used as the basis for my recommendations. Rather, I suggest that the broader disbursal of the sand spurry plants, and the vigorous owl's-clover population noted in 2007 indicate healthy populations.

Incidentally, the owl's-clover plants were present in greater numbers than the threshold. And, the date of survey is roughly correlated with the number of individuals for western sand spurry. This suggests that an earlier survey may have yielded greater numbers of spurry plants.

Furthermore, the site may have seen a reduction in the Spartina marsh and an expansion of the native species Mixed marsh community. The paired photos in Appendix C show the site from about the center of the peninsula facing the bridge. In 2005, the site appears to be exclusively Spartina. In 2007, this area is a mixed marsh with Humboldt Bay owl's-clover as a principal component. Though the cause for this change in community is not evident, it presents an interesting line for questioning.

RECOMMENDATIONS

I do not recommend enforcing contingency measures at this time. The dense-flowered cordgrass population seems to be relatively static, so removal is not indicated based on the 2005 NRM report. The rare plant populations appear vigorous, so reseeding is not needed. Though the monitoring goal of 475 western sand spurry individuals was not met this season, for the reasons discussed above and in previous reports, I do not believe this is cause for alarm. I do not think there is a need to monitor these populations again.

Not withstanding the above recommendations, PG&E is planning on completing the aborted HDD at the site in 2008. I suggest a predisturbance quantification of the rare plant populations at the site to compare with post disturbance conditions. I also recommend including a control population and multiple visits to ensure the peak population is enumerated. Finally, I recommend using a sampling protocol that allows for a more accurate and precise estimate of population size. This predisturbance work should be included in reports to all interested agencies.

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PG&E plans to conduct another HDD at the site in 2008. Pre-disturbance surveys with a control and repeatable sampling design should be included in the 2008 project. I would also suggest designing a Spartina disturbance protocol to test the hypothesis that disturbance may be a factor in restoring Mixed marsh communities in the upper marsh of Freshwater Slough.

Please contact me or the PG&E representative(s) listed below to discuss the wetland restoration area.

Sincerely,

David Loya
Plant Ecologist & Wetlands Specialist
Natural Resources Management Corporation
1434 Third Street, Eureka, CA 95501
707/269-1382 (v); 707/442-8823 (f)
Email: dloya@nrmcorp.com

cc: Jesus Viscarra
Terrestrial Biologist
Pacific Gas & Electric Co.
350 Salmon Street
Chico, CA 95928
530/896-4263 (v); 530/896-4266 (f)
Email: JRV8@pge.com

Patricia Sanchez
Permitting Specialist
Pacific Gas & Electric Co.
245 Market Street, mail-code N10A
San Francisco, CA 94403
415/973-8250 (v); 415/973-9250 (f)
Email: PDS9@pge.com

Reference cited:

NRM. October 18, 2005. *Wetland Restoration Plan for Coastal Salt Marsh Habitat Affected by Pacific Gas and Electric Company's Freshwater Slough HDD G/L 137B Project*. Unpublished technical report prepared for PG&E by NRM. Eureka, CA.

Attachments (Appendices A, B, and C)

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APPENDIX A

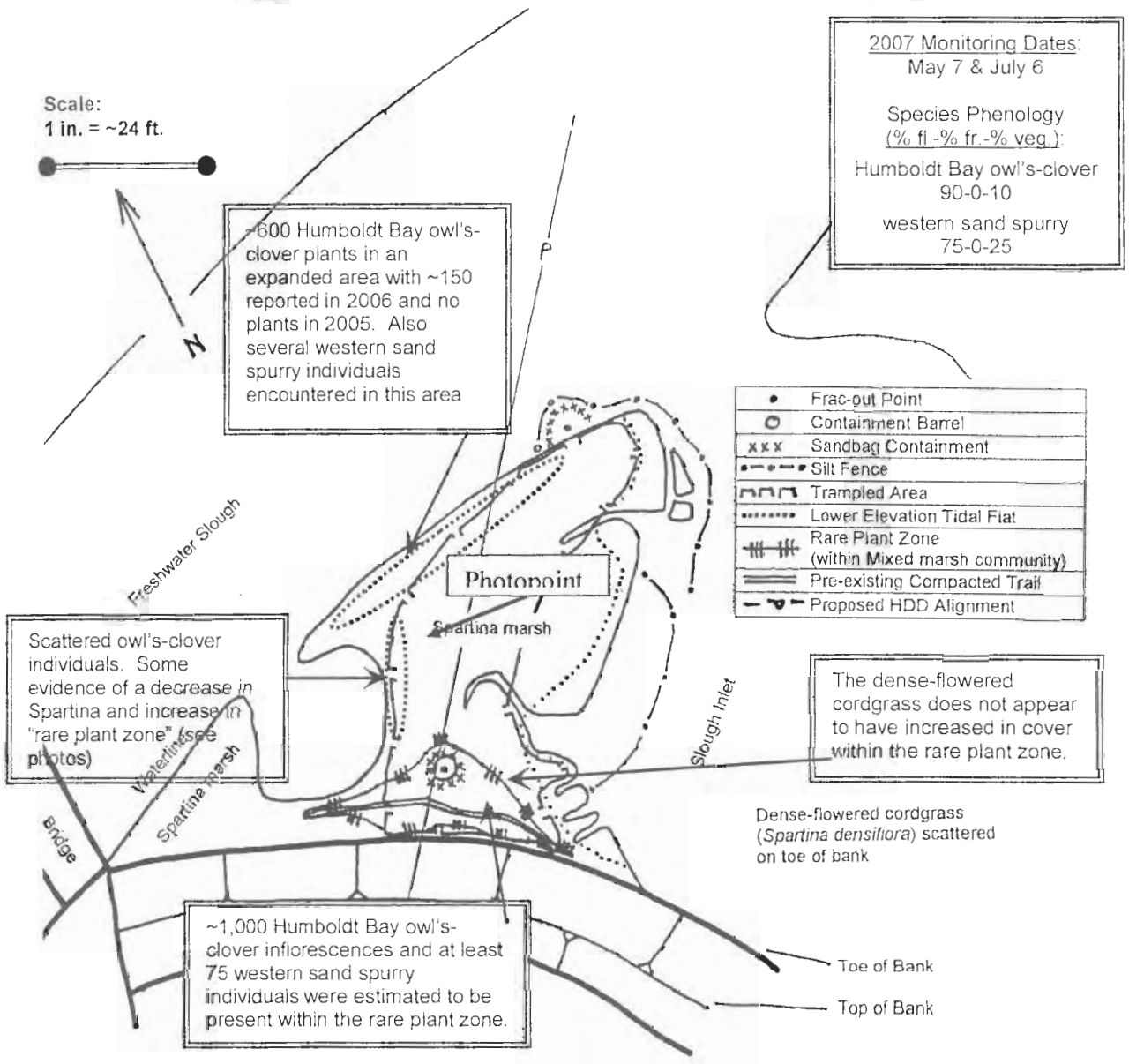

Figure 1. Sketch map of the coastal salt marsh where the frac-out occurred (from NRM 2005) with notes from 2007 monitoring.

APPENDIX B
Overall List of Vascular Plant Species Noted on the Salt Marsh Peninsula (see Fig. 1 above)
Survey Dates: May 30 and July 11, 2006

Shrubs:
Baccharis pilularis coyote brush
Cytisus scoparius Scotch broom
Rubus discolor Himalayan blackberry

Grasses and Graminoids:
Deschampsia caespitosa tufted hair-grass
Distichlis spicata salt grass
Festuca arundinacea tall fescue
Isolepis cernua low bulrush
Juncus effusus common rush
Juncus lesueurii salt rush
Spartina densiflora dense-flowered cordgrass

Other Flowering Herbs:
***Castilleja ambigua* ssp. *humboldtiensis* Humboldt Bay owl's-clover**
Cotula coronopifolia brass-buttons
Jaumea carnosa jaumea
Limonium californicum sea lavender
Plantago maritima maritime plantain
Potentilla anserina silverweed
Salicornia virginica pickleweed
Sonchus oleraceus common sow thistle
***Spergularia canadensis* ssp. *occidentalis* western sand spurry**
Spergularia rubra ruby sand spurry
Triglochin maritima seaside arrow-grass

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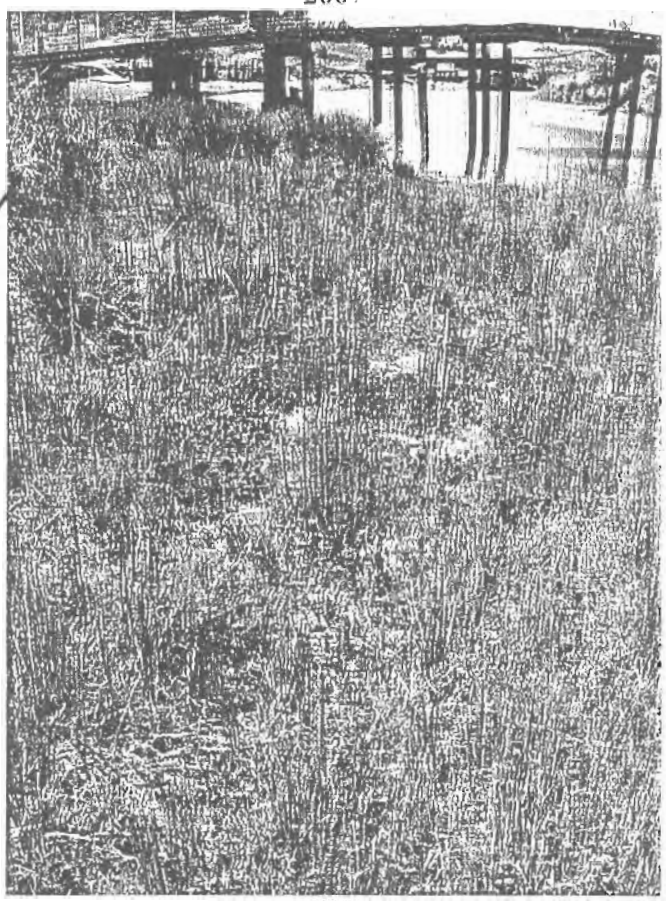
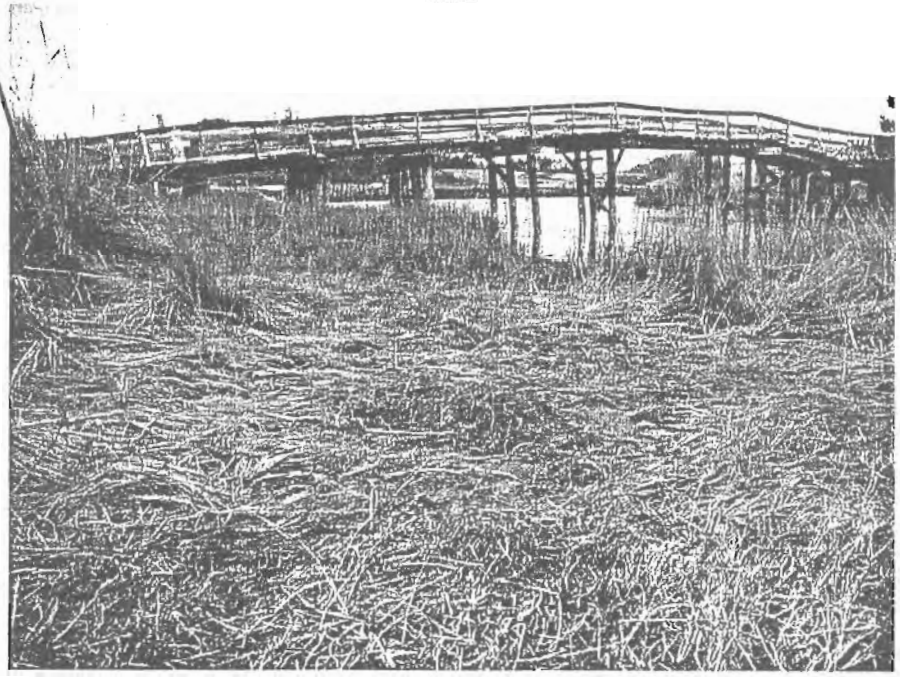
APPENDIX C

2007



View of approximately same shot outside of the rare plant zone (see "photo point" Appendix 1). In 2005, before the work, this area was a Spartina monoculture. In 2007, this area is dominated by native species, including Humboldt Bay owl's-clover. Though it is not clear that this resulted from the trampling associated with the FRAC-out, it is cause for interest.

2005



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HDD Fluid Release Contingency Plan
G/L 137B Freshwater Slough Project.

Revised March 28, 2008

Prepared by:
Pacific Gas and Electric Company
Environmental Services
3400 Crow Canyon Road
San Ramon, California 94583

Prepared for:
Pacific Gas and Electric Company
Corporate Real Estate
245 Market Street, Mail Code N10A
San Francisco, CA

Contact: Craig Geldard
Aquatic Biologist/Environmental Coordinator
(925) 866-5308

PG&E

TES

This Horizontal Directional Drilling (HDD) Fluid Release Contingency Plan was developed in support of the PG&E's proposed G/L 137B crossing of Freshwater Slough Project. The project entails using HDD technology to bore beneath Freshwater Slough for the re-routing of an approximate 1,350-foot section of G/L 137B. The approximate bore length is 970-feet with an estimated depth of 85 feet beneath the slough channel. The drilling staging area, bore entrance pit, and pipeline stringing area will be located in the open pastureland on the side of the Slough.

This plan is a project permitting requirement and has been developed in consultation with the U.S. Army Corps of Engineers, California Department of Fish and Game, National Oceanic and Atmospheric Administration, and the California Coastal Commission. This plan will address all inadvertent releases (frac-out) of drilling fluids into terrestrial or aquatic environments associated with the project. The goal of the plan is to effectively control, manage, and report any surface release of drilling fluids associated with HDD operations of the project. The plan effectively involves eight sections or processes:

1. Establishment of an on-site materials list to manage and control drilling fluid surface releases, relevant to the project size and environmental issues involved with the project.
2. Recommended Pre-construction Protection Measures.
3. On-Site Biological Monitoring Program.
4. 2008 Additional Measures to Reduce Likelihood of a Frac-out.
5. Containment and Control Methods for Frac-outs.
6. Notification Processes and Contacts.
7. Evaluation Plan/Abandonment Contingency Plan
8. Hazardous Materials Management

1. On-Site Materials Checklist

Types and amounts of materials required for the G/L 137B Freshwater Slough HDD Project are as follows: (*These materials must be present on-site or immediately available*)

- Large diameter standing pipe material (such as 55-gallon open ended drums*, heavy PVC/CMP pipe, or culvert type material)
- Heavy weight plastic, clean gravel filled sand bags (200 recommended)
- Silt fencing (300-feet recommended)
- Rice straw bales
- Straw log or wattles (200-feet recommended)
- Industrial grade PVC mesh with steel T-posts
- Geotek filter bags, 10-by-12-foot size or equivalent
- Several 5-gallon plastic buckets
- Shovels (flat blade and round nose)
- Wide heavy-duty push broom
- Absorbent pads and plastic sheeting for placement beneath motorized equipment operating in the vicinity of a riparian/stream zone
- Vacuum hose (200-feet minimum)

*These may be welded together to achieve the necessary water level clearance

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- Portable pumps
- Vacuum trucks (800 and 3000-gallon capacities)

2. Recommended Pre-Protection Measures

The following protection measures are recommended prior to beginning HDD operations:

- Addition of dye to drilling fluid to aid in visible detection.
- Creation of an earth or sandbag berm surrounding drilling fluid staging areas to contain any inadvertently spilled fluid. These areas may also be reinforced with PVC mesh and steel posts, straw bales, or silt fencing.
- Installation of sediment control devices between drilling fluid staging areas and waterways or wetlands on-site. This also includes any nearby culvert or drainage ditch that leads to the waterway or wetland.
- Restricting HDD operations to daylight hours to effectively allow for frac-out detection.

3. On-Site Biological Monitoring Program

During drilling operations, visual inspection along the bore alignment shall take place at all times. A qualified biologist or biological monitor, familiar with the environmental issues of the project, will be on-site during all HDD operations that involve the active pumping of drilling fluid into the bore hole. The monitor will be responsible for keeping a daily log of HDD activity. The drilling contractor shall regularly provide the monitor with the following information throughout the entire HDD procedure:

- Position of the drill head in relation to the point of entry
- Estimate of the volume of drilling fluid pumped during the drilling process, as compared to the volume of current returns
- Abnormal drilling fluid pressures at time of occurrence
- Changes of drilling fluid contents
- Equipment breakdowns and repairs

Some loss of returns may be inevitable as drilling fluids are absorbed by the lateral and subterranean fractures within the formation. A complete and sudden loss of returns serves as a signal to both the drill operator and the monitor that something more significant may be occurring and to watch closely for a possible surface release. **In the event of a frac-out, the on-site monitor has the authority to halt all operations until appropriate containment and control procedures are implemented. The monitor shall then immediately notify and brief designated PG&E representative(s) of the situation.**

4. 2008 Additional Measures to Reduce Likelihood of a Frac-Out

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PG&E has determined that HDD remains the best engineering option for crossing of Freshwater Slough. The following are additional 2008 recommended protective measures:

- Although the drilling contractor's personnel are trained to implement the HDD without the need for a drilling engineer, and while the presence of a drilling engineer on-site is not required by standard industry practice, as a further precautionary measure, an experienced drilling engineer, which is expert in the HDD process, will be present, on site, at all times during the drilling process, from mobilization, through demobilization and site restoration, including pilot bore, pre-reaming, reaming, and pullback, to ensure appropriate drilling methodology techniques are used. The drilling engineer will be familiar with the soil conditions, possess a thorough understanding of the ground and groundwater conditions at the project site, be capable of making important observations and assessing HDD Contractor practices in real time, and will advise the driller on the best practices for the conditions encountered. Important observations will be recorded and will include measurement and observation of drilling fluid properties, drilling speed, pump capacity, drilling fluid quantities and pressures, and any circulation losses.

- The drilling contractor will use a down-hole pressure monitoring tool, which was not previously available for use during the 2005 HDD attempt that will provide additional information regarding bottom hole pressure that can be compared against calculated maximum allowable drilling fluid pressure. The on-site drilling engineer will compare the measured down-hole pressures to the maximum allowable pressures and minimum required pressures calculated from a hydrofracture risk evaluation prior to commencement of the bore. If actual down-hole pressures approach maximum allowable values, the drilling engineer will advise the contractor. The contractor may use this information to modify drilling practices, and therefore further minimize the chances of a frac-out.

- Two piezometers will be installed between the entry and Freshwater Slough. The piezometers will be monitored regularly when the drill head is within 50 feet of the piezometers locations to evaluate drilling fluid excess pressures. The piezometer tips (screened interval) will be set 10 to 15 feet above the HDD bore, offset 5 feet from the centerline. If the piezometers indicate increasing pressures, the drilling engineer will advise the HDD contractor. The contractor will adjust drilling speed, drilling fluid properties, or other drilling operations as necessary to reduce excess pressures.

- The HDD will go at least thirty feet deeper than the previous attempt to avoid possible soil disturbances caused by the prior bore and thereby decrease the likelihood of another frac-out. Entry and exit angles will be increased and set back distances will be increased to allow the HDD bore to be deepened. A deeper bore will increase the overburden so that, if there is a frac-out, it would be less likely to reach the surface and cause any environmental damage.

- The HDD Contractor will have on-site tools, equipment, and personnel that are trained and experienced for rapid containment, clean-up, and removal of any drilling fluid surface spills or frac-outs to reduce the consequences of any incident.

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- The HDD Contractor selected for the Line 137B Freshwater Slough crossing will be selected from a list of pre-qualified HDD Contractors. The prequalification criterion will focus on successful bores in wetlands areas and will have demonstrated good practices that avoided adverse impacts to sensitive river or wetlands habitat.

With the implementation of the above measures, PG&E believes that it is taking all reasonable steps to reduce the likelihood of a frac-out from reoccurring to the extent feasible. PG&E has requested and obtained third party independent review of the proposed plan, by Dr. David Bennett, a well known nationwide HDD expert. Dr. Bennett concurs with PG&E's assessment that the proposed plan represents the best practices to minimize the risk of hydrofracture and inadvertent drilling fluid returns.

5. Containment and Control

Upon detection of a terrestrial or aquatic frac-out, the following plan of action shall be placed in effect:

A. Directional boring will stop immediately and the drill head will be pulled back to relieve pressure on the frac-out.

B. For terrestrial frac-outs in the project area, an earth or sandbag berm will be constructed around it for containment. On-site materials consisting of industrial grade PVC mesh with steel T-posts and natural straw bales may also be installed around the frac-out areas to contain the fluid.

C. For frac-outs occurring within a waterway or wetlands any individual or combination of the following approaches may be used to contain the drilling fluid:

   a. A sand bag berm surrounding the frac-out area (effective at waters edge situations).

   b. A large diameter standing pipe (such as 55-gallon open ended drums, heavy PVC/CMP pipe, or culvert type material) tall enough to exceed the water level should be placed over the frac-out and sealed at the base by sand bags.

   c. Industrial grade PVC mesh with steel T-posts and natural straw bales installed above and below the crossing site where the depth of the water allows.

D. If the frac-out does not pose a threat to biological resources on-site, then agency notification is not necessary, otherwise appropriated notifications shall be made by a PG&E representative.

E. After these containment procedures are implemented, any drilling fluid that has been contained will be returned to the entry pit for re-use or removed using a vacuum truck and then transported to a disposal site as approved by the California Division of Oil & Gas.

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F. The affected "frac-out" area(s) will be immediately evaluated to avoid further spill or accidental discharge of drilling fluids. All necessary revisions to project methodology and containment/control materials will be made to maintain control of the frac-out and prevent further ones.

G. Revisions to the project Wetland Mitigation Plan prepared by Natural Resources Management Corporation (dated March 28, 2008) will be made to address frac-out impact area(s) associated with this project. Revisions will assure restoration of frac-out impact areas to pre-project conditions. Revision of the project Wetland Mitigation Plan may require an amendment to the coastal development permit for this project, as stated special condition 2D of the permit conditions.

6. Notification Processes and Contacts

In the event that a frac-out threatens biological resources identified on-site, the following agencies will be immediately notified by a PG&E representative:

PG&E Project Representatives:

1. Craig Geldard, Aquatic Biologist-Environmental Services, 925-866-5308
2. Patricia Sanchez, Land Agent-Land Services, 415-973-8250
3. PG&E Environmental Inspector, Aquila Doudna, (707) 444-0873, pager (707) 256-6270 or cell (707) 599-2679

Resource Agency Representatives:

1. California Department of Fish and Game, Scott Bauer, (707) 441-2011
2. National Oceanic and Atmospheric Administration, Clarence Hostler, (707) 825-5165
3. U. S. Army Corps of Engineers, Carol Heidsiek, (707) 443-0855
4. Regional Water Quality Control Board, Dean Prat, (707) 576-2801 or (707) 576-2220
5. California Coastal Commission, Bob Merrill, (707) 445-7833

7. Evaluation Plan/Abandonment Contingency Plan

After containment and notification steps have been taken, PG&E management or designee contract drilling engineer representative will evaluate the feasibility of continuing the boring process. At that time it will be decided whether to continue with the bore or implement the abandonment contingency plan (ACP) after evaluating the following:

Evaluation Plan

1) The exact location of the drilling head assembly will be verified with portable locating equipment. If it is determined that the drilling profile does not match the planned profile, and exceeds design limits, the ACP will be implemented.

2) If the location and profile are within design limits, the specific weight of the drilling mud will be verified to ensure a slightly overbalanced condition to the surrounding formation. The specific weight will be adjusted as necessary.

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3) If location, profile, and drilling mud weight are determined to be within design limits, and frac-out of Bentonite slurry is controlled, the contract drilling engineer may proceed with the bore.

4) Should it be determined that the stability of the bored crossing is in serious question, even if location, profile, and drilling mud weight are deemed satisfactory, the ACP will be implemented.

Abandonment Contingency Plan

The following general play would be executed if for any reason the drilling operation were forced to be suspended and the partially completed drilled hole abandoned.

During Pilot Hole Drilling

If drilling were to be suspended during pilot hole drilling, the following general procedures would be executed:

1) Advancement of the drill string would be halted.

2) Cement or Bentonite mixing and pumping equipment would be mobilized to the drilling location.

3) Cement or Bentonite pumping equipment would be rigged up to the drill string.

4) Drill string would be withdrawn and hole pumped with cement or industry approved fill material to displace the Bentonite slurry material.

During Reaming

If Drilling were to be suspended during the reaming of the hole, the following general procedures would be executed:

1) Pull back of the reaming string would be halted.

2) Cement or Bentonite mixing and pumping equipment would be mobilized to the drilling location.

3) Cement or Bentonite pumping equipment would be rigged up to the drill string.

4) If possible, the reamer would be replaced with a cementing head.

   a) The reamer would be replaced with a cementing head.

   b) Drill string would be withdrawn and hole pumped with cement or industry approved fill material to displace the Bentonite slurry material.

5) If reamer could not be pushed back to exit end, then:

   a) Drill string would be withdrawn and hole pumped with cement or industry approved fill material to displace the Bentonite slurry material.

b) Drilling rig would rig down at entry end and right up at exit end.

c) Run in pilot hole with cement head on pilot hold drill string until previously cemented reamed hole is pumped.

d) Drill string would be withdrawn and hole pumped with cement or industry approved fill material to displace the Bentonite slurry material.

8. Hazardous Materials Management

The only known hazardous materials that will be on site during the construction phase will be fuels and lubricants in construction equipment. Material Safety Data Sheets for all hazardous materials to be used on this project are located in Appendix A. No fuels or lubricants will be stored on the construction location. The exposure to a fuel or lubricant spill will be limited to the actual tank capacity of the equipment.

This Hazardous Materials Management Plan is supplemental to a separate plan developed specifically for this project. In the event of a hazardous materials spill on the construction site the project specific plan is to be implemented. The following is supplemental to the project specific plan:

1) Primary action at the spill location:

   a) Notification of the PG&E representative or designee.

   b) Contain the spill by building earth dikes to surround the spill.

2) Secondary action:

   a) For small quantity spill apply absorbent pads, stored in the contractor construction storage container on site. All absorbent pads to be disposed of in plastic bags and placed into container marked for proper disposal.

   b) For larger quantity spills request the contracted hazardous waste removal contractor to mobilize to the site with a vacuum truck.

   c) If any hazardous material reaches any waterway or ditch containing water deploy absorbent booms which are stored at the construction container on site.

3) Final clean-up:

   a) All contaminated soil or other contaminated materials to be removed and placed into plastic bags or other approved container and disposed of off site by the contracted hazardous waste contractor.

   b) Perform any remedial backfill and grading to restore area of spill.

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Notifications:

1) Immediately notify on site biological monitor, contractor supervisor and owner representative.

2) Make all notifications to county and state agencies as appropriate and as required by the regulations of the local emergency services. A copy of the notification information is in the possession of the on site biological monitor and contract site supervisor.

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Erosion Control Plan
Line 137B HDD Freshwater Slough Crossing Project

March 31, 2008

Project Name:	G/L 137B Freshwater Slough HDD Crossing

Discharger Information:	Pacific Gas and Electric Company 3400 Crow Canyon Road San Ramon CA 94583 925-820-2000

Contact Person:	Rand Unverferth 375 N. Wiget, Ste 130 Walnut Creek, CA 94598 925-974-4093

Authorized Representative:	Bill Granger 375 N. Wiget, Ste 200 Walnut Creek, CA 94598 925-974-4087

Project Information

Project Location:	The south end of the project area is near the west end of Park Ave, Eureka CA. The north end of the project area is accessed via the north end of Devoy Road, which junctions with Myrtle Ave, Eureka, CA.
Legal Description:	Portions of sections 19 and 30, T5N R1E HB&M
A BMP/Site map showing the project location is attached in Appendix A	

Project Type:	Underground Gas Line – reroute and replace

Project Description:

Pacific Gas and Electric Company's (PG&E) project involves replacing a 1,350-foot section of 8-inch diameter high pressure natural gas transmission pipeline (Line 137B) in Eureka, California. PG&E is proposing to install approximately 970 feet of 8-inch pipeline beneath Freshwater Slough using the horizontal directional drilling (HDD) method. The estimated depth of the new alignment will be approximately 85 feet beneath the channel of the slough. The remaining 380 feet of pipeline will be installed on the north side of the slough using an open cut trench method. Surface disturbance areas will include the following:

A. An entry and receiving bore pit (each approximately 6 ft x 12 ft x 8 ft deep) with associated tail ditches (approximately 3 ft x 20 ft x 6 ft deep) at entry and exit locations of the new HDD alignment.
B. An HDD set-up area adjoining the entry bore pit that will be approximately 100 ft by 100 ft to accommodate the drilling rig, mud tanks, pumps and drill stem racks (0.23

acres - this area includes the entry bore pit and soil stockpiles). This work area exits onto a private gravel road.

C. Approximately 380 feet of trenching approximately 2 ft wide by 5 ft deep.
D. Temporary stockpiles or windrows of topsoil and subsoil excavated from the trench and bore pits.
E. Temporary work areas from the north bank of the slough to the north tie-in point approximately 100 ft wide by 600 ft long (1.38 acres - this area includes the exit bore pit, trench and soil stockpile areas).
F. Temporary 100 ft wide work area extending approximately 600 feet past north tie-in point to assemble the pipeline to be pulled through the HDD alignment (1.38 acres).
G. Access to the entry pit will be via Park Street in Eureka. Access to the exit pit will be via Devoy Road, southeast of the project area. Approximately 3,200 feet of "two-track" farm road will be utilized to access the work areas from Devoy Road. (Approximately 1.47 acres assuming maximum disturbed width of 20 feet).
H. Removal of 4 to 8 feet of exposed pipeline in the Slough Channel during low tide when the pipe is exposed. The pipe ends will be cut off, the ends filled with concrete slurry and capped. Cutting and capping will be conducted from a boat in the slough with a support vehicle on the bank. No disturbances to the slough bed or banks are anticipated.

Direct discharge may occur into Freshwater Slough (Freshwater Creek) as a result of project activities to remove an approximately 4 to 8 foot segment of exposed pipeline located in the Slough. Freshwater Creek is included in the list of CWA Section 303(d) water bodies. This water body is impaired for sedimentation/siltation. The segment of exposed pipeline that will be removed is located in the Slough channel generally at and below the high tide line of the slough. BMPs that address non-storm water discharges that may occur during pipeline removal and final stabilization are listed in the Sediment and Erosion Control BMP section.

The remainder of the project activities would not discharge directly into Freshwater Slough.

Water used for hydrostatic testing and pipeline flushing will be discharged to pasture land via an energy dissipation device.

Site map:	BMP/Site map is attached in Appendix A
Total area to be disturbed by construction activities:	~3 acres (Project Acreage, including roads, 4.5)

Construction Dates:	Begin: August 1, 2008 End: September 30, 2008
Rainy Season Dates (as listed by RWQCB jurisdiction):	Region 1 (Northcoast) October 1 – May 1

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Contractors or Individuals Responsible for BMP Installation, Maintenance and Repair Activities:		
Company Name, Address, and activity	**Contact Person and Telephone Number**	**Emergency Contact Number**
Construction contractor	ARB, Inc.	Unknown at this time

Qualified Person(s):		
Responsibility	**Name**	**Telephone Number**
BMP preparation, revisions and amendments	David Loya	707-442-1735
Compliance with Implementation of BMPs	Bill Granger	925-974-4087
Daily BMP Inspections/Biological Monitors	David Loya, Sandra Brown, Sherman Garinger, Bradford Norman	707-442-1735
BMP Inspections (Pre/post-storm and storm events)	David Loya	707-442-1735

BMP implementation and Construction Sequence:
BMPs will be implemented at the start of construction activities and progress concurrently with construction.

Sediment and Erosion Control BMPs: Listed below and locations indicated on attached BMP/Site map in Appendix A. Additional BMPs addressing frac-out contingency are included in Appendix B	
Project Activity:	**Applicable BMP(s)**
All construction activities	BMP #1-01 Scheduling; work is scheduled to be completed prior to the beginning of the rainy season. BMP #2-01 Material Delivery and Storage BMP #2-02 Material Use BMP #2-03 Spill Control BMP #2-04 Solid Waste Management BMP #2-05 Hazardous Materials/Waste Management
Entry bore pit and adjoining set-up and temporary work area.	BMP #1-03 Fiber Rolls: Install fiber roll around downslope perimeter of work area; maintain during construction period. BMP #1-08 Stockpile Management: Install perimeter sediment barrier around stockpiled soil. BMP #4-01 Preservation of Existing Vegetation: Preserve existing vegetation between the edge of the

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	work area and the dike.
Exit bore pit and new pipeline trenching.	BMP #1-08 Stockpile Management: Implement when there is potential for transport of stockpile material by precipitation or non-storm water runoff.
Temporary work areas north of slough.	BMP #1-03 Fiber Rolls: Install fiber roll between the downslope edge of the work area and the drainage ditch north of the dike; maintain during construction period. BMP #4-01 Preservation of Existing Vegetation; Preserve existing vegetation between the edge of the work area and the dike. Mark edge of work area with wood stakes as needed.
Access route to the entry pit and temporary work area north of slough.	BMP #1-03 Fiber Rolls: Install fiber rolls at crossings when there is potential for precipitation to transport material from the access route into sloughs or channels. BMP #4-01 Preservation of Existing Vegetation; Minimize the width of the area disturbed associated with the access route. Preserve existing vegetation in the areas adjoining the access route.
Frac-out contingency	BMP Silt Screen: Install floating silt screen in staged position in slough at down stream, south side of project ready for deployment in the event of a frac-out BMP #1-03 Fiber Rolls: Construction contractor shall have no less than 200 ft of fiber rolls available to contain terrestrial frac-out. Installation shall be on the down slope side of the spill BMP Silt Fencing: Construction contractor shall have no less than 200 ft of silt fencing available to contain terrestrial frac-out. Installation shall be on the down slope side of the spill and shall be correctly toed-in. Plywood Barrier: Construction contractor shall have four sheets of 4x8x3/4 CDX plywood available in staging area to protect salt marsh and bank soils from compaction due to tracking. These shall be installed in slough access areas in the event of a frac-out.

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Permanent BMPs for stabilizing disturbed land areas: (Including maintenance and monitoring activities until adequate stabilization is achieved).	
Project Activity:	**Permanent BMP(s) for stabilizing disturbed areas:**
Entry bore pit and adjoining set-up and temporary work area.	Backfill bore pit with stockpiled subsoil and topsoil to return the surface to its original grade. Restore the surface of the temporary work area to its original grade and contour, and grass seed areas that supported grass vegetation prior to disturbance.
Exit bore pit and new pipeline trenching.	Backfill bore pit and trench with stockpiled subsoil and topsoil to return the surface to its original grade. Restore the surface to its original grade and contour, and seed areas.
Temporary work areas north of slough.	Restore the surface of the temporary work area to its original grade and contour, and seed all disturbed areas.
Access route to the exit pit and temporary work area north of slough.	Restore the surface of the access route to its original grade and contour, and grass seed areas that supported grass vegetation prior to disturbance.
Removal of 4 to 8 feet of exposed pipeline.	The banks of the slough will be considered permanently stabilized when the cut ends of the exposed pipe are filled and the capping process is final.
All disturbed areas	All disturbed areas that are to be seeded will be scarified prior to seeding to de-compact soils and breakup clumps of soil on the surface. Seed shall be a commercially available seed mixture composed of the same grass species that dominate the perennial grasslands at the present time. Grass seed should be broadcast evenly at an application rate of 1.5-2.3 pounds per 1000 sq ft (65-100 pounds per acre). Hydroseeding at an equivalent application rate may also be used (BMP 4-04).

Non-storm water discharge descriptions:	
Description of discharge:	A. Discharge of water used for hydrostatic testing and pipeline flushing to pasture land. B. Possible discharge related to removal of exposed pipeline in Freshwater Slough channel.

Non-storm water discharge BMPs:	
Discharge A:	Use an energy dissipation device to control water discharged from the pipe following testing and flushing. Direct discharge away from work areas or disturbed areas and towards vegetated pasture lands.
Discharge B:	BMP #3-08 Over-water protection; Use temporary containment structures or devices, such a plywood or tarps, to prevent soil or debris from entering the waters of the slough while removing and capping the exposed segment of gas line. Remove any soil or debris that is deposited on the bank of the slough before the rising tide reaches deposited material.

Monitoring Program (MP)

The monitoring emphasis is on conducting daily visual inspections during working hours to ensure the BMPs are adequate, maintained, and in place at the end of the construction day.

The goals of site inspections are to:

(a) identify construction activities that may contribute pollutants to storm water discharges;
(b) evaluate whether BMPs identified in the plan are adequate and properly installed and maintained; and
(c) determine whether additional control practices or corrective maintenance activities are needed.

MP Requirements

1. The requirements of this MP shall be implemented at the time of commencement of construction activity. The discharger is responsible for implementing these requirements until construction activity is complete and the site is stabilized.
2. All inspections are to be conducted by the biological monitors or other qualified personnel.
3. Inspections must be implemented at the appropriate level to protect water quality at all times throughout the life of the project.
4. Visual inspections are to be conducted daily during working hours and in conjunction with other daily activities in areas where active construction is occurring.
5. Conduct daily visual inspections to verify that appropriate BMPs for storm water and non-storm water are being implemented and in place in areas where active construction is occurring.
6. Conduct inspections of the construction site prior to anticipated storm events, during extended storm events, and after actual storm events to identify areas contributing to a discharge of storm water associated with construction activity. Pre-storm inspections are to ensure that BMPs are properly installed and maintained; post-storm inspections are to assure that BMPs have functioned adequately. During extended storm events, inspections shall be required during normal working hours for each 24-hour period.
7. Inspections will be conducted to ensure the BMPs are adequate and maintained. Inspection activities will continue until adequate permanent stabilization has been established and, in areas vegetated, until minimum vegetative coverage has been established.

A log of the inspections conducted will be maintained. The log will provide the date and time of the inspection and who conducted the inspection.

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Appendix A

BMPs / Site Plan Map

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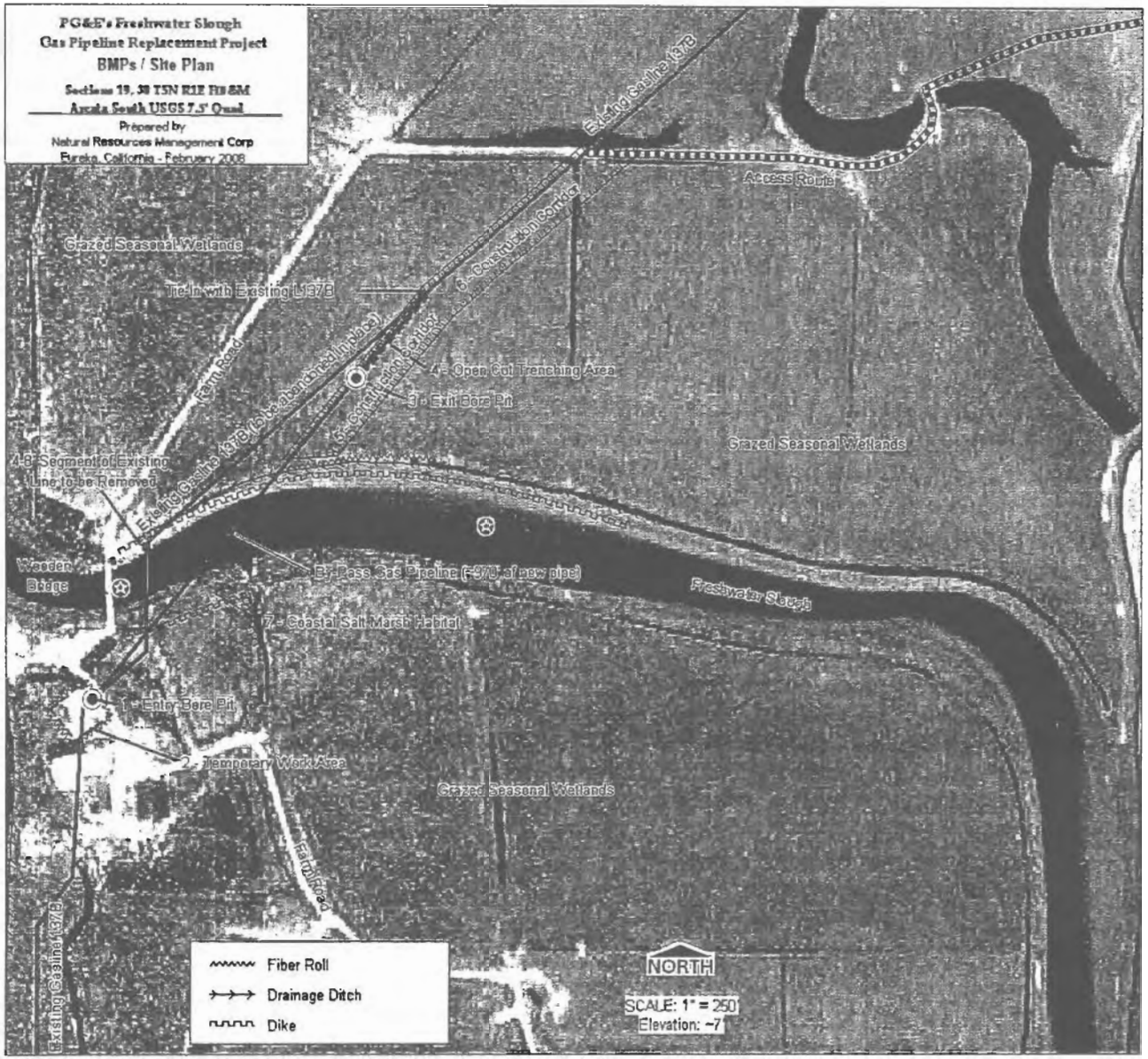

Sediment and Erosion Control BMPs:	
Project Activity:	Applicable BMP(s)
1 & 2 Entry bore pit and adjoining set-up and temporary work area.	BMP #1-03 Fiber Rolls: Install fiber roll around downslope perimeter of work area and maintain during construction period. BMP #1-08 Stockpile Management: Install perimeter sediment barrier around stockpiled soil. BMP #3-01 Preservation of Existing Vegetation: Preserve existing vegetation between the edge of the work area and the dike.
3 & 4. Exit bore pit and new pipeline trenching.	BMP #1-08 Stockpile Management: Implement when there is potential for transport of stockpile material by precipitation or non-storm water runoff.
5 & 6 Temporary work areas north of slough.	BMP #1-03 Fiber Rolls: Install fiber roll between the downslope edge of the work area and the drainage ditch north of the dike and maintain during construction period. BMP #4-01 Preservation of Existing Vegetation: Preserve existing vegetation between the edge of the work area and the dike. Mark edge of work area with wood stakes as needed.
Access route to the exit pit and temporary work area north of slough.	BMP #1-03 Fiber Rolls: Install fiber rolls at crossings where there is potential for precipitation to transport material from the access route into sloughs or channels. BMP #4-01 Preservation of Existing Vegetation: Minimize the width of the area disturbed associated with the access route. Preserve existing vegetation in the areas adjoining the access route.

Permanent BMPs for stabilizing disturbed land areas:	
Project Activity:	Permanent BMP(s) for stabilizing disturbed areas:
1 & 2 Entry bore pit and adjoining set-up and temporary work area.	Backfill bore pit with stock piled subsoil and topsoil to return the surface to its original grade. Restore the surface of the temporary work area to its original grade and contour, and grass seed areas that supported grass vegetation prior to disturbance.
3 & 4 Exit bore pit and new pipeline trenching.	Backfill bore pit and trench with stock piled subsoil and topsoil to return the surface to its original grade. Restore the surface to its original grade and contour, and grass seed areas.
5 & 6 Temporary work areas north of slough.	Restore the surface of the temporary work area to its original grade and contour, and grass seed all disturbed areas.
Access route to the exit pit and temporary work area north of slough.	Restore the surface of the access route to its original grade and contour, and grass seed areas that supported grass vegetation prior to disturbance.
Removal of 4 to 8 feet of exposed pipeline.	The banks of the slough will be considered permanently stabilized when the cut ends of the exposed pipe are filled and the capping process is final.
All disturbed areas.	All disturbed areas that are to be grass seeded will be scarified prior to seeding to de-compact soils and breakup clumps of soil on the surface. Grass seed shall be a commercially purchased mixture of forage species. Grass seed shall be broadcast evenly at an application rate of 1.5-2.1 pounds per 1000 sq ft (65-100 pounds per acre).

Non-storm water discharges description	
Description of discharge:	A. Discharge of water used for hydrostatic testing and pipeline flushing to pasture land. B. Possible discharge related to removal of exposed pipeline in Freshwater Slough channel.
Non-storm water discharges BMPs:	
Discharge A:	Use an energy dissipation device to control water discharged from the pipe following testing and flushing. Direct discharge away from work areas or disturbed areas and towards vegetated pasture lands.
Discharge B:	BMP #3-08 Over-water protection: Use temporary sandbag or wood structures or devices, such as plywood or tarps, to prevent soil or debris from entering the waters of the slough while removing and capping the exposed segment of gas line. Remove any soil or debris that is deposited on the bank of the slough before the rising tide reaches deposited material.

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2
1
1

Appendix B

Frac-out Contingency Measures

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Frac-out Contingency Measures

The following measures will be implemented to ensure rapid and effective response in the event of a frac-out. These measures are designed to be deployed in the aquatic and near aquatic environment with a focus on the site of the previous frac-out. The installation is flexible so that the control features can be moved to any point within the project area with the minimum of effort. Since the site of the previous frac-out has the highest likelihood of failure, the staging area is adjacent to the previous frac-out site.

The measures are divided into "staged" and "ready" measures. The staged measures will be installed prior to construction. The staged features are those considered minimally necessary to contain and clean a spill in most cases in the aquatic environment. The ready measures are those that may be necessary or useful during spill response, but their deployment depends on the nature of the frac-out. In addition to these measures, a relief well rig will be available to implement the measures detailed in the April 3, 2008 letter from Bennett Trenchless Engineers to David Goldberg Re: Response to Coastal Commission 2.e.

Staged:

1. Stage a 50 ft floating silt curtain at south end of slough. The curtain will be rolled from the anchor line to the floats and attached to the floats with quick release straps. The curtain will be attached to a staging rope extended across the slough. The staging rope will be used to tow the curtain into position in the event of a frac-out. Once positioned, the curtain will be deployed by releasing the anchor line allowing the screen to extend from the waterline to the slough floor. If deployed, the curtain will remain installed until the site is completely cleaned.
2. Install terrestrial silt fence enclosing site of previous frac-out. The fence will be anchored to a row of sandbags with anchor staples. An additional row of sandbags will be laid on top of the stapled edge. The fence will be installed during low tide. This installation will remain until construction operations are completed. The fence will be maintained daily.
3. Boat staged on south side of slough at base of silt curtain. The boat will store remaining staged items and will be used to deploy the silt curtain.
4. Stage in boat a 50 gal drum, five sand bags to weigh the drum down over a frac-out, shovels, rakes, bags to contain shoveled soils.
5. Stage vacuum truck on upland site with hose staged and ready to be used at water's edge on south side of slough. Extension pieces to 150' staged and ready for use at water's edge.
6. 4-4x8x3/4 plywood sheets to protect vegetation in the marsh staged on slope near salt marsh

On site for use if needed:

1. MSDS for Bentonie and any additives in drilling fluid
2. 100 sand bags
3. absorbent mats for
4. 200' fiber rolls
5. 200' terrestrial silt fencing

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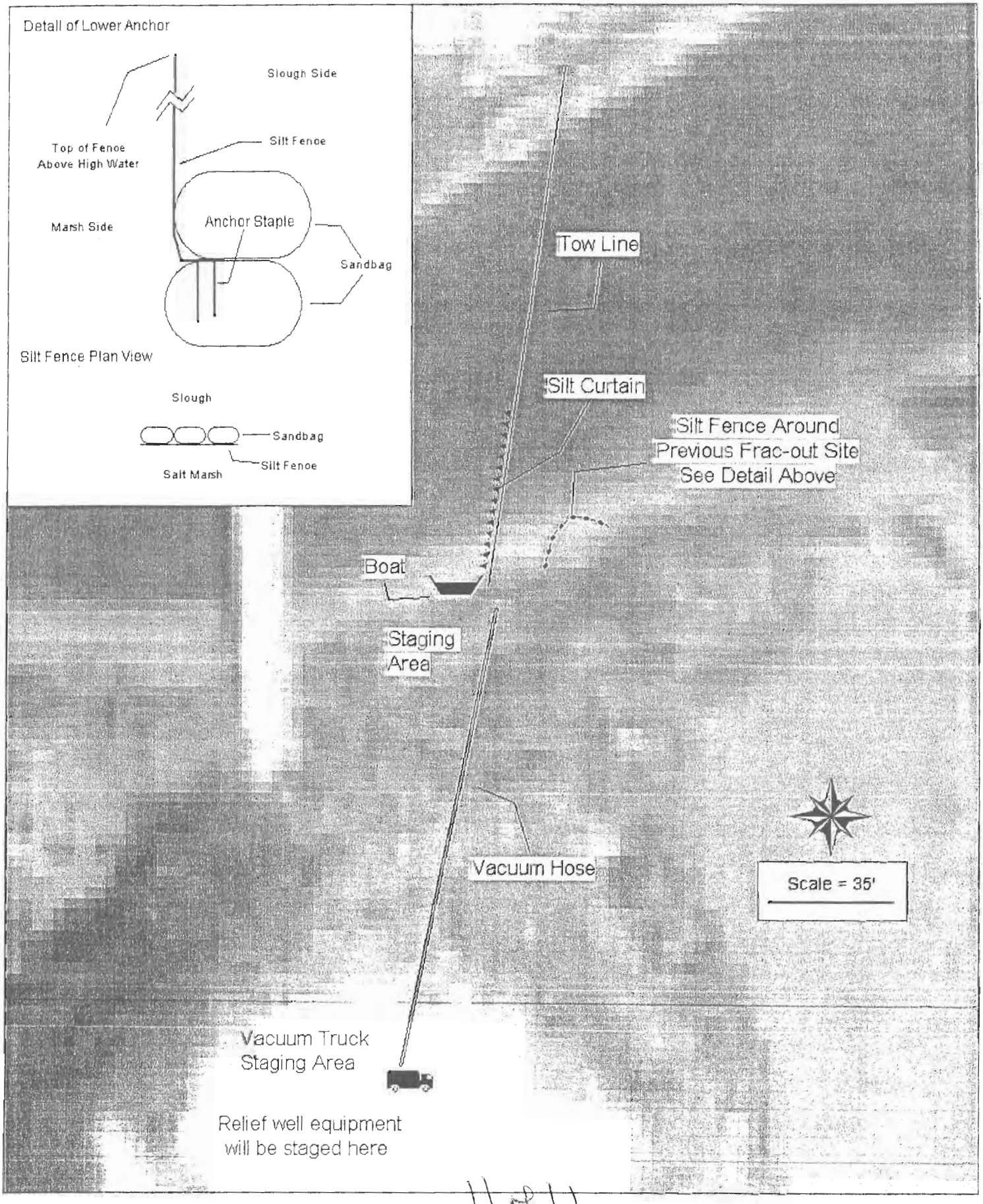
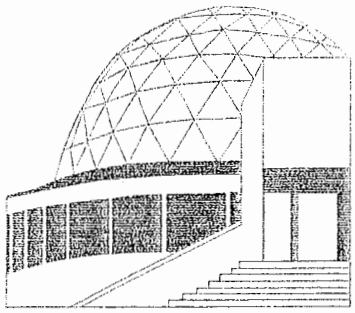
PG&E Line 137B HDD Frac-out Contingency Measures - This map shows the staging locations of "Staged" measures.





Applied Technology Services

Humboldt County Gas Line 137B Horizontal Directional Drill Crossing of Freshwater Slough

Hazardous Materials Management Plan

Prepared by

Pacific Gas and Electric Company
Applied Technology Services
3400 Crow Canyon Road
San Ramon California 94583

Prepared for
The California Coastal Commission
Eureka, California 95501

March 2008

Report No.: 402.331.08.5

Pacific Gas and Electric Company
Applied Technology Services
3400 Crow Canyon Road, San Ramon, California 94583

Prepared by

Ray E. Hintze

Ray E. Hintze
Chemist

Approved by

Clement O. Da Silva

Clement O. Da Silva
Senior Engineer

CONTENTS

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1 SCOPE

1.1 Introduction

This Hazardous Materials Management Plan defines hazardous materials control, containment, and spill removal procedures to reduce the risks associated with their use by Pacific Gas and Electric Company (PG&E) and any associated contractors (Contractor) for the Humboldt County Gas Line (G/L) 137B Horizontal Directional Drill (HDD) Crossing of Freshwater Slough. This plan includes identification of hazardous materials to be used in the project, restrictions to their use, protective and containment measures, contingency plans for cleanup of any accidental spills, and reporting protocols in the event of a spill. The plan applies to construction activities along the gas line right of way (ROW) and staging/lay down areas.

A copy of this Hazardous Materials Management Plan will be issued to the supervisors before project work begins. The Project Manager (PM) will discuss this plan with the workers before construction starts. As part of this education process, the PM will also distribute to each worker a placard summarizing individual worker responsibilities for minimizing spill risks.

1.2 Responsibilities

The Company is responsible for

- Providing an on site Environmental Inspector (EI) to monitor performance and ensure plan compliance.
- Providing daily communication between the PM and the EI.
- Ensuring that all project personnel understand their responsibilities under this plan.
- Completing spill reports.
- Immediately contacting agency personnel as required to report a spill.
- Complying with the provisions of this plan.

The contractor is responsible for

- Complying with all federal, state and local laws pertaining to the use of hazardous materials associated with this project.
- Reporting any spill to the EI and a PG&E Environmental Field Specialist (EFS).
- Requesting the PG&E EFS to be present during cleanup activity to ensure environmental compliance.
- Complying with the provisions of this plan.

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2 HAZARDOUS MATERIALS

Except for the drilling mud, pipe coating, and concrete slurry, all hazardous materials used on the construction site will be contained in vehicles and equipment necessary for pipeline construction. Under normal operation, no hazardous materials will be released from this equipment.

2.1 Fuels

Fuels used by equipment for this construction project are unleaded gasoline and diesel. A Manufacturer's Safety Data Sheet (MSDS) for each fuel is included in Appendix A.

2.2 Fluids

Fluids used by vehicles and equipment for this construction project are motor oil, gear oil, power steering fluid, brake fluid, automatic transmission fluid, hydraulic fluid, battery electrolyte, and antifreeze coolant. An MSDS for each fluid and miscellaneous material, such as drill pipe thread lubricating compound, is included in Appendix A.

2.3 Drilling Mud

Drilling mud is a mixture of water and bentonite (a natural clay). The MSDS for bentonite and a drilling mud additive (a polymer viscosifier) are included in Appendix A.

2.4 *Concrete*

Concrete will be used for abandoning the old gas line in place. An MSDS for concrete is included in Appendix A.

2.5 Pipe Coating

Protal two-part epoxy coating will be applied on girth welds and fittings. An MSDS for Protal is included in Appendix A.

3 RESTRICTIONS TO HAZARDOUS MATERIALS USAGE

3.1 Equipment Types

The types of motorized equipment anticipated to be used on the project include

- Track and tired diesel equipment such as flatbed trucks, dump trucks, water/vacuum trucks, backhoe, concrete trucks, boom truck, dozer, triflow recycler, self-contained vacuum unit, welder, and directional drill
- Pickup trucks and light duty vehicles

3.2 Equipment Use Areas

Equipment will be used in areas identified on the map (Figure 1). The project site south of Freshwater Slough is upland habitat, while the project site north of Freshwater Slough is wetland habitat. Access to

the southern portion of the project site is by way of Park Street (Figure 1), which is paved. Access to the northern portion of the project, which includes the wetlands under the California Coastal Commission jurisdiction, is shown as a hatched line in Figure 1 that begins along Devoy Road and uses an abandoned railroad right of way. Using existing culvert crossings will minimize disturbance to streambeds or swales. Routes to the construction sites were chosen to minimize environmental impacts.

For the new pipeline installation, the staging areas for supplies and equipment are: 1) the 100 ft x 100 ft area south of the Entry Bore Pit and 2) the 100 ft x 600 ft area immediately north of the Exit Bore Pit. Adjacent and north of this latter corridor is another 100 ft x 600 ft corridor that will be used for laying out the new pipe sections and welding them together.

For the old pipeline abandonment, equipment will be used on the immediate north side of Freshwater Slough where the existing pipeline is exposed from erosion. Here a 4–8 ft segment of this pipeline will be permanently removed. The section of old pipeline running north of this area to the new pipeline tie in will be plugged and inerted with nitrogen, with the exception of a 40-foot long segment running through the levee, which will be filled with concrete.

The section of old pipeline running underneath the slough will be filled with concrete from the Entry Bore Pit access point on the south side of Freshwater Slough.

3.3 Wetlands Areas

The California Coastal Commission wetland area for this project is shown in Figure 1. Work in these areas is the most critical with respect to control of hazardous materials.

3.4 Equipment Refueling

All vehicles and equipment will be refueled at the Eureka Service Center or at local gas stations, with the following exceptions: The backhoe, dozer, triflow recycler, and directional drill will be refueled during daylight hours at the staging areas using secondary drip pans with spill cleanup materials readily available.[1]

3.5 Equipment Maintenance

All equipment maintenance will take place at the Eureka Service Center or other off-site repair facilities. No maintenance or repair will take place at the construction site unless absolutely necessary. In such a case, the EI or EFS will be observing; secondary containment will be used; and spill kits will be immediately available.

[1] Matrix Environmental Planning. *Storm Water Pollution Prevention Plan, Humboldt-Arcata 60 kV Line Reconstruction.* Best Management Practice (BMP) NS-9.

4 PROTECTIVE AND CONTAINMENT MEASURES

4.1 Vehicle and Equipment Inspections

Within two weeks before construction begins, certified mechanics will thoroughly inspect all vehicles and equipment to be used on the project, including hydraulic system hoses and connections, for any potential or actual fluid leaks. The mechanics will record inspection results and actions taken on a master list that will be given to the PM. Thereafter, the equipment operators will check for any visible leaking fluids each day before moving the vehicles from the overnight parking spots, whether at the Eureka Service Center or at the construction site. The EI will also inspect for leaks when equipment is in operation. Any equipment exhibiting fluid leaks on the construction site will be immediately removed from the site and repaired before re-entering the site. If on-site fluid leaks are discovered, immediate spill cleanup procedures will be followed.[2]

4.2 On-Site Containment and Cleanup Materials List

On-site containment and cleanup materials include drain pans, empty drums, absorbent materials, oil absorbent booms, oil absorbent pads, plastic sheeting, filled sandbags, and a concrete washout basin. The EI will ensure that spill cleanup materials are present in each area where construction work is performed. Each vehicle or piece of equipment will have an on-site spill kit. Cleanup kits will be appropriate for each material used on the individual vehicle.

4.3 Washout Basin for Concrete Equipment

A washout basin for the concrete pump will be located at the upland "2-Temporary Work Area" site shown in Figure 1. No washout of concrete equipment will be done in any other place. No other vehicle or equipment washing will be done on the construction site (see Figure 2).[3]

5 CONTINGENCY PLAN FOR HAZARDOUS FLUID CLEANUP AND DISPOSAL

If a small spill of fluids contained in construction equipment occurs, construction workers will immediately

- Shut down the equipment.
- Contain the spill or leak.
- Notify the EI and a PG&E EFS.
- Remove all contaminated soil for proper disposal.
- Remove the equipment from the project area and take to a repair facility.
- Complete the spill report form provided in Appendix B.

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[2] Ibid. BMP WM-4.

[3] Matrix Environmental Planning. *Storm Water Pollution Prevention Plan, Humboldt-Arcata 60 kV Line Reconstruction.* BMP WM-8.

If a large spill, such as a broken hydraulic line, occurs, construction workers will immediately

- Assess the safety of the situation
- Stop the leak at the source if possible
- Contain the spread of the spilled fluid (e.g.,oil booms or earthen berm)
- Notify the EI and a PG&E EFS.
- Remove contaminated soil for proper disposal.
- Remove the equipment from the project area and take to a repair facility.
- Complete the spill report form provided in Appendix B.

Any spills caught with drip pans or absorbent materials will be taken to the Eureka Service Center for proper disposal in accordance with local, state, and federal regulations. Any contaminated soil will be removed and taken to Eureka Service Center before disposing in accordance with all applicable regulations. In the event of soil contamination, soil samples from the cleaned area will be submitted to an accredited environmental laboratory for analysis to ensure that the entire spill has been cleaned up.

6 CLEANUP OF NON-HAZARDOUS MATERIALS

Debris from miscellaneous trash, lunches, and breaks will be collected in trash containers in vehicles and disposed of in appropriate waste receptacles off site.

Portable sanitation facilities will be inspected daily for leaks by the EI. Any leaking units will be removed, and any contaminated soil will also be removed for proper disposal.

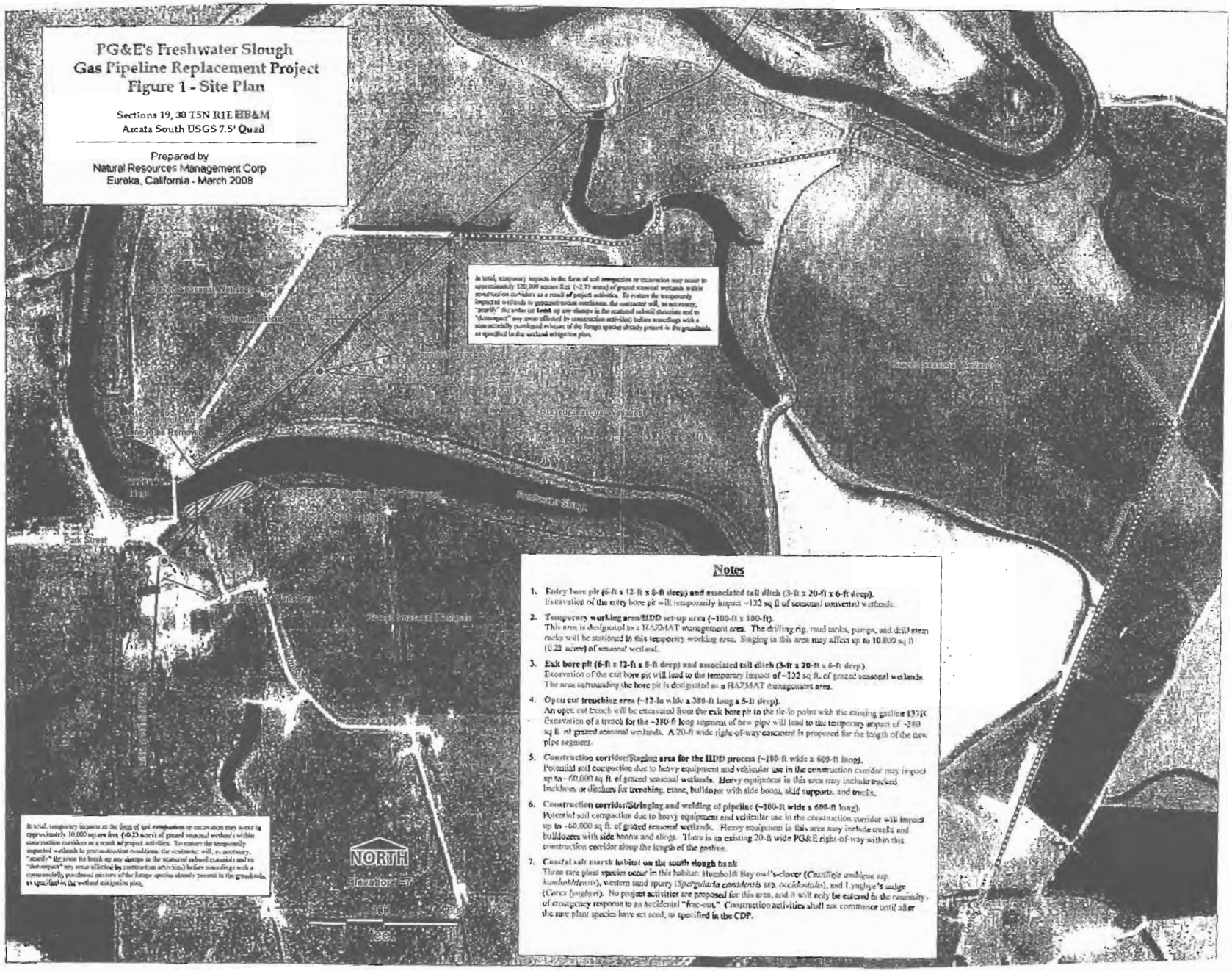
Specific details concerning cleanup of non-hazardous waste and construction materials will be found in the *Pacific Gas and Electric Company Line 137B Freshwater Slough Project Debris Disposal Plan.* (published by Pacific Gas and Electric Company, Corporate Real Estate.)

7 REPORTING PROTOCOLS IN THE EVENT OF A HAZARDOUS MATERIALS SPILL

Notification Contacts

1. PG&E Environmental Inspector, Aquila Doudna, office (707) 444-0873, pager (707) 256-6270 or Cell (707) 599-2679
2. California Department of Fish and Game, Scott Bauer, (707) 441-2011
3. National Oceanic and Atmospheric Administration, Clarence Hostler, (707) 825-5165
4. U. S. Army Corps of Engineers, Carol Heidsiek, (707) 443-0855
5. Regional Water Quality Control Board, Dean Prat, (707) 576-2801 or (707) 576-2220
6. California Coastal Commission, Bob Merrill, (707) 445-7833

Figures


PG&E's Freshwater Slough
Gas Pipeline Replacement Project
Figure 1 - Site Plan
Sections 19, 30 T5N R1E HB&M
Arcata South USGS 7.5' Quad
Prepared by
Natural Resources Management Corp
Eureka, California - March 2008
In total, temporary impacts in the form of soil compaction or excavation may occur to approximately 120,000 square feet (~2.75 acres) of grazed seasonal wetlands within construction corridors as a result of project activities. To restore the temporarily impacted wetlands to preconstruction conditions, the contractor will, as necessary, "scarify" the areas (at least up any changes in the scattered subsoil excavate and to "decompact" any areas affected by construction activities) before seedings with a commercially purchased mixture of the forage species already present in the grasslands, as specified in the wetland mitigation plan.
In total, temporary impacts in the form of soil compaction or excavation may occur to approximately 10,000 square feet (~0.23 acres) of grazed seasonal wetland within construction corridors as a result of project activities. To restore the temporarily impacted wetlands to preconstruction conditions, the contractor will, as necessary, "scarify" the areas (at least up any changes in the scattered subsoil excavate and to "decompact" any areas affected by construction activities) before seedings with a commercially purchased mixture of the forage species already present in the grasslands, as specified in the wetland mitigation plan.
NORTH
Elevations =/-
Notes
1. Entry bore pit (6-ft x 12-ft x 8-ft deep) and associated tail ditch (3-ft x 20-ft x 6-ft deep).
Excavation of the entry bore pit will temporarily impact ~132 sq ft of seasonal converted wetlands.
2. Temporary working area/HDD set-up area (~100-ft x 100-ft).
This area is designated as a HAZMAT management area. The drilling rig, mud tanks, pumps, and drill stem racks will be stationed in this temporary working area. Staging in this area may affect up to 10,000 sq ft (0.23 acres) of seasonal wetland.
3. Exit bore pit (6-ft x 12-ft x 8-ft deep) and associated tail ditch (3-ft x 20-ft x 6-ft deep).
Excavation of the exit bore pit will lead to the temporary impact of ~132 sq ft. of grazed seasonal wetlands. The area surrounding the bore pit is designated as a HAZMAT management area.
4. Open cut trenching area (~12-in wide x 380-ft long x 8-ft deep).
An open cut trench will be excavated from the exit bore pit to the tie-in point with the existing gasline 177(i). Excavation of a trench for the ~380-ft long segment of new pipe will lead to the temporary impact of ~380 sq ft of grazed seasonal wetlands. A 20-ft wide right-of-way easement is proposed for the length of the new pipe segment.
5. Construction corridor/Staging area for the HDD process (~100-ft wide x 600-ft long).
Potential soil compaction due to heavy equipment and vehicular use in the construction corridor may impact up to ~60,000 sq ft. of grazed seasonal wetlands. Heavy equipment in this area may include tracked backhoes or ditchers for trenching, crane, bulldozer with side boom, skid supports, and trucks.
6. Construction corridor/Stringing and welding of pipeline (~100-ft wide x 600-ft long).
Potential soil compaction due to heavy equipment and vehicular use in the construction corridor will impact up to ~60,000 sq ft. of grazed seasonal wetlands. Heavy equipment in this area may include trucks and bulldozers with side booms and slings. There is an existing 20-ft wide PG&E right-of-way within this construction corridor along the length of the gasline.
7. Coastal salt marsh habitat on the south slough bank
Three rare plant species occur in this habitat: Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*), western sand spurry (*Spergularia canadensis* ssp. *occidentalis*), and Lyngbye's sedge (*Carex lyngbyei*). No project activities are proposed for this area, and it will only be entered in the necessity of emergency response to an accidental "frac-out." Construction activities shall not commence until after the rare plant species have set seed, as specified in the CDP.

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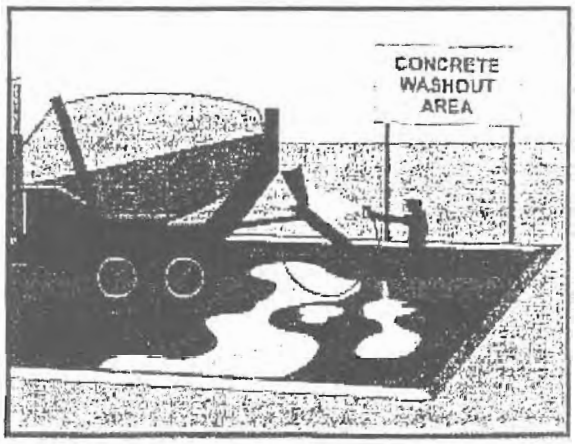
Concrete Waste Management WM-8



Objectives		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	✓

Legend:
✓ Primary Objective
✓ Secondary Objective

Targeted Constituents	
Sediment	✓
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives
None

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite, performing onsite washout in a designated area, and training employee and subcontractors.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result form demolition activities
- Slurries containing portland cement concrete (PCC) or asphalt concrete (AC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition
- Concrete trucks and other concrete-coated equipment are washed onsite
- Mortar-mixing stations exist
- See also NS-8, Vehicle and Equipment Cleaning

Limitations

- Offsite washout of concrete wastes may not always be possible.

CASQA
California Stormwater Quality Association

Figure 2. Diagram of on-site concrete waste management.

Appendices

12 9 12

PACIFIC GAS AND ELECTRIC COMPANY
LNE 137B FRESHWATER SLOUGH PROJECT
DEBRIS DISPOSAL PLAN

General Notes

- No construction materials, debris or waste shall be placed or stored during construction in a manner where they may be subject to entering wetlands or other coastal waters.
- Any and all debris resulting from construction activities will be removed within 30 days following the construction activities.
- Soils stockpiling shall be controlled. Areas excavated for trenching and the entrance and receiving pits will generate backfill which will be used to refill the holes. This backfill soils will be stored on plastic sheeting next to the work area. Backfilling the trench/pits involves replacing the excavated subsoil in the appropriate layers. Where the subsoil is unsuitable for us as backfill, it will be hauled from the site and imported backfill will be used. It will be covered to prevent silt travel if rain is present. Excess soils will be disposed of on a daily basis through out the project.

1.0 Pipeline Removal

- There will be a section of pipe that will be removed within the Coastal Commission Zone.
- The pipe will be removed, cleaned and taken to the Eureka Center Hazardous Collection Facility.

2.0 Erosion Control Debris

- Erosion controls consists of (but is not limited to) wood stakes, silt fencing fabric, sand bags, straw waddles and / or straw bales.
- All debris will be taken to the Eureka or Fortuna transfer stations for disposal.
- Sand bag condition will be evaluated for future use within the PG&E system. Sand bags which will be disposed of will be emptied at the PG&E Humboldt Substation and the bags will be disposed of at the Eureka transfer station.

3.0 Excess Soils

- PG&E will use excavated soils to backfill trench and entrance and receiving pits.
- Excess spoils will be disposed of through the PG&E soils disposal process. Customers come to the PG&E Eureka Service Center and request excess soil be brought to their property. PG&E has a form to release the soils upon delivery. Project soils will be disposed of through this process in upland, non Coastal Commission Zone property only. If required, PG&E will provide quantities and addresses where the soils were disposed of.
- The excess soils will be stockpiled and protected against silt run off on PG&E property until all soils are disposed of.

EXHIBIT NO. **11**
APPLICATION NO.
1-04-010-A1
PACIFIC GAS & ELECTRIC
DEBRIS DISPOSAL PLAN
(1 of 5)

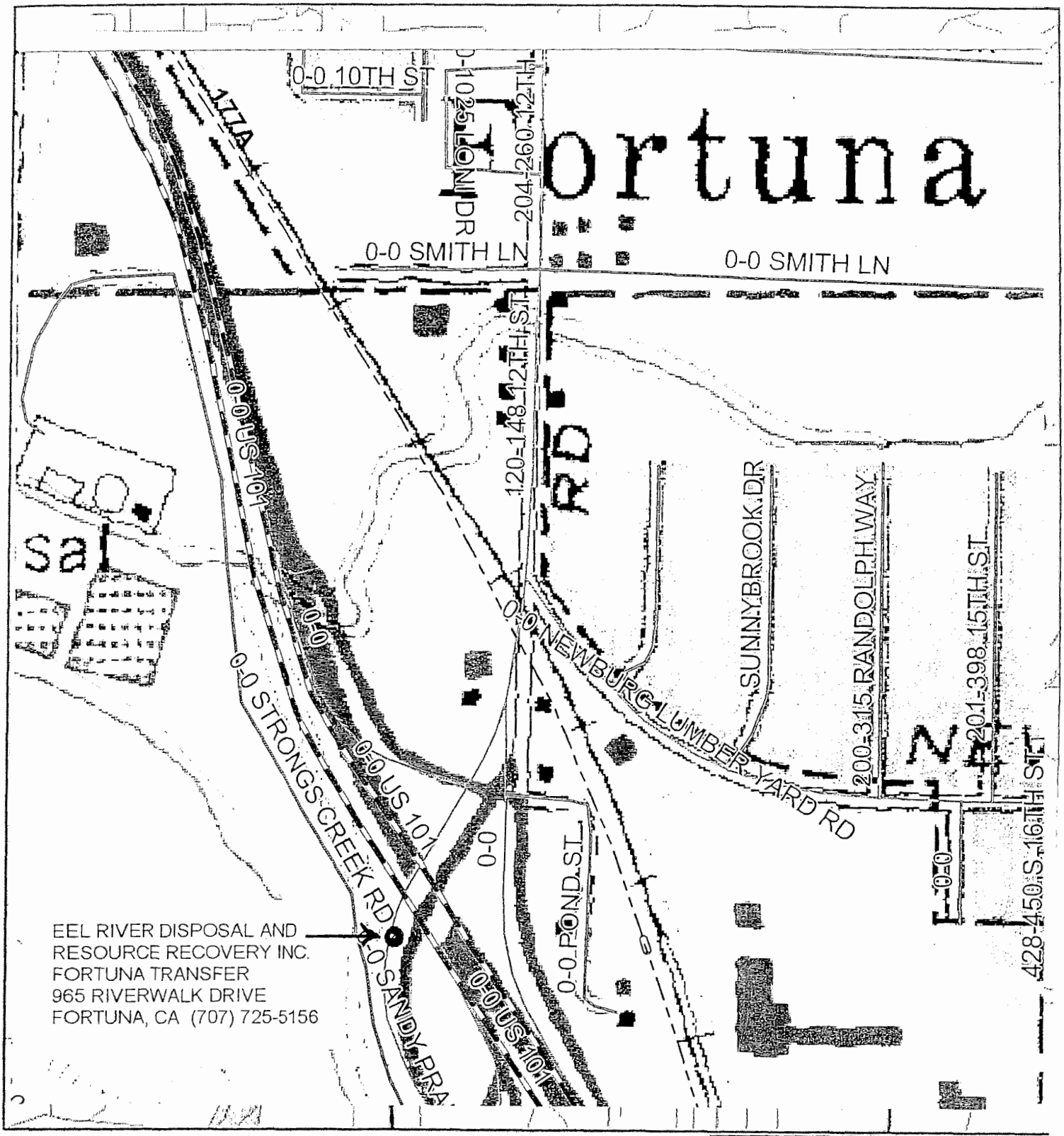
PACIFIC GAS AND ELECTRIC COMPANY
LNE 137B FRESHWATER SLOUGH PROJECT
DEBRIS DISPOSAL PLAN

4.0 Hazardous Materials

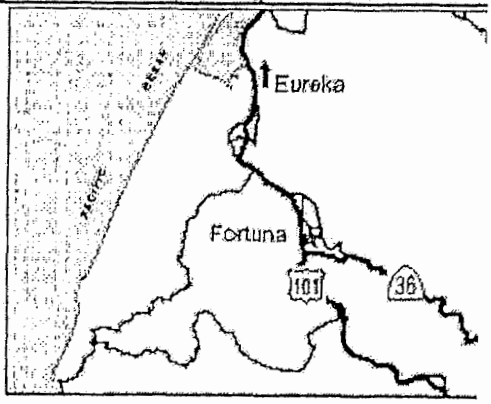
- Hazardous material for this project consists of empty aerosol cans, oily rags, cleaning product containers and fuels and lubricants in construction equipment. No fuels or lubricants will be stored on the construction location.
- This debris will be disposed of at the Eureka Service Center Hazardous Collection Facility. Disposal is addressed through the PG&E hazardous waste disposal contracts.

5.0 Trash

- This will generally consist of trash generated from lunches, dinners, materials labeling/wrapping and boxes.
- There will be trash containers on the vehicles for collection in the field, trash cans at the lay down area.
- All debris will be taken to the Eureka or Fortuna transfer stations for disposal.



Line 137B Freshwater Slough Project



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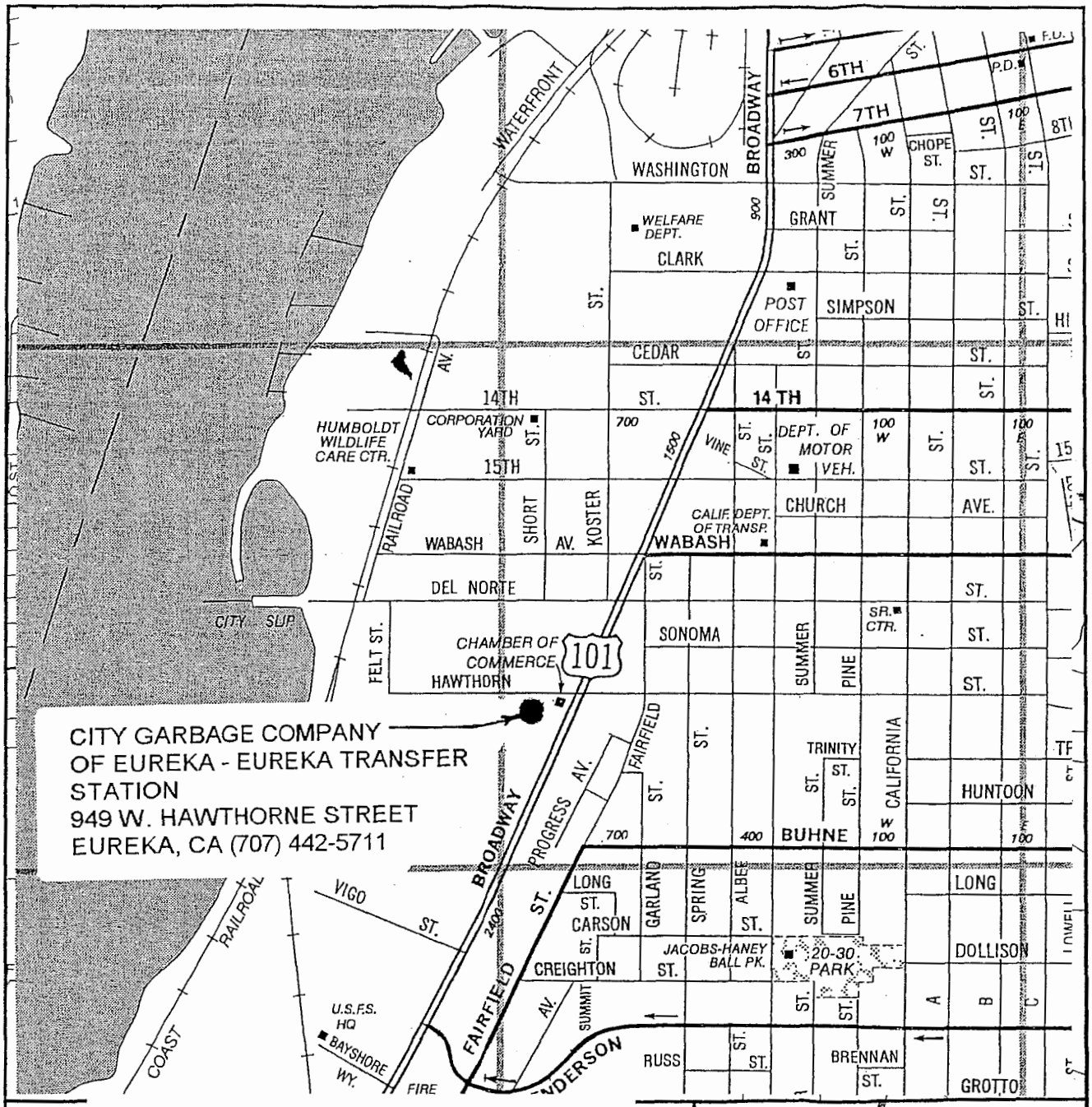
EEL RIVER DISPOSAL AND
RESOURCE RECOVERY INC.
FORTUNA TRANSFER
965 RIVERWALK DRIVE
FORTUNA, CA (707) 725-5156

3 of 5



Line 137B Freshwater Slough Project

CITY GARBAGE COMPANY
OF EUREKA - EUREKA TRANSFER
STATION
949 W. HAWTHORNE STREET
EUREKA, CA (707) 442-5711

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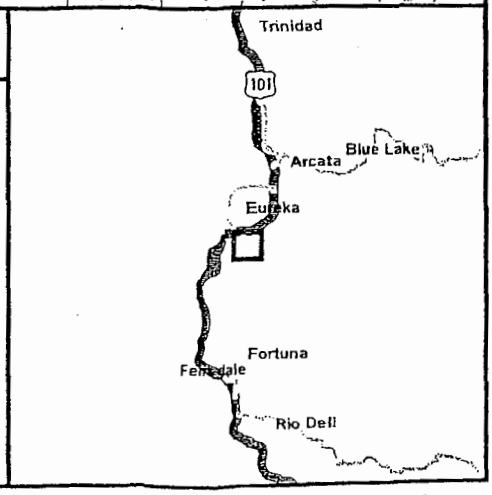
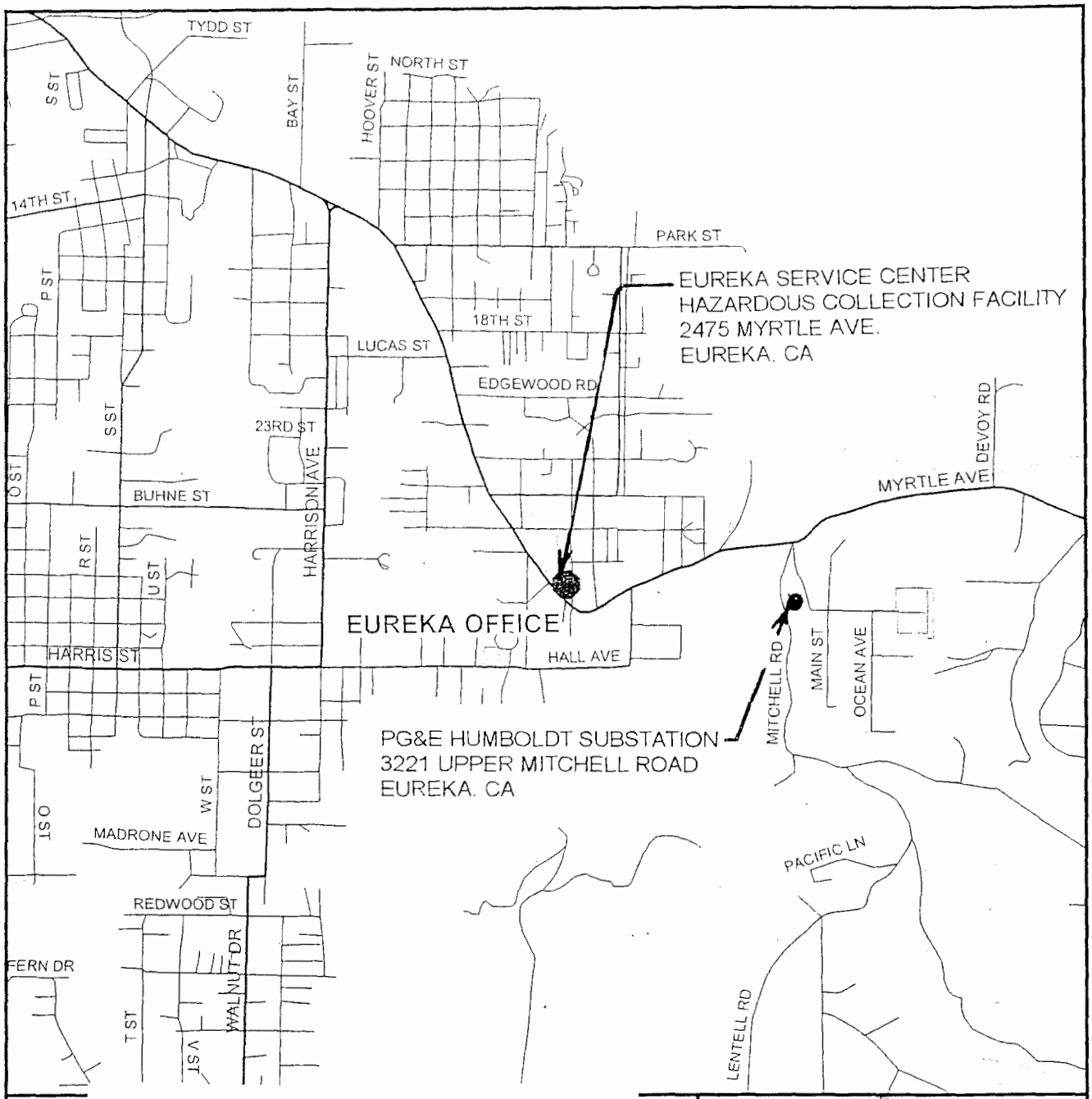


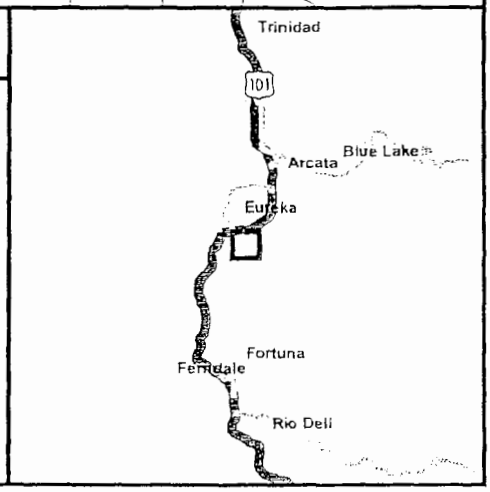


Line 137B Freshwater Slough Project

EUREKA SERVICE CENTER
HAZARDOUS COLLECTION FACILITY
2475 MYRTLE AVE.
EUREKA, CA

PG&E HUMBOLDT SUBSTATION
3221 UPPER MITCHELL ROAD
EUREKA, CA

N



NRM
NATURAL RESOURCES MANAGEMENT
CORPORATION

1434 Third Street • Eureka, CA • 95501-0682
707 442-1735 • fax: 707 442-8823
Email: nrm@nrmcorp.com
Web: www.nrmcorp.com

Wetland Mitigation Plan for Pacific Gas and Electric Company's Freshwater Slough 137B Gas Pipeline Replacement Project

Submitted to: Craig Geldard, Aquatic Biologist/Environmental Coordinator
Pacific Gas and Electric Company
3400 Crow Canyon Road
San Ramon, California 94583

Patricia Sanchez, Permitting Specialist
Pacific Gas and Electric Company
245 Market Street, Mail Code N10A
San Francisco, CA 94403

Prepared by: David Loya, Plant Ecologist
Natural Resources Management Corp.
1434 Third Street
Eureka, CA 95501
Phone: (707) 269-1382
E-mail: dloya@nrmcorp.com

Submitted: March 26, 2008

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Attachments

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1 Summary

The Pacific Gas and Electric Company (PG&E) proposes to replace am approximately 1,350-ft section of gas line beneath and adjacent to Freshwater Slough, which will cause temporary impacts to approximately 2.75 acres of grazed seasonal wetlands on the north end of the project and approximately 0.23 acres of un-grazed converted seasonal wetlands on the south end. Temporary impacts will occur from heavy equipment use resulting in soil compaction, vegetation removal, and excavation within a construction corridor approximately 100-ft by 1,200-ft (~2.75 ac) in size on the north side of the slough and approximately 100-ft by 100-ft in the work area at the entrance pit south of the slough. PG&E proposes to fully restore all affected wetland acres, with consideration for their associated functions and values, to preconstruction conditions. This will be achieved through various mitigation measures involving topsoil stockpiling, site grading, soil decompaction, reseeding, and other measures described below. The mitigation success will be monitored and contingency measures will be implemented should the mitigation prove unsuccessful.

2 Project Location

The project area is located near the northeastern edge of Eureka on and around Freshwater Slough, which flows into Eureka Slough, which flows into Humboldt Bay in Humboldt County, California (Project Location, Attached). The legal description of the project area includes Sections 19 and 30 of T5N and R1E, HBM on the Arcata South U.S.G.S. 7.5-minute quadrangle map. The topography is more or less flat, and the elevation is approximately seven feet (see Site Plan, attached).

3 Project Description

Pacific Gas and Electric Company's (PG&E) project involves replacing a 1,350-foot section of 8-inch diameter high pressure natural gas transmission pipeline (Line 137B) in Eureka, California. PG&E is proposing to install approximately 970 feet of 8-inch pipeline beneath Freshwater Slough using the horizontal directional drilling (HDD) method. The estimated depth of the new alignment will be approximately 85 feet beneath the channel of the slough. The remaining 380 feet of pipeline will be installed on the north side of the slough using an open cut trench method.

The new alignment will remove a dog-leg in the existing alignment and provide the correct configuration and position to string the pipe for pullback under the slough. Once the new pipe is tied in, PG&E will remove a section (4 to 8 feet) of the existing pipe (exposed pipe) extending out from the channel (north end of bridge). The remainder of the line will be filled with concrete slurry and abandoned in place. The removal of the pipe (4 to 8 feet) from the channel would take place during the late summer, at low tide, and would be done by boat from the bank of the slough. No disturbance to the bank or removal of any material from the slough is expected. Access to the south bank (entrance pit) will be via Park Street and access to the north tie-in point/exit bore pit will be via Myrtle Road to Devoy Road through private property to the site.

The project work area will include approximately 380 feet of trenching approximately one ft wide by five ft deep for installation of the new pipe. Stockpiles or windrows of topsoil and subsoil excavated from the trench are all temporary.

The HDD process utilizes a large hydraulically-powered horizontal drilling rig. The drilling rig is usually transported on a lo-boy trailer pulled by a semi-trailer truck. New pipeline segments will

also be transported to the project site on tractor-trailer flatbeds. The pipeline segments will be offloaded using a small crane, backhoe, or excavator. Additional HDD support equipment and vehicles include a drilling mud tank, a power unit for the hydraulic pumps, mud pumps, back-hoe or excavator, forklift, bulldozer with wide boom, 2-ton dump truck, 1,500 gallon water truck, welder, 3,200 gallon self contained vacuum unit, and various utility and crew vehicles. An exhaustive description of the project, including drilling methodology details, is available in the permitting documents.

4 Potential Impacts & Mitigation Needs

4.1 Jurisdictional Areas Potentially Impacted

Project activities will cause temporary impacts to "diked former tidelands" in the Coastal Zone, which are classified as "grazed seasonal wetlands" (also known as "farmed wetlands"). Temporary impacts to grazed seasonal wetlands will result from the following:

- Soil compaction and vegetation removal may occur to a total of up to 60,000 sq ft. (~1.38 ac.) of grazed seasonal wetlands due to the use of a 100-ft wide by 600-ft long construction working strip along the pastureland between the northern slough bank and the tie in point with the existing pipeline. Heavy equipment in this area may include tracked backhoes or ditchers for trenching, a crane, a bulldozer with side boom, skid supports, and trucks.
- Excavation of the exit bore pit (6-ft x 12-ft x 8-ft deep) and associated tail ditch (3-ft x 20-ft x 6-ft deep) will temporarily impact 132 sq ft. of grazed seasonal wetlands within the above-mentioned construction corridor.
- Excavation of an open cut trench (approximately 12-in wide x 380-ft long x 5-ft deep) will temporarily impact 380 sq ft. of grazed seasonal wetlands within the above-mentioned construction corridor. The trench will extend from the exit bore pit to the northern tie-in with the existing line.
- Potential soil compaction and vegetation removal may occur to an additional 60,000 sq ft. (~1.38 ac.) of grazed seasonal wetlands due to the use of an additional 100-ft wide by 600-ft long construction corridor north of the tie-in point, where activities will generally be limited to the stringing and welding of the pipe segment to be pulled back through the bore under the slough. Heavy equipment in this area may include trucks and bulldozers with side booms and slings.
- Soil compaction and vegetation removal may occur in the 10,000-sq ft (~0.23 ac) temporary work area associated with the entry bore pit. Heavy equipment will stage and operate in this area.
- Excavation of the entry bore pit (6-ft x 12-ft x 8-ft deep) and associated tail ditch (3-ft x 20-ft x 6-ft deep) will temporarily impact 132 sq ft. of un-grazed seasonal wetlands within the above-mentioned temporary work area.

In total, the project may cause temporary impacts resulting from soil compaction, vegetation removal, and excavation to approximately 130,000 sq ft (~3 acres) of seasonal wetlands (see Site Plan, attached); 120,000 sq ft are on the northern end of the project and 10,000 sq ft are on the southern end of the project.

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Additional potential impacts to wetlands could arise in the event of an accidental spill of drilling fluids ("frac-out"). Drilling fluids could discharge into Freshwater Slough and adjoining wetland areas, including coastal salt marsh. The project includes a drilling fluid spill contingency plan, which helps minimize damage to natural resources and provides feasible mitigation for restoring any areas impacted in the event of a spill (see PG&E 2005).

The affected wetlands in the project area fall under the regulatory jurisdiction of the U.S. Army Corps of Engineers (Section 404 of the Clean Water Act and Section 10 of the River and Harbors Act), the U.S. Department of Commerce, NOAA (Section 7 of the Endangered Species Act and Section 402 of the CWA), California Coastal Commission (Chapter 3 of the Coastal Act), the California Department of Fish and Game (Section 1603 of the Fish and Game Code), and the California Regional Water Quality Control Board (Section 401 of the Clean Water Act, Water Quality Certification).

4.2 Mitigation Purpose & Goal

The purpose of this mitigation plan is to ensure the continued functionality of all affected wetlands after construction is completed. Therefore, the proposed mitigation goal is the on-site, in-kind restoration, with respect to area as well as associated functions and values, of all affected wetlands to preconstruction conditions. The restoration area goal is a full 1:1 ratio, which is sufficient since the impacts are temporary, and success is highly probable. A restoration at this site using the methods presented here was successful after having been implemented for the aborted 2005 HDD project.

5 Existing Conditions of Project Area and Affected Wetlands

The project area is located within the Coastal Zone at approximately 7 feet above sea level. The site is located in diked former tidelands, which, prior to European settlement in the region, were unleveed, intertidal, mostly coastal salt marshes. These areas were converted for agriculture, variously drained (through diking, channeling, etc.), and now are used primarily for cattle grazing. The land remains wetland because the underlying sediments are highly reduced, nearly impermeable silts and clays, and many areas are seasonally ponded. The soils of these "grazed seasonal wetlands" or "farmed wetlands," as they've historically been known, are classified as Bayside (Ba) silty clay loam (McLaughlin & Harradine 1965), which is listed as a hydric soil by the Natural Resources Conservation Service (NRCS, 1995; see soil survey map for project area, attached). The NRCS classifies the soils in the area as Occidental, which are very poorly drained and exhibit frequent ponding (NRCS 2007). The hydric soils and wetland hydrology of the grazed seasonal wetlands support various perennial and annual species that are highly tolerant of seasonal flooding. Among these are various exotic pasture grasses. Species in the area include curly dock (*Rumex crispus*), tufted hairgrass (*Deschampsia caespitosa*), creeping buttercup (*Ranunculus repens*), spreading bentgrass (*Agrostis stolonifera*), sweet vernal grass (*Anthoxanthum odoratum*), orchard grass (*Dactylis glomerata*), velvet grass (*Holcus lanatus*), tall fescue (*Festuca arundinacea*), perennial ryegrass (*Lolium perenne*), and others.

The 2008 project description includes a 10,000-sq ft temporary work area on the southern side of the slough that was not included in the previous project. This work area is also in a converted wetland, which has been partially drained and variously impacted by land use throughout its history. The work area is adjacent to brackish to freshwater wetlands west of the project site.

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These wetlands are influenced by water impounded at Park Street. These wetlands are dominated by curly dock, perennial rye grass, spreading bentgrass, and orchard grass.

The project area on the south bank of Freshwater Slough supports coastal salt marsh habitat adjacent (Salt Grass series and/or Pickleweed series in Sawyer and Keeler-Wolf, 1995), a slightly brackish seasonal wetland on the "upland" side of the levee/berm, and a weedy grassland that presumably has been filled and graded by the property owner. The soils on the south side of the slough are also classified as hydric (Bayside) (McLaughlin & Harradine 1965; NRCS 1995; NRCS 2007, see soil survey map for project area, attached). Vegetation along the slough bank and in the salt marsh consists of Lyngbye's sedge (*Carex lyngbyei*, a CNPS List 2 species[1]), dense-flowered cord grass (*Spartina densiflora*), salt grass (*Distichilis spicata*), pickleweed (*Salicornia virginica*), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*, a CNPS List 1B species), western sand spurry (*Spergularia canadensis* var. *occidentalis,* a CNPS List 2 species), seaside arrow-grass (*Triglochin maritima*), jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), and various other species (NRM 2003; also see Sawyer & Keeler-Wolf 1995 for associated species). Vegetation in the slightly brackish seasonal wetland on the "upland" side of the levee consists of salt grass, brass-buttons (*Cotula coronopifolia*), saltbush (*Atriplex* sp.), Pacific silverweed (*Potentilla anserina* ssp. *pacifica*), tufted hairgrass, and others. South of this wetland, the area is dominated by nonnative species such as weedy pampas grass *(Cortaderia jubata)*, orchard grass, tall fescue, common velvet grass, hairy cat's-ear *(Hypochaeris radicata)*, curly dock, and others. This area has been filled and graded.

6 Characteristics, Functions, & Values of Affected Wetlands

The wetlands that will be temporarily impacted by project activities are "grazed seasonal wetlands" (diked former tidelands) classified by the U.S. Fish and Wildlife Service (Cowardin *et al.* 1979) as Palustrine, Emergent, Non-persistent, Seasonally Flooded/Saturated wetlands (PEM2E). This type of wetland includes nontidal wetlands dominated by annual plants or perennials whose above-ground biomass does not survive the beginning of the subsequent growing season. In the project area, these wetlands, with their underlying impermeable soils, become ponded and saturated for sufficient duration in the rainy season to support a predominance of hydrophytic vegetation. The natural wetland types from which these seasonal wetlands were converted are classified mostly as Estuarine, Intertidal, Emergent, Persistent wetlands (E2EM3, coastal salt marsh/tidal marsh) and Estuarine, Intertidal, Streambed, Mud (E2SB5, e.g., Freshwater Slough).

The functions and values of the affected wetlands are limited for two main reasons. First, the wetlands that will be affected temporarily by project activities have a history of disturbance from grazing and other human uses. Second, due to the small cumulative size of the affected wetlands (~3 acres), the significance of their functional role in the ecosystem is limited.

[1] Species listed by the California Native Plant Society (CNPS) in the *Inventory of Rare and Endangered Plants of California* (6th edition, 2002) are categorized as follows: **List 1A**: presumed extinct in CA; **List 1B**: rare, threatened, or endangered in CA and elsewhere; **List 2**: rare, threatened, or endangered in CA, but more common elsewhere; **List 3**: need more information – a review list; **List 4**: uncommon – a watch list.

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Nevertheless, the affected wetlands contribute to various ecological functions, including the following (also see Roberts Environmental Consulting 2002 for the City of Eureka's Mad River Pipeline Wetland Mitigation Plan):

- **Flood control**: The grazed seasonal wetlands, located in the lowest reaches of the watershed, function as part of the larger reservoir inside the levees around Humboldt Bay. These wetlands detain floodwaters and, thereby, protect adjacent uplands and infrastructure located in uplands.
- **Water quality protection**: As the grazed seasonal wetlands detain overland flows of precipitation, the soil microfauna likely break down at least some of the pollutants of water quality concern.
- **Terrestrial habitat**: Because of their history of disturbance, the grazed seasonal wetlands do not have a high wildlife habitat functional rating. They likely support robust rodent populations and are foraging grounds for many raptor and other bird species. In addition, deer, and likely other small mammals, are common on the bottomlands. Project impacts are not proposed for sensitive terrestrial habitat areas such as salt marsh or in un-grazed freshwater or brackish marsh. Botanical surveys in the project area resulted in no detections of sensitive species in the grazed seasonal wetlands (NRM 2003).
- **Aquatic habitat support**: As the affected wetlands are seasonal, they do not provide direct aquatic habitat functions. Indirectly, however, they contribute to the export of nutrients to the aquatic environment, providing limited "food web" support.
- **Aesthetic values**: The grazed seasonal wetlands offer the (subjective) "values" of "open space" and "aesthetic condition." However, project activities will not affect the openness of the area at large, and the aesthetic condition of the project area will not be significantly altered by the pipe realignment since all impact areas will be restored to preconstruction conditions.

7 Mitigation Goals & Objectives

During the 2004 project, the Coastal Commission specified the following goals and objectives for the "mitigation areas" (see Notice of Intent to Issue Permit #1-04-010 dated November 30, 2004), which, in this case, includes the combined ~120,000 sq ft. construction corridors:

> *Areas of temporary disturbance within seasonal wetlands including the construction corridor and any other disturbed sites, including any construction access routes within the grazed seasonal wetlands not following established roadways shall be (i) restored to before-impact elevations in a manner that does not result in depressions, ridges, or mounds; (ii) decompacted, and (iii) replanted with a commercially available seed mixture composed of the same grass species that dominate the perennial grasslands at the present time to a level of coverage and density equivalent to vegetation coverage and density of the surrounding undisturbed areas.*

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8 Work Plan for Restoring Wetlands to Preconstruction Conditions

The construction-related trenching, bore pit excavation, and heavy equipment use will result in temporary impacts to seasonal wetlands in a total of ~130,000 sq ft (~3 ac). The estimate accounts for the maximum potential impact area based on the project description. The impacts will vary in intensity depending on the activities implemented on the ground. While impacts will be most intense in the excavation areas, much of the temporary work area may not be impacted at all. The types of impacts range from top and subsoil disturbance to minor vegetation disturbance.

Excavation activities will cause the largest and potentially the longest lasting impacts. Excavation may affect soil compaction, chemistry, and fauna. To ensure the most effective restoration of the excavation sites, the excavated subsoil material will be replaced within the excavated areas. The subsoil will be stockpiled on-site in a manner that prevents its erosion or other movement off-site; site BMPs will ensure stability of stockpiled soils. Because the newly installed segment of pipe will occupy a volume within the trench that will no longer be available for soil, there will be excess soil material. The excess subsoil will be disposed of through PG&E's soils disposal process, whereby owners of property in upland, non-coastal zone locales can request and receive spoils (refer to Project Debris Disposal Plan).

The subsoils are less productive, generally, than topsoil. For this reason, the topsoil will be stockpiled separately from the subsoil and will be replaced in a topsoil position in the excavated areas. PG&E's contractor will be required to leave adequate room at the top of the trench in which to replace the majority of the topsoil material originally removed from the trench location within the trench excavation. The contractor will, as necessary, "scarify" the construction corridors and temporary work areas to break up any clumps in the scattered subsoil materials and to "decompact" any areas affected by construction activities before reseeding with commercially purchased mixture of the forage species already present in the grasslands, as noted below.

The following measures are recommended to achieve the mitigation goal of fully restoring the affected grazed seasonal wetlands to preconstruction conditions:

1. Prior to construction, all work areas and construction corridors shall be delineated, and all construction activities shall occur within the delineated limits. All vehicles and construction equipment shall be restricted to pre-established work areas and roads.
2. A pre-project worker education program shall be held for construction crews to ensure that all ground personnel are aware of work area boundaries, wetlands, and other sensitive resources in the project area.
3. The top 6 to 8 inches of topsoil contains the roots, seeds, and accumulated organic material of the vegetation that dominates the grazed seasonal wetlands. Excavated topsoil shall be stockpiled separately from the underlying soils (subsoil). Stockpiled topsoil shall be kept moist until replaced in the areas from which it was excavated, and they shall be replaced in the topsoil position. Final grading of topsoil shall match the original contour.
4. Erosion and sediment control BMPs shall be employed around temporarily stockpiled spoils material and work areas.

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5. Backfilling the excavated areas shall involve replacing the excavated subsoil in the layers from which they were excavated, and spreading the stockpiled topsoil as the top fill material, to return the surface to its original grade.
6. All areas of temporary impact within seasonal wetlands shall be restored to before-impact elevations in a manner that does not result in depressions, ridges, or mounds.
7. All areas of temporary impact within grazed seasonal wetlands shall be ripped to break up any clumps in the scattered subsoil materials and to "decompact" any areas affected by construction. This shall occur prior to seeding, as specified below.
8. Following completion of backfilling, equipment removal, site grading, and soil decompaction, the construction corridors and work areas within the seasonal wetlands shall be hydroseeded or broadcast seeded as necessary with a commercially available seed mixture composed of the same grass species that dominate the perennial grasslands at the time of construction.
9. A qualified biological monitor shall be present on site during all construction and restoration activities.
10. All excess stockpiled soils shall be taken to one of the off-site disposal facilities mentioned in the Debris Disposal Plan.

9 Success Criteria

Implementation - The restoration/mitigation work shall be considered successful upon implementation when all the measures in section 8 are implemented as verified by a biologist. To ensure efficient compliance, the biologist that monitors the work shall verify at each step that it has been successfully carried out. Critical stages include the placement of soil in the correct horizons, proper grading and decompaction, and seeding.

Corrective Measures – Any work that cannot be verified by the biologist to meet the mitigation specifications shall be redone to specifications prior to finalizing construction

Term – The restored wetlands shall match vegetative composition and cover and topography of adjacent seasonal wetlands by the end of the first 18 months. The following criteria shall be used to evidence the form and function of the wetlands has been recovered to predisturbance conditions.

Plant cover and composition shall be verified by a biologist by comparing vegetation in the construction corridor with that of the adjacent undisturbed areas. The plant establishment shall be considered successful if there is no visual difference between the areas. If there is a visual difference, differences in plant cover shall be no larger than 10 percent between the areas.

The topography criterion shall be considered satisfied if no major differences in topography, such as depressions that affect hydrologic patterns or vegetative establishment, occur within the monitoring period. Minor soil settling may occur, and slight topographic changes that do not affect hydrology (i.e., ponding) or vegetation shall not be considered a deficiency.

Corrective Measures – If the plant composition or cover is dissimilar from the adjacent pasture, reseeding is indicated. Broadcast seeding shall be used in areas that do not meet the success criteria. Depending on the time of year, the seeded areas may require irrigation.

If the topography criterion is not satisfied, clean top soil shall be imported using hand tools (i.e., wheel barrow, & etc) to recontour the elevations. Trucks and other heavier equipment shall not be used, as these will compact the wetland soils.

10 Maintenance & Monitoring

All maintenance and monitoring activities shall be carried out or overseen by a qualified biologist. All restored wetland areas shall be protected and maintained throughout an 8-week establishment period by watering, fertilizing, re-seeding, and repairing, as necessary to establish thick, uniform plant growth. Areas that fail to produce uniform growth shall be reseeded, which will necessitate the initiation of a new 8-week maintenance period beginning at the time of reseeding.

A vegetation monitoring report that evaluates the success criteria shall be prepared by a qualified biologist or botanist. The report shall be submitted to the Coastal Commission within 18 months of project completion. If the report indicates that the revegetation of any of the disturbed areas, including the construction corridor and staging areas, has not been successful, in part or in whole, the contingencies or a revised revegetation program shall be implemented and the monitoring period shall be extended until success is documented.

11 References

CNPS (California Native Plant Society). 2001. *Inventory of Rare and Endangered Plants of California*. Special Publication #1, 6th edition. Rare Plant Scientific Advisory Committee, D.P. Tibor, convening editor. California Native Plant Society, Sacramento, CA. 387 pp.

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--. 2007. Soil Map – Humboldt County Central Part, California: (PGE Freshwater Slough). Web Soil Survey accessed online at http://websoilsurvey.nrcs.usda.gov/app/ on June 18, 2007.

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PG&E (Pacific Gas and Electric Co.). January 13, 2005. *HDD Fluid Release Contingency Plan G/L 137B Crossing of Freshwater Slough Project*. Unpublished technical report prepared by PG&E Technical and Ecological Services for PG&E Corporate Real Estate. San Ramon, CA.

Roberts Environmental Consulting. April 20, 2002. *Mitigation at Ryan Slough Pump Station for Mad River Pipeline Vaults*. Memorandum submitted to the City of Eureka Community Development Department (Lisa Shikany) by Chad Roberts. Davis, CA.

Sawyer, J.O. & T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society, Sacramento, CA.

Attachments:

Project Location Map

Site Plan – ("Figure 1 – Site Plan")

Site Plan & Wetland Features – Restoration Plan

Soil survey map for project area

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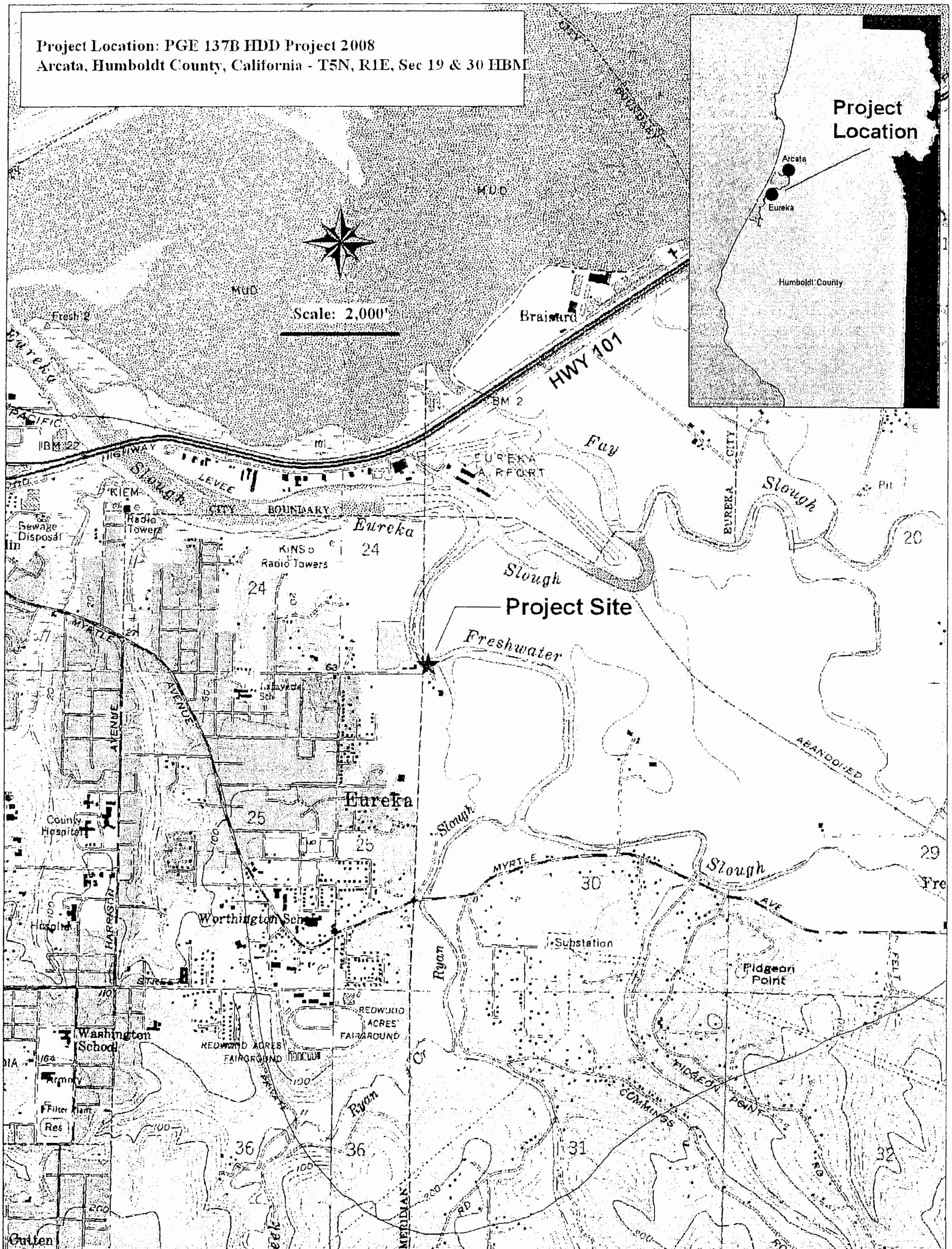
Project Location: PGE 137B HDD Project 2008
Arcata, Humboldt County, California - T5N, R1E, Sec 19 & 30 HBM
Project Location
Arcata
Eureka
Humboldt County
Scale: 2,000'
HWY 101
Project Site
MUD
Brainard
EUREKA AIRPORT
Eureka Slough
Fay Slough
Freshwater Slough
CITY BOUNDARY
Radio Towers
KINS Radio Towers
Sewage Disposal
County Hospital
Eureka
Worthington Sch
Substation
Pidgeon Point
Washington School
Armory
Filter Plant
REDWOOD ACRES FAIRGROUND
MYRTLE AVE
HARRISON AVENUE
ABANDONED
MERIDIAN
Ryan Cr
24
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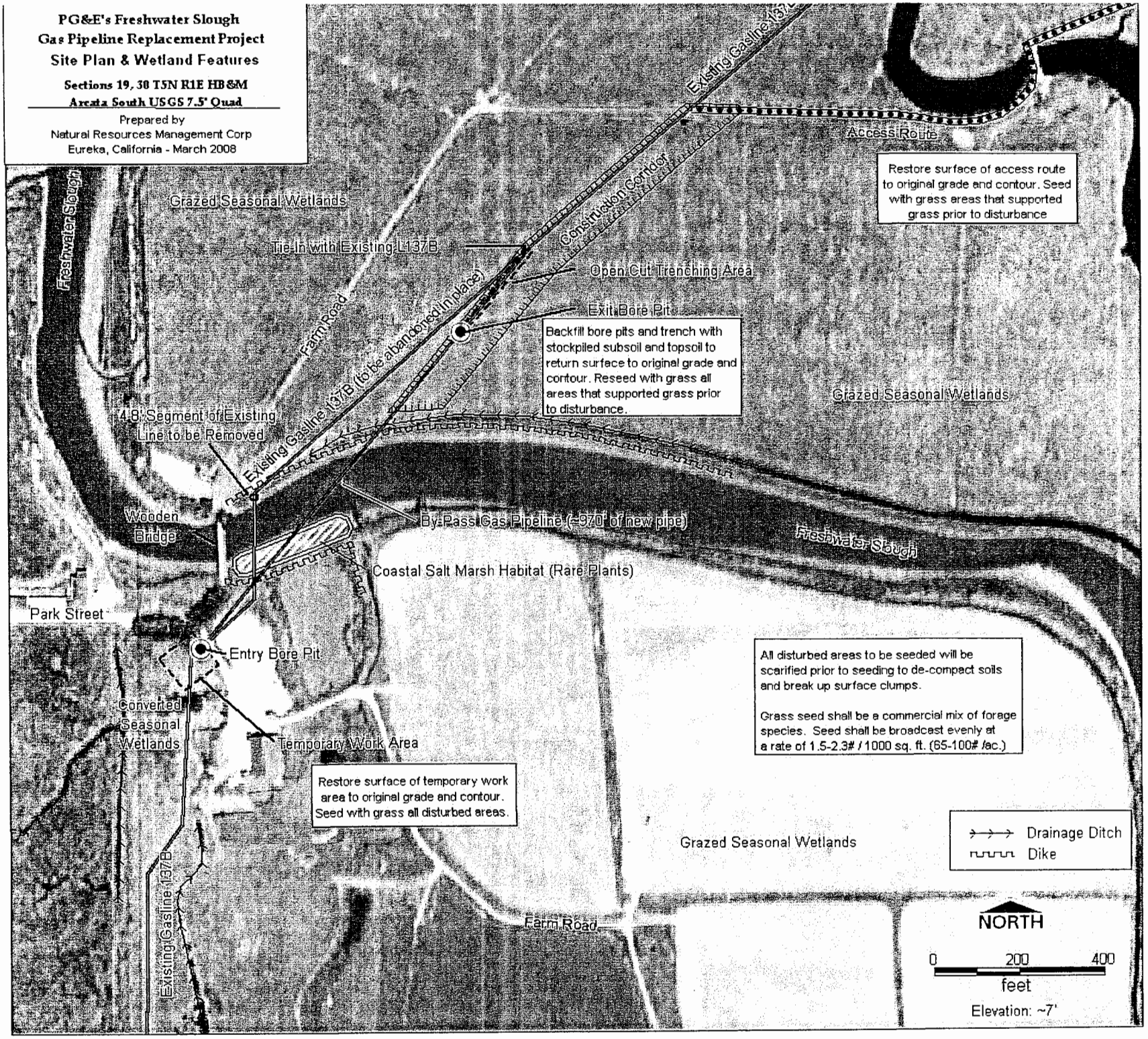
PG&E's Freshwater Slough
Gas Pipeline Replacement Project
Site Plan & Wetland Features

Sections 19, 30 T5N R1E HB&M
Arcata South USGS 7.5' Quad

Prepared by
Natural Resources Management Corp
Eureka, California - March 2008



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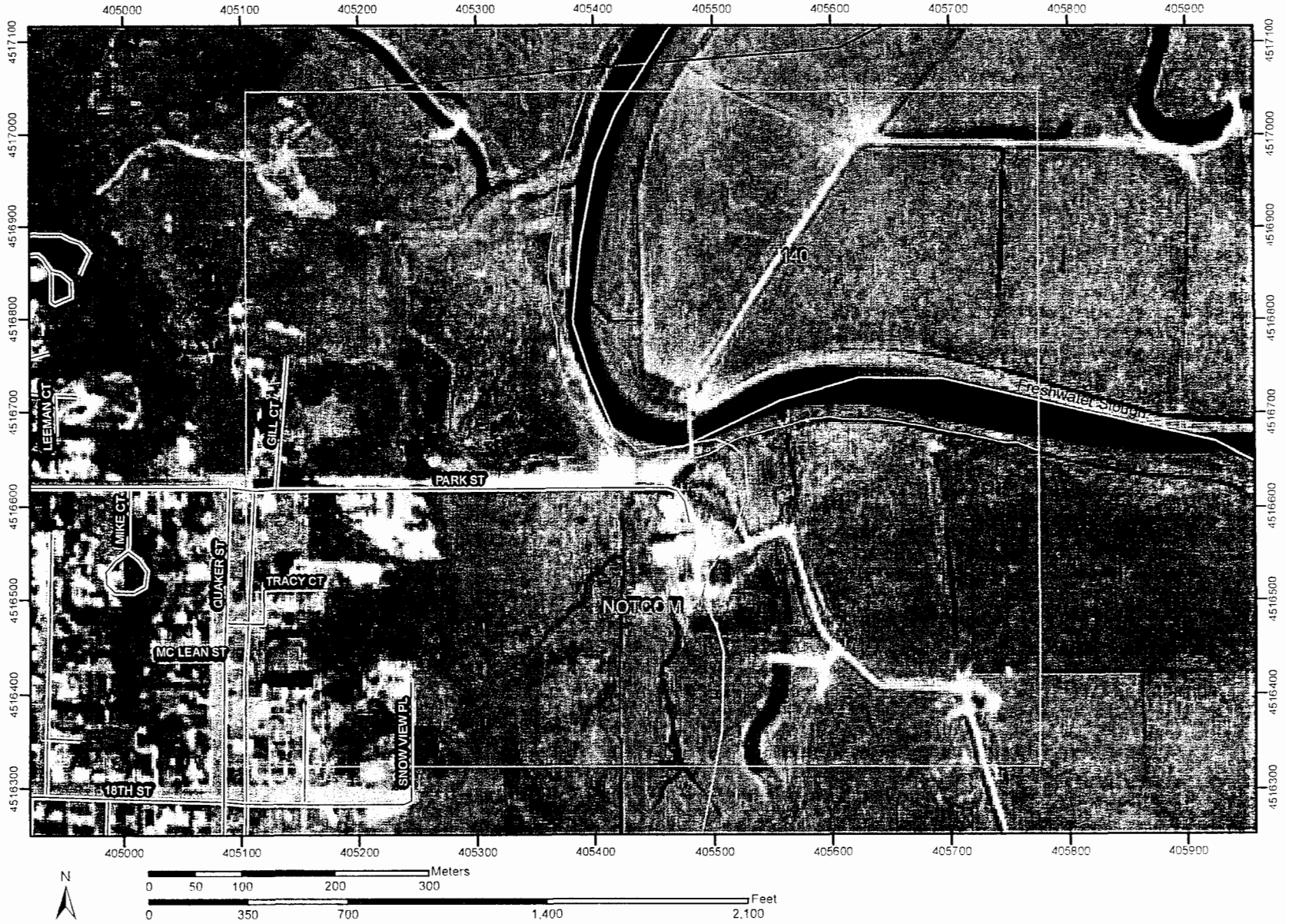
Soil Map--Humboldt County, Central Part, California
(PGE Freshwater Slough)



USDA Natural Resources Conservation Service

Web Soil Survey 2.0
National Cooperative Soil Survey

6/18/2007
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humboldt County, Central Part, California
Survey Area Data: Version 1, Mar 14, 2007

Date(s) aerial images were photographed: 1990; 6/12/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Humboldt County, Central Part, California (CA600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
140	Occidental, 0 to 2 percent slopes	46.4	30.7%
NOTCOM	Mapping not complete	104.5	69.3%
Totals for Area of Interest (AOI)		150.9	100.0%

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STATE OF CALIFORNIA -- THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET • SUITE 200
EUREKA, CA 95501-1865
VOICE (707) 445-7833
FACSIMILE (707) 445-7877

MAILING ADDRESS:
P. O. BOX 4908
EUREKA, CA 95502-4908

Hearing Date: November 19, 2004
Commission Action: **Approved with Conditions, November 19, 2004**

EXHIBIT NO. **13**
APPLICATION NO.
1-04-010-A1
PACIFIC GAS & ELECTRIC
ADOPTED FINDINGS FOR CDP 1-04-010 (1 of 28)

ADOPTED FINDINGS

APPLICATION NO.:	**1-04-010**
APPLICANT:	**Pacific Gas and Electric**
PROJECT LOCATION:	At Freshwater Slough, at the east end of Park Street, east of Eureka, Humboldt County.
PROJECT DESCRIPTION:	Replace a 1,200-foot-long section of 8-inch diameter high-pressure natural gas pipeline beneath Freshwater Slough and in adjoining pastureland.
LOCAL APPROVALS RECEIVED:	None required.
OTHER APPROVALS RECEIVED:	(1) Army Corps of Engineers Nationwide Permit 12 Verification; (2) Regional Water Quality Control Board 401 Water Quality Certification; and (3) Department of Fish & Game Streambed Alteration Agreement.
OTHER APPROVALS REQUIRED:	None
SUBSTANTIVE FILE DOCUMENTS:	Humboldt County Local Coastal Program

STAFF NOTES:

1. Adopted Findings

The Commission held a public hearing and approved the permit at the meeting of November 19, 2004. The adopted findings for approval differ from those contained in the written staff recommendation dated November 4, 2004. At the hearing, the staff presented an addendum that presented text for subsections B and C of the "Filling and Dredging in Coastal Waters and Wetlands," findings which were not included in the original staff report. The Commission adopted the changes to the staff recommendation in their entirety.

The following resolution, conditions, and findings were adopted by the Commission on November 18, 2004 upon conclusion of the public hearing.

2. Standard of Review

The approved project is located in the Commission's retained jurisdiction. Humboldt County has a certified LCP, but the site is within an area shown on State Lands Commission maps over which the state retains a public trust interest. Therefore, the standard of review that the Commission must apply to the project is the Chapter 3 policies of the Coastal Act.

RESOLUTION TO APPROVE THE PERMIT:

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment.

II. STANDARD CONDITIONS: **See Attachment A.**

III. SPECIAL CONDITIONS:

1. Horizontal Directional Drilling Bore Trajectory Plan

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT,** the applicant shall submit for review and approval of the Executive Director, a

plan that shows the planned trajectory of the horizontal directional drilling bore to be drilled under Freshwater Slough.

(1) The plan shall include, at a minimum, the following components:

(a) A narrative report indicating the depth of the bore and demonstrating how the proposed trajectory and drilling depths comply with the requirements of Special Condition No. 7, below that that the horizontal drilling shall be conducted as much as possible at depths greater than 35 feet;

(b) A site plan showing the end points and path of the proposed directional bore; and

(c) An elevation of the proposed directional bore showing the trajectory and depth of the bore below the surface.

B. The permittee shall undertake development in accordance with the approved plan. Any proposed changes to the approved final plan shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

2. <u>Drilling Fluid Spill Contingency Plan</u>.

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOMENT PERMIT**, the applicant shall submit, for review and written approval of the Executive Director, a final revised horizontal directional drilling ("HDD") fluid monitoring and spill contingency plan that substantially conforms with the 23 July, 2004 HDD Fluid Release Contingency Plan prepared by Matrix Environmental Planning entitled *"HDD Fluid Release Contingency Plan G/L 137B Crossing of Freshwater Slough Project,"* except that Material Safety Data Sheets for all materials that will be used in the horizontal directional drilling operation shall be attached to the plan.

B. The permittee shall undertake horizontal directional drilling activities in accordance with the approved final plan. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is required.

C. In the event that a spill or accidental discharge of drilling fluids occurs during horizontal directional drilling operations, all construction shall cease and shall not recommence except as provided in subsection (D) hereof:

D. Following discovery of the spill or accidental discharge of drilling fluids, the permittee shall submit to the Executive Director a revised project and restoration plan prepared by qualified professional(s) that provides for (1) necessary revisions to the proposed project to avoid further spill or accidental discharge of drilling fluids, and (2) restoration of the area(s) affected by the spill or accidental discharge to pre-project conditions. The revised project and restoration plan shall be consistent with any applicable requirements of the State Water Resources Control Board and the California Department of Fish & Game. The revised project and restoration plan shall be processed as an amendment to the coastal development permit unless the Executive Director determines that no amendment is required. Construction may nor recommence until after any necessary amendment to this permit is approved by the Commission or the Executive Director has determined that no amendment is legally required.

3. Final Wetland Mitigation Plan

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT,** the applicant shall submit for review and written approval of the Executive Director, a final wetland mitigation plan for all wetland impacts associated with the proposed project. The program shall be developed in consultation with the California Department of Fish & Game and at a minimum shall include:

1. A detailed revised site plan of the wetland impact areas. The final plan must delineate all impact areas (such as on a map that shows elevations, surrounding landforms, etc.), the types of impact, and the exact acreage of each impact so identified.

2. A detailed final site plan of the mitigation areas.

3. The following goals, objectives, and performance standards for the mitigation areas:

   a. Areas of temporary disturbance within seasonal wetlands including the construction corridor and any other disturbed sites, including any construction access routes within the grazed seasonal wetlands not following established roadways shall be (i) restored to before-impact elevations in a manner that does not result in depressions, ridges, or mounds, (ii) decompacted, and (iii) replanted with

locally with a commercially available seed mixture composed of the same grass species that dominate the perennial grasslands at the present time to a level of coverage and density equivalent to vegetation coverage and density of the surrounding undisturbed areas

4. The final design and construction methods that will be used to ensure the mitigation site achieves the defined goals, objectives, and performance standards.

B. The permittee shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

4. Erosion and Sedimentation Control Plan

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit for review and approval of the Executive Director, a plan for erosion and sedimentation control.

(1) The erosion control plan shall demonstrate that:

(a) During construction, erosion on the site shall be controlled to avoid adverse impacts on adjacent properties and coastal resources;

(b) Temporary erosion control measures shall be implemented during construction including, but not limited to: preserving existing vegetation surrounding the construction areas as much as possible; installing silt fences, fiber rolls, weed free rice straw barriers or similar barriers on the down slope side of the construction areas and maintaining these barriers in place throughout the construction period; stabilization and containment of stockpiles; and replanting or seeding any disturbed areas with a commercially available seed mixture composed of the same grass species that dominate the perennial grasslands in the seasonal wetlands at the present time

(2) The plan shall include, at a minimum, the following components:

(a) A narrative report describing all temporary runoff and erosion control measures to be used during construction;

(b) A site plan showing the location of all temporary erosion control measures; and

(c) A schedule for installation and removal of the temporary erosion control measures.

B. The permittee shall undertake development in accordance with the approved plan. Any proposed changes to the approved final plan shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

5. **Hazardous Materials Management Plan**

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT,** the applicant shall submit, for the review and written approval of the Executive Director, a plan to reduce impacts to water quality from the use and management of hazardous materials on the site. The plan shall be prepared by a licensed engineer with experience in hazardous material management.

1. The plan, at a minimum, shall provide for the following:

(a) Equipment fueling shall occur only during daylight hours in designated fueling areas;

(b) Oil absorbent booms and/or pads shall be on site at all times during project construction. All equipment used during construction shall be free of oil and fuel leaks at all times;

(c) Provisions for the handling, cleanup and disposal of any hazardous or non-hazardous materials used during the construction project including, but not limited to, paint, asphalt, cement, equipment fuel and oil, and contaminated sediments;

(d) A schedule for maintenance of containment measures on a regular basis throughout the duration of the project;

(f) Provisions for the containment of rinsate from the cleaning of equipment and methods and locations for disposal off- site. Containment and handling shall be in upland areas and otherwise outside of any environmentally sensitive habitat area;

(g) A site map detailing the location(s) for hazardous material storage, equipment fueling and maintenance, and any concrete wash-out facilities; and

(h) Reporting protocols to the appropriate public and emergency services agencies in the event of a spill.

B. The permittee shall undertake development in accordance with the approved final plan. Any proposed changes to the approved final plan shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

6. Debris Disposal Plan

PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall submit, for the review and approval of the Executive Director, a plan for the disposal of excess construction related debris, including excess soil from the horizontal directional drilling and trenching operations. The plan shall describe the manner by which the material will be removed from the construction site and identify a disposal site that is in an upland area where materials may be lawfully disposed.

The permittee shall undertake development in accordance with the approved final plan. Any proposed changes to the approved final plan shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development.

7. Conformance of Horizontal Directional Drilling Activities to Geotechnical Report

A. The permittee shall undertake the horizontal directional drilling activities for the proposed fiber optic cable installation development in accordance with all recommendations contained in the following Engineering Geologic Report:

Kleinfelder July 9, 2003, "Geotechnical Engineering Investigation, replacement of Gas Line 137-B at Freshwater Slough Crossing, Eureka, California," and signed by John L. Finnigsmier (R.G., CEG) Traver E Metcalf, Jr. (CE, GE), and Kris Johnson (RG, CEG),

except that the horizontal drilling shall be conducted as much as possible a depths greater than 35 feet.

B. Any proposed changes to the horizontal directional drilling activities shall be reported to the Executive Director. No changes shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

8. Notification of Work and Coastal Commission Staff Inspections

At least one week prior to performing any horizontal directional drilling boring, the permittee shall submit written notice to the Eureka office of the California Coastal Commission of the specific dates when the horizontal directional drilling boring will be performed. The notice shall indicate which boring(s) are to be performed, the dates the work will occur, and a map indicating the precise locations where boring would be performed. The permittee shall promptly notify Commission staff of any changes to the schedule for performing horizontal directional drilling for which notice has previously been given. The permittee shall permit the Coastal Commission staff to enter and inspect the project area for purposes of determining compliance with Coastal Development Permit No. 1-04-010.

9. Assumption of Risk, Waiver of Liability and Indemnity Agreement

By acceptance of this permit, the applicant, on behalf of (1) itself; (2) its successors and assigns and (3) any other holder of the possessory interest in the development authorized by this permit, acknowledges and agrees (i) that the directional drilling activities proposed by the applicant may subject the project area to hazards from accidental spills of drilling fluids; (ii) to assume the risks to the applicant and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards; and (v) to agree to include a provision in any assignment of the development authorized by this permit requiring the sublessee or assignee to submit a written agreement to the Commission, for the review and approval of the Executive Director, incorporating all of the foregoing restrictions identified in (i) through (iv).

10. **Construction Access, Materials, and Equipment Staging.**

(a) All construction materials and equipment staging areas shall be limited to the locations and sizes specified in the permit application.

(b) Access routes and the watercourse crossing shall be limited to the routes mapped and described in the permit application. Portions of access routes within wetlands that are excessively wet or soft shall be covered with: (a) heavy synthetic mats or other acceptable non-toxic material that can be readily laid down along equipment access routes and immediately removed following construction and (b) shall be the minimum width and length necessary to allow movement of equipment to and from the project site.

11. **Construction Methods**

All pipeline construction shall be performed consistent with the following provisions:

A. The top six to eight inches (6-8") of excavated material within grazed seasonal wetlands (which contains the root masses, rhizomes, seeds, and accumulated organic material of the vegetation that dominates these seasonal wetlands) shall be separately stockpiled by the contractor, and the contractor shall assure that this stockpiled soil material is kept moist and that the material is reintroduced as soon as possible to excavation as the top fill material.

B. Prior to the commencement of construction, the work area would be delineated, limiting the potential area affected by construction and workers shall be educated about the limitations on construction;

C. A qualified biologist shall monitor the site during all ground disturbing activities to avoid impacts to sensitive species. All occurrences of special status plants will be delineated and entry to areas containing such plants shall be restricted;

D. All vehicles and equipment shall be restricted to pre-established work areas and established or designated access routes;

E. Soil compaction from heavy equipment travel in wetland areas will be alleviated through mechanical soil aeration where appropriate.

F. All trash and waste items shall be contained;

G. The contractor shall implement erosion control techniques around the temporarily stored spoil material.

H. All construction activities in the vicinity of the south bank of Freshwater Slough shall be conducted after the Humboldt Bay owl's-clover and the western sand spurry have set seed as verified by a qualified biologist.

12. Grazed Seasonal Wetland Vegetation Monitoring

The permittee shall submit a vegetation monitoring report for the review and written approval of the Executive Director within 18 months after completion of construction of the replacement gas line approved under CDP No. 1-04-010. The monitoring report shall be prepared by a qualified biologist or botanist and shall evaluate whether the objective of reestablishing vegetation in all of the grazed seasonal wetland areas impacted by project construction to a level of coverage and density equivalent to vegetation coverage and density of the surrounding undisturbed areas has been achieved. If the report indicates that the revegetation of any of the disturbed areas including the construction corridor and staging areas has not been successful, in part, or in whole, the permittee shall submit a revised revegetation program to achieve the objective. The revised revegetation program shall require an amendment to this coastal development permit.

IV. FINDINGS AND DECLARATIONS

The Commission hereby finds and declares:

1. Site Description

Pacific Gas and Electric Company (PG&E) proposes to replace 1,200 lineal feet of natural gas pipeline that extends under Freshwater Slough and adjoining pasturelands Freshwater Slough is a tributary of Eureka Slough, which flows into Humboldt Bay at the northeastern edge of Eureka (See Exhibits 1-3).

The proposed project includes the installation of a new segment of pipeline under the slough using horizontal directional drilling techniques. Freshwater Slough is subject to tidal action in this location, and the south bank of the slough contains salt grass and pickelweed vegetation. Two sensitive plant species, Humboldt Bay owl's-clover and western sand spurry, have been identified within this salt/brackish marsh habitat. Above the salt/brackish marsh habitat, riparian and upland species can be found, including coyote brush, scotch broom, berries, and ornamental cypress and pine trees

The adjoining pastureland to the north of the slough where trenching operations would be conducted consists of grazed seasonal wetlands. These diked former tidelands are used for livestock grazing and other agricultural purposes. Vegetation in the grazed seasonal wetland area is dominated by exotic perennial grasses such as sweet vernal grass, orchard grass, velvet grass, tall fescue and perennial ryegrass.

Ruderal vegetation, typical or roadsides and disturbed areas, make up the sparse forbs cover within the proposed horizontal directional drilling entry pit staging area on the south bank of the slough.

2. Project Description

The development involves the rerouting of a 1,200-foot-long section of exposed, existing pressurized natural gas line that crosses beneath Freshwater Slough at the east end of Park Avenue east of Eureka. The existing section of line that crosses beneath the slough has become exposed and is at risk of rupture. The exposed section of line would be by-passed by the new crossing and abandoned in place (See Exhibit 3).

Beginning at the southern tie-in point, the applicant proposes to install 700 feet of new pipe under the slough using the Horizontal Directional Drilling (HDD) method and install approximately 500 feet of new pipe in the pasture on the north side of the slough up to the northern tie-in point by open cut trench. The new alignment would remove a dog-leg in the existing alignment and provide the correct configuration and position to string the pipe for pullback under the slough. Once the new pipe is tied in, the applicant would remove the segment of the bypassed pipeline between the bank and the low tide level. The remaining sections of the bypassed line would be pigged for their entire length to remove and trapped liquids, capped, filled with nitrogen, and retired in place.

Construction access to the south bank of the slough where an HDD set-up area and entrance pit would be installed would be via Park Street. Access to the receiving pit and north tie-in point would be through private property from Myrtle Avenue, north on Devoy Road, northwest along an abandoned railroad right-of-way, then southwest along farm roads and the pipeline easement strip to the work site.

The directional drilling process utilizes a hydraulically-powered horizontal drilling rig. Support equipment includes a drilling mud tank and a power unit for the hydraulic pumps and mud pumps. Approximately 94,000 gallons of drilling fluid would be utilized, with bentonite additive at a concentration of 9 pounds per gallon of water. A drilling fluid spill contingency plan has been prepared for the project that includes procedures for monitoring for discharges of drilling fluids, stopping the HDD if a discharge is detected, containing the spill, returning discharged fluids back to the pit, or disposal with vacuum trucks

Surface disturbance associated with the HDD include an entry pit and a receiving pit, each pit measure approximately 6' x 12' x 8' deep, with associated tail ditches each measuring 3' x 20' x 6' deep. The HDD set-up area would be approximately 100' by 100' to accommodate the drilling rig, mud tanks, pumps and drill stem racks.

While the bore is occurring, the special armor-coated pipe sections to be pulled through the crossing would be strung on pipe supports in the extra workspace along the edge of the 100-foot-wide temporary construction right-of-way, welded, and the joints are coated. Once the bore hole is the correct diameter, the pipe is pulled through the bore until it surfaces on the entry side. Bulldozers with side booms and slings would support the pipe as it is slowly pulled through the bore until it surfaces on the entry side. The completed bored crossing would then be connected to the section of pipeline to be installed in a trench within the pastureland and the entry and receiving pits for the HDD would be backfilled.

Open cut trenching would occur within a right-of-way through the pastureland on the north side of the slough between the tie-in with the HDD bored segment of line and the northern tie-in with the existing line. The trenching would be conducted by tracked backhoes or ditchers. The trench would be a minimum of 12 inches wide and about 5 feet deep to ensure at least 4 feet of cover over the pipeline. Stringing of the pipe is completed by trucking pipe lengths to and along the right-of-way and unloading with a crane or bulldozer with a side boom onto wood skid supports. The pipe would be lowered into the trench from the skid supports using side booms. The excavated soil will be backfilled in layers into the trench after installation of the pipeline. The topsoil is replaced last to re-establish the preconstruction soil profile.

Hydrostatic testing is completed prior to tie-in by filling the new pipeline with water, increasing the pressure to a minimum of 125 percent of the maximum operation pressure, and holding the pressure for a period of time. Following testing, the pipe would be flushed to remove dirt and other debris. An energy dissipation device would be utilized to control the water discharged from the pipeline following hydrostatic testing and flushing and appropriate best management practices would be used to ensure no silt enters the slough from this discharge.

A number of additional mitigation measures are proposed to ensure no impacts to environmentally sensitive habitat occurs.

- Directed surveys for sensitive plant species would be repeated prior to construction;
- The HDD would be planned for late summer, consistent with a construction window recommended by NOAA Fisheries;
- All occurrences of special status plants would be delineated and access to areas containing the plants would be restricted;

- Prior to commencement of construction, work areas would be delineated to limit the area affected by construction;
- Appropriate erosion and sedimentation BMPS would be installed around the HDD receiving and entry pits, as well as the discharge structure and pipeline removal work area;
- The top 6-8 inches of topsoil from excavated areas would be separately stockpiled and reintroduced upon the completion of the pipeline installation;
- Disturbed area would be reseeded;
- Soil compaction from the use of heavy equipment would be alleviated by mechanical soil aeration where possible;
- A pre-project worker education program would be held for construction crews involved;
- Qualified biological monitors would be present on the site during all ground disturbing activities;
- All vehicles would be restricted to pre-established work areas and roads.

3. Filling and Dredging in Coastal Waters and Wetlands

The proposed project includes various activities that are a form of filling and dredging in wetlands. The main portion of the project that affects wetlands involves the trenching activity on the north side of Freshwater Slough, connecting the segment of pipeline to be installed under the slough using horizontal directional drilling with the northern tie-in point with the existing gas line. Because the pipeline will be buried under pasturelands or installed under the slough using HDD, there is no permanent above ground wetland fill associated with the project. However, the project would temporarily disturb 2.75 acres of grazed seasonal wetland during construction. The affected area includes a 100-foot wide construction working strip along the approximately 600 feet of pastureland between the slough and the tie in point with the existing pipeline where most of the activity will be concentrated, and an additional 100-foot-wide by 600-foot-long strip north of the tie-in point where activities will generally be limited to the stringing and welding of the pipe segment to be pulled back through the bore under the slough

Coastal Act Section 30233 allows filling and dredging in wetlands only where there is no feasible less environmentally damaging alternative, where feasible mitigation measures have been provided to minimize adverse environmental effects, and where the project is limited to one of eight specified uses. Additionally, Coastal Act Sections 30230 and 30231 address protection of the biological productivity and water quality of the marine environment from the impacts of development.

Section 30233 of the Coastal Act provides as follows, in applicable part:

(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

...

(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

Section 30230 of the Coastal Act states, in applicable part:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30231 of the Coastal Act addresses the protection of coastal water quality and marine resources in conjunction with development and other land use activities. Section 30231 states:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of wastewater discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantially interference with the surface water flow, encouraging, wastewater reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams. (emphasis added)

The above policies set forth a number of different limitations on what development projects may be allowed in coastal wetlands. For analysis purposes, the limitations can be grouped into four general categories or tests. These tests are:

a. that the purpose of the filling, diking, or dredging is for one of the eight uses allowed under Section 30233;

b. that the project has no feasible less environmentally damaging alternative;

c. that feasible mitigation measures have been provided to minimize adverse environmental effects; and

d. that the biological productivity and functional capacity of the habitat shall be maintained and enhanced where feasible.

A. Permissible Use for Fill

The first test set forth above is that any proposed filling, diking or dredging in wetlands must be for an allowable purpose as specified under Section 30233 of the Coastal Act. The relevant category of use listed under Section 30233(a) that relates to the proposed construction of the water pipeline is subcategory (5), stated as follows:

> *(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.*

To determine if the proposed fill/dredging is for an incidental public service purpose, the Commission must first determine that the proposed filling/dredging is for a public service purpose. The project involves the replacement of 1,200 lineal feet of high pressure natural gas transmission pipeline which traverses beneath Freshwater Slough and through grazed seasonal wetlands within an existing PG&E right of way to ensure continued delivery of natural gas for a portion of the coastal communities of Humboldt County. Therefore, since the proposed project would be undertaken to ensure the continued delivery of natural gas service to the public, the Commission finds that the fill/dredging to replace the high-pressure natural gas transmission pipeline expressly serves a public service purpose consistent with Section 30233(a)(5).

The Commission must next determine if the fill/dredging is for an "incidental" public service purpose. The project would replace a segment of an existing 8-inch diameter high-pressure natural gas transmission line with a new segment of 8-inch diameter line. The project would not result in an expansion of natural gas service area. Rather, the project would replace a deterioration section of line with a new one to assure the reliability of the primary natural gas service for the region. Therefore, the Commission finds that the replacement of a segment of high-pressure natural gas transmission line is incidental to the existing natural gas transmission line as replacement of a segment of the line will serve to improve the reliability of the existing natural gas transmission line.

Therefore, the Commission finds that for the reasons discussed above, the dredging (excavation) and filling for the proposed project is for an incidental public service purpose, and thus, is an allowable use pursuant to Section 30233(a)(5) of the Coastal Act.

B. Alternatives Analysis

The second test set forth by the Commission's fill policies is that the proposed fill project must have no feasible less environmentally damaging alternative. Coastal Act Section 30108 defines "feasible" as follows:

> *'Feasible' means capable of being accomplished in a successful manner within a reasonable time, taking into account economic, environmental, social, and technological factors.'*

Several alternatives have been evaluated to determine whether there is a feasible less environmentally damaging alternative to the proposed project. These alternatives include (a) using a trenching technique rather than horizontal directional drilling to cross Freshwater Slough, (b) reconstructing the gas line in a different alignment that might avoid wetlands, and (3) the no project alternative. The Commission finds, as discussed below, that there is no feasible less environmentally damaging alternative to the project as conditioned.

(1) Use Trenching To Bury Gas Line Under Freshwater Slough

Installing the new section of gas line under Freshwater Slough using a trenching technique rather than horizontal directional drilling would reduce the total area of disturbance of grazed seasonal wetlands. As proposed, the bore pit for the horizontal directional drilling on the north side of the slough would affect 72 square feet of area. In addition, a 100-foot-wide by 600-foot-long staging area is proposed to be used primarily for set up of the horizontal directional drilling process and the stringing and welding of the pipe segment to be pulled back through the horizontal directionally drilled bore. Using trenching rather than horizontal directional drilling would eliminate the need for both of these proposed project elements, reducing the total amount of disturbance within the grazed seasonal wetlands. However, trenching through Freshwater Slough would result in significant impacts to the slough environment. The channel bottom and the banks of the channel, which are vegetated with salt marsh and include at least two listed plant species would be directly affected by excavation for the trench. The trench area would have to be dewatered and the slough water diverted prior to excavation by the construction of a coffer dam or similar device, resulting in an area of channel bottom and bank disturbance much greater than just the width of the trench. Diverting the slough waters would also adversely affect threatened salmonids and other fish species passing through the channel. The proposed horizontal directional drilling operation avoids all of these impacts. Although use of the horizontal directional drilling technique as proposed would result in greater impacts to the grazed seasonal wetlands, these impacts to the environment would be far less significant that the impacts to the channel from a trenching operation as the proposed project as conditioned avoids all significant impact to

threatened plant and fish species. In addition, restoration of the grassy vegetation of the grazed seasonal wetlands is far quicker and easier to achieve than restoration of disturbed salt marsh habitat within the slough channel, which is a more diverse and complex habitat type. Therefore, the Commission finds that using trenching to bury the new section of gas line under Freshwater slough is not a feasible less environmentally damaging alternative.

(2) **Reconstructing Gas Line in an Alternative Alignment.**

An alternative to reconstructing the affected section of gas line in the location proposed would be to reconstruct the line in an alternative alignment where wetlands might be avoided or the amount of wetlands affected might be reduced. Such an alternative might be to relocate the line adjacent to Old Arcata Road, along the inboard edge of the grazed seasonal wetland area that extends from Arcata to Eureka. However, PG&E does not own sufficient alternative right-of-way to accommodate a new gas line anywhere in the project vicinity. Therefore, the Commission finds that reconstructing the line in an alternative alignment would not be a feasible less environmentally damaging alternative.

(3) **No Project Alternative**

The no project alternative would not replace the 1,200-foot-long section of pressurized gas pipeline and rely on continued use of the existing segment of pressurized gas line. The project was proposed because the existing situation is hazardous and could also result in a shut down of natural gas service for a large portion of the region. A section of the previously buried existing gas line is exposed along Freshwater Slough and is in danger of rupture. Rupture of the line would increase the risk of fire and explosion and would cut off natural gas service to a large portion of the region. Thus, the no project alternative would not meet the project goals of eliminating a hazardous condition that threatens public safety and ensuring the continued delivery of a vital utility for a large portion of the region. Therefore, the Commission finds that the no project alternative is not a feasible less environmentally damaging alternative.

Therefore, the Commission finds that the proposed project, as conditioned, is the least environmentally damaging feasible alternative as required by Section 30233(a).

C. **Feasible Mitigation Measures**

The third test set forth by Section 30233 is whether feasible mitigation measures have been provided to minimize adverse environmental impacts. The reconstruction of the 1,200-foot-long section of gas line would occur partially within grazed seasonal

wetlands. Depending on the manner in which the proposed project is constructed, the project could have potential adverse impacts to (1) seasonal wetland habitat, (2) sensitive plant species, and (3) water quality. The potential impacts and their mitigation are discussed in the following sections:

(1) Seasonal Wetland Habitat

As noted above, the project will temporarily disturb 2.75 acres of grazed seasonal wetland during construction. The affected area includes a 100-foot-wide construction working strip along the approximately 600 feet of pastureland between the slough and the tie-in point with the existing pipeline where most of the activity will be concentrated, and an additional 100-foot-wide by 600-foot-long strip north of the tie-in point where activities will generally be limited to the stringing and welding of the pipe segment to be pulled back through the bore under the slough.

Most of the seasonal wetlands in the project site were originally subject to tidal action, but like much of the land around Humboldt Bay, the project site was diked off decades ago and reclaimed for agricultural use. Due to its low elevation, the project area is subject to seasonal ponding from rain and runoff and also has a high groundwater table. The wetland vegetation on the site is not particularly abundant or diverse in comparison with other wetland habitats around Humboldt Bay because of its current and historic use as pasture for cattle grazing. Nonetheless, the area does provide some wetland habitat including foraging habitat for a diversity of water-associated wildlife including waterfowl, wading birds, and shorebirds.

The wetlands also function to provide a certain degree of water quality protection, as they temporarily detain rainwater runoff and allow for the removal of impurities entrained in stormwater flowing over the pasture lands.

PG&E proposes to restore all of the grazed seasonal wetlands disturbed by project construction to pre-project conditions. All of the grazed seasonal wetlands affected by project construction would be restored by (a) replacing the topsoil excavated as part of the trenching operation, and (b) decompacting and reseeding the construction corridor.

By restoring the native topsoil and reseeding the construction corridor with appropriate species, the vegetation common to the area would rapidly reestablish to pre-project conditions. Therefore, the Commission attaches Special Condition Nos. 3 and 11 to ensure that these restoration measures are implemented. Special Condition No. 3 requires, among other things, that the applicant submit prior to issuance of the permit a final wetland mitigation plan for the review and approval of the Executive Director that provides all areas of temporary disturbance be restored to before impact elevations, decompacted, and replanted with a commercially available local seed mix composed of the same grass species that dominate the perennial grasslands at the present time to a

level of coverage and density equivalent to vegetative coverage and density of the surrounding undisturbed areas. Special Condition No. 11 requires, among other things, that the applicant save excavated topsoil and reuse the soil to fill voids left by the removal of old piles.

To ensure that construction disturbance to the seasonal wetlands is minimized, the Commission attaches Special Condition No. 10. This condition requires that all staging areas and construction access routes be limited to the location and sizes specified in the permit application.

To ensure that the construction area through the seasonal wetlands is revegetated to pre-project conditions as proposed, the Commission attaches Special Condition No. 12 that requires the applicant to submit a monitoring report to the Executive Director within 18 months following completion of the installation of new segment of gas line. The monitoring report must be prepared by a qualified biologist or botanist and must evaluate whether the objective of reestablishing vegetation in areas of project construction to a level of coverage and density equivalent to vegetation coverage and density of surrounding undisturbed areas has been achieved. If the report indicates that the revegetation of the disturbed areas following reseeding has not been successful, in part, or in whole, the applicant is required to submit for the review and approval of the Executive Director a revised reseeding program to achieve the objective. The revised reseeding program shall require an amendment to this coastal development permit.

Although project construction is not proposed to occur in the heart of the rainy season, there may be areas along the transmission line that may be excessively wet or soft and unable to support construction equipment. In the event that such areas are encountered during project construction, Special Condition No. 10 includes a requirement that the applicant utilize temporary stabilization materials such as reinforced construction stabilization mats. The use of stabilizing materials would minimize compaction impacts to the wetlands from construction equipment. Special Condition No. 10 requires that this construction method be implemented, that access routes be the minimum width necessary to allow movement of equipment to and from the project site, and that all stabilizing materials be removed entirely following project construction.

Therefore, the Commission finds that the project as conditioned, includes all feasible mitigation measures to minimize all significant adverse impacts on seasonal wetland habitat consistent with Sections 30233 of the Coastal Act.

(2) Water Quality

The proposed project is located largely within seasonal wetlands and crosses underneath Freshwater Slough. Potential adverse impacts to the water quality of the seasonal

wetlands and Freshwater Slough could occur in the form of sediment disturbance and transport and from the discharge of fuels, lubricants, and debris.

The proposed project incorporates various construction measures to minimize the potential for sediment mobilization, which could result in significant adverse water quality impacts in the form of increased turbidity. The applicant proposes to install various unspecified erosion control measures and re-vegetation of areas affected by construction. Use of such measures would greatly reduce the potential for sediment mobilization. However, the application is not specific as to how such measures would be implemented to ensure that sediment mobilization is minimized and does not indicate how trash and waste items would be prevented from entering wetlands.

Therefore, the Commission attaches Special Condition Nos. 4, 5, 6, and 11 to ensure that feasible mitigation measures are implemented that will reduce adverse water quality impacts below a level of significance.

Special Condition No. 4 requires the applicant to submit for the review and approval of the Executive Director prior to issuance of the permit an erosion and sedimentation control plan. The condition requires the sedimentation and erosion control plan to incorporate certain specific best management practices including (a) preserving existing vegetation surrounding the construction areas as much as possible, (b) installing silt fences, fiber rolls, and weed fee rice straw barriers around construction areas, and (c) stabilization and containment of stockpiles.

Special Condition No. 5 requires the applicant to submit for the review and approval of the Executive Director prior to issuance of the permit a hazardous materials management plan. The condition requires the hazardous materials management plan to incorporate certain best management practices to minimize the chances that spills from equipment fueling and rinsate from the cleaning of equipment would enter water courses. The plan must designate specific fueling areas, ensure that oil absorbent booms and or pads be on site at all time during construction for use during an accidental spill, and include provisions for the handling, cleanup and disposal of any hazardous or non-hazardous materials used during the construction project.

Special Condition No. 6 requires the applicant to submit for the review and approval of the Executive Director prior to issuance of the permit a debris disposal plan. The condition requires the debris disposal plan to address how excess construction related debris, including excess soil from the horizontal directional drilling and trenching operations would be removed from the site and identify a disposal site that is in an upland area where materials may be lawfully disposed.

Special Condition No. 11 imposes certain construction responsibilities on the permittee that relate to the protection of water quality including requirements that all trash and

waste items be contained, the use of erosion control techniques around stockpiles, and that construction workers be educated about these limitations on construction prior to the commencement of construction.

Therefore, as conditioned, the Commission finds that the project as conditioned, includes all feasible mitigation measures to minimize all significant adverse impacts on water quality consistent with Sections 30233 and 30231 of the Coastal Act.

(3) Sensitive Plant Species

Botanical surveys were conducted of the project site. According to these surveys, two sensitive plant species were identified as occurring within the project area, including Humboldt Bay owl's clover *(Castilleja ambigua* ssp. *humboldtiensis)* and Western sand spurry *(Spergularia canadensis* var. *occidentalis).*

Humboldt Bay owl's clover

Humboldt Bay owl's-clover is associated with salt marsh habitats and is on the California Native Plant Society List 1B indicating plants that are rare, threatened, or endangered in California and elsewhere. Humboldt Bay owl's-clover is well established in remnant salt marshes along Eureka Slough and its tributaries, including Freshwater Slough at the project area.

Western sand spurry

Western sand spurry is associated with salt marsh habitats and is on the California Native Plant Society List 2 with an R-E-D code of 3-3-1, meaning its distribution is highly restricted in California and it is seriously endangered in California, but it is more or less widespread outside of the state. In California, it is known only from coastal salt or brackish marsh habitat areas around Humboldt Bay. Like the Humboldt Bay owl's clover, Western sand spurry is established in remnant salt marshes along Eureka Slough and its tributaries, including Freshwater Slough at the project area.

The use of horizontal directional drilling as part of the construction process would avoid the Humboldt Bay owl's clover, Western sand spurry and their host salt marsh habitat by installing the new pipeline segment within a bore underneath the habitat. In addition, the proposed project includes certain other mitigation measures to avoid impacts to this species including delineating and restricting access to all areas containing the plants, and using qualified biological monitors to ensure that no disturbance to the rare plants occurs during construction. Special Condition No. 11 requires that these mitigation measures be implemented and that the construction workers be educated about the extent and need for these limitations on construction. Furthermore, the requirements of Special Condition

No. 3 that a final wetland mitigation plan be submitted that delineates all wetland impact areas will ensure that construction does not occur in salt marsh habitat containing the rare plant where work is not authorized.

Therefore, the Commission finds that the project as conditioned, includes all feasible mitigation measures to minimize all significant adverse impacts to sensitive plant species consistent with Section 30233 of the Coastal Act.

D. Maintenance and Enhancement of Marine Habitat Values

The fourth general limitation set by Section 30233 and 30231 is that any proposed dredging or filling in coastal wetlands must maintain and enhance the biological productivity and functional capacity of the habitat, where feasible.

As discussed above in the section of this finding on least environmentally damaging feasible alternatives and mitigation, the conditions of the permit will ensure that the project will not have significant adverse impacts on the water quality of various watercourses within the project area and will ensure that the construction of the replacement electric transmission line will not adversely affect the biological productivity and functional capacity of the wetland environments through which the replacement line will be constructed. Therefore, the Commission finds that the project, as conditioned, will maintain the biological productivity and functional capacity of the habitat consistent with the requirements of Section 30233, 30230, and 30231 of the Coastal Act.

E. Conclusion

The Commission thus finds that the proposed dredging and filling is an allowable use under Section 30233(a) of the Coastal Act, that there is no feasible less environmentally damaging alternative, that feasible mitigation is required to minimize all significant adverse impacts associated with the dredging and filling of coastal wetlands, and that wetland habitat values will be maintained or enhanced. Therefore, the Commission finds that the proposed development, as conditioned, is consistent with Sections 30233, 30230 and 30231 of the Coastal Act.

4. Geologic Hazards

Section 30253 states in applicable part:

New development shall:

(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs...

Section 30253 states that development shall neither create nor contribute significantly to erosion, geologic instability or destruction of the site or surrounding areas.

The principal geologic concern related to the project is that horizontal directional drilling activities associated with the installation of the replacement gas line under Freshwater Slough could result in release of drilling fluids (bentonite) into the waters of the slough. Most likely is the release of bentonite as a result of a "frac-out," the propagation of fractures from the drilling bore to the surface of the ground. Frac-out results from drilling through brittle, fractured and/or poorly consolidated rocks or sediments, the maintenance of too-high fluid pressures in the bore during drilling, and drilling at too shallow a depth below the ground.

The most effective way to guard against the release of drilling fluid into the environment through frac-out is to drill in geologic strata that are least susceptible to frac-out. A site specific geotechnical analyses of the geology at the bore site is the most effective way of determining how deep the boring must be made to avoid boring through geologic strata that is susceptible to frac-out. The applicant proposes to drill a directional bore within the coastal zone as part of the proposed project.

The applicant's geotechnical engineering consultant, Kleinfelder, Inc, has performed a geotechnical analyses of the proposed Horizontal Directional Drilling (HDD) bore to determine among other things, the appropriate bore depth (See Exhibit No. 4). As part of the investigation, the consultant drilled a total of five exploratory vertical borings to provide the basis for interpretive geologic cross-sections. The geotechnical investigation includes specific recommended drilling depths for the directional bore, and includes other recommendations for the directional boring contractors to follow.

The Commission's staff geologist has reviewed the geotechnical reports prepared as part of the investigations and has determined that the reports provide adequate information for the horizontal directional drilling contractor to perform the boring in an environmentally safe manner, and recommends that the permittee be required to conduct the boring in accordance with the recommendations contained within the geotechnical report with one exception. The staff geologist notes that the geotechnical report provides data that shows that drilling conditions would be best below about 35 feet in depth, yet the recommended

depth for the bore beneath the slough is only indicated at "greater than 15 feet." The staff geologist recommends that drilling be conducted as much as possible at depths greater than 35 feet. Therefore, to ensure that the project will be performed safely and not contribute to geologic hazards, the Commission attaches Special Condition Nos. 1, 2, and 7. Special Condition No. 7 requires the permittee to undertake the horizontal directional drilling activities in accordance with all recommendations contained in the geotechnical report except that the horizontal drilling shall be conducted as much as possible a depths greater than 35 feet. Special Condition No. 1 requires the permittee to submit for the review and approval of the Executive Director a plan showing the horizontal directional drilling bore and demonstrating that the bore will be conducted as much as possible a depths greater than 35 feet.

As noted above, drilling in geologic strata that are least susceptible to frac-out is the most effective way to guard against the release of drilling fluid into the environment from directional boring activities. An additional way to guard against frac-out impacts is to carefully monitor the directional drilling activity as it occurs to look for indications of a frac-out before much of the drilling fluid escapes into the environment. Besides simply observing the ground for the emergence of drilling fluids, the level and pressure of drilling fluids used in the operation can be monitored. Frac-out impacts can be further minimized by replacing drilling fluid used in the directional drilling process with water whenever conditions permit.

With the geotechnical investigation performed by the applicant at proposed drilling sites under Freshwater Slough and with the precautionary measures required by Special Condition Nos. 1 and 7, the chances that a damaging frac-out would result from the proposed directional drilling activity have been minimized and such an event is unlikely to occur. However, because of the uncertainties about the exact soil conditions existing at each drilling location and the potential for human error in the directional drilling process, it cannot be guaranteed that no damaging frac-out would ever occur. Therefore, the applicant has prepared a contingency plan detailing precautions and cleanup methods that would be employed in the event of release of drilling fluids into the environment be developed (See Exhibit No. 5).

The Commission's staff geologist has reviewed the contingency plan and has determined that the contingency plan is comprehensive and generally will provide the drilling contractor with the needed information for responding to any potential inadvertent return of drilling fluids to the surface. The staff geologist recommends, however, that Material Safety Data Sheets for all materials that will be used in the HDD operation be attached to the contingency plan. Therefore, Special Condition No. 2 requires that a final revised horizontal directional drilling ("HDD") fluid monitoring and spill contingency plan be submitted for the review and approval of the Executive Director that substantially conforms with the previously submitted plan except that Material Safety Data Sheets for all materials that will be used in the horizontal directional drilling operation shall be

attached to the plan. In addition, the condition requires that in the event of a spill or accidental discharge of drilling fluids during drilling operations, the permittee must cease all construction and the permittee must submit a revised project and restoration plan that provides for (1) necessary revisions to the proposed project to avoid further spill or accidental discharge of drilling fluids, and (2) restoration of the area(s) affected by the spill or accidental discharge to pre-project conditions. Construction cannot commence until any necessary amendment for the plan to be incorporated into the project has been approved. These requirements will ensure that necessary adjustments to the project to prevent further spills will be made and that the impacts of the approved development on coastal resources will be fully mitigated.

Additionally, the Commission attaches Special Condition No. 9, which requires the applicant to assume the risks of accidental spills of drilling fluids during the proposed directional drilling activities and waive any claim of liability on the part of the Commission. Given that the applicant has chosen to implement the project despite these risks, the applicant must assume the risks. In this way, the applicant is notified that the Commission is not liable for damage as a result of approving the permit for development. The condition also requires the applicant to indemnify the Commission in the event that third parties bring an action against the Commission as a result of the failure of the development to withstand hazards. In addition, the condition ensures that any future assignees of the permit will be informed of the risks, the Commission's immunity from liability, and the indemnity afforded the Commission.

Therefore, the Commission finds that as conditioned, the proposed project is consistent with the requirements of Coastal Act Section 30253 that development shall neither create nor contribute significantly to geologic instability or destruction of the site or surrounding areas.

5. Public Access

Section 30210 of the Coastal Act requires that maximum public access shall be provided consistent with public safety needs and the need to protect natural resource areas from overuse. Section 30212 of the Coastal Act requires that access from the nearest public roadway to the shoreline be provided in new development projects except where it is inconsistent with public safety, military security, or protection of fragile coastal resources, or adequate access exists nearby. Section 30211 requires that development not interfere with the public's right to access gained by use or legislative authorization. Section 30214 of the Coastal Act provides that the public access policies of the Coastal Act shall be implemented in a manner that takes into account the capacity of the site and the fragility of natural resources in the area. In applying Sections 30210, 30211, 30212, and 30214 of the Coastal Act, the Commission is also limited by the need to show that any denial of a permit application based on these sections, or any decision to grant a

permit subject to special conditions requiring public access, is necessary to avoid or offset a project's adverse impact on public access.

Although the project is partially located between the first public road and a tidal slough, an inlet of the sea, it would not adversely affect public access. The project site is within a rural, agricultural area used primarily for cattle grazing. There are no trails or other public roads that provide shoreline access within the vicinity of the project that would be affected by the project. Furthermore, the proposed project would not create any new demand for public access or otherwise create any additional burdens on public access.

Therefore, the Commission finds that the proposed project does not have any significant adverse effect on public access, and that the project as proposed without new public access is consistent with the requirements of Coastal Act Sections 30210, 30211, 30212, and 30214.

6. California Environmental Quality Act

Section 13906 of the California Code of Regulation requires Coastal Commission approval of a coastal development permit application to be supported by findings showing that the application, as modified by any conditions of approval, is consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Public Resources Code Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available, which would significantly lessen any significant effect that the activity may have on the environment.

The Commission incorporates its findings on conformity with Coastal Act policies at this point as if set forth in full. These findings address and respond to all public comments regarding potential significant adverse environmental effects of the project that were received prior to preparation of the staff report. As discussed herein in the findings addressing the consistency of the proposed project with the Coastal Act, the proposed project has been conditioned in order to be found consistent with the policies of the Coastal Act. As specifically discussed in these above findings which are hereby incorporated by reference, mitigation measures which will minimize all adverse environmental impact have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity would have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found consistent with the requirements of the Coastal Act and to conform to CEQA.

EXHIBITS:

1. Regional Location Map
2. Vicinity Map
3. Site Plan
4. Excerpts of Geotechnical Report
5. Spill Contingency Plan
6. Excerpts of Biological Assessments

APPENDIX A

STANDARD CONDITIONS

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.