

**DOCKET**

**01-AFC-7C**

**DATE** OCT 18 2007

**RECD.** OCT 26 2007

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Democratic Club and Hayward Area Planning Association  
7

8 STATE OF CALIFORNIA

9 STATE ENERGY RESOURCES

10 Conservation and Development Commission

11 In the Matter of:

Docket No.: 01-AFC-7C

12 Initially noticed as "Petition to Amend the  
13 Commission Decision Approving the Application  
for Certification for the Russell City Energy  
14 Center";

DECLARATION OF ANDREW WILSON III  
IN SUPPORT OF GROUP PETITIONERS'  
PETITION TO INTERVENE, REOPEN THE  
ADMINISTRATIVE PROCEEDINGS,  
REOPEN THE EVIDENTIARY RECORD  
AND FOR RECONSIDERATION

15 Later Noticed as "Modification of the Application  
16 for Certification for the Russell City Energy  
Center"  
17

Date: TBD  
Location: TBD  
Time: TBD

18  
19  
20 I, Andrew Wilson III, hereby declare:

21  
22 1. I am a resident of the City of Hayward and a Project Software Developer by profession. I  
23 am also a pilot of 28 years and instrument rated to fly a Cessna P210N. Since February 15,  
24 2007 I have been following the proceedings of the California Energy Commission during the  
25 late spring / early summer 2007 which initially examined the proposed project entitled  
26 "Eastshore," a 115 megawatt thermal power plant, together with the project known as the  
27 Russell City Energy Center, a 600 megawatt thermal power plant. Later on, the proceedings

28 Decl. of Williams CEC 01-AFC-7C

Cec petition decl williams.doc

1 for Eastshore plant was separated from the Russell proceedings and I have continued to  
2 follow the proceedings for both plants. I have personal knowledge of the facts set forth  
3 below and if called as a witness in this matter, would and could testify competently to the  
4 following.

5 2. Attached as Exhibit A is a true and correct copy of California Energy Commission's  
6 *fact sheet on the Sutter Power Plant.*  
7 published ~~power plant Database as of California reflecting the various sizes which power~~  
8 ~~plants are constructed.~~

9 3. I attended the Alameda County Airport Land Use Commission meeting August of 2007  
10 where Gary Cathey of California Transportation Aviation described his experience over-  
11 flying a power plant named Sutter Power Plant in Yuba County. Mr. Cathey said he flew  
12 through the plume at 800 to 1,000 feet, classified the turbulence caused as severe, and one of  
13 his wings tilted up and that he would not fly through the plume any lower because of the  
14 severe turbulence and risk. He said he had the highest ratings possible from the FAA. A  
15 conversation by the Commission members pursued with Mr. Mike Argentine of Calpine,  
16 who stated told the Commission that the Sutter Power Plant was a Calpine Power Plant and  
17 stated that the Sutter Power Plant was the same size as the Calpine Russell Energy Center  
18 Power Plant (RCEC).

19 4. In fact, however, as reflected in Exhibit A the size of Calpine's Sutter Plant is 540 MW,  
20 not 600 MW. At the hearing at which Mr. Cathey attended for Russell and Mr.  
21 Argentine, the Alameda Airport Land Use Commissioners voted to require that RCEC  
22 include a Notice To Airmen (NOTAM) be posted on aviation charts warning pilots not to  
23 fly below 1,000 feet above the RCEC power plant. The horizontal distance required by  
24 the NOTAM will encroach upon the Airport Buffer Zone and Airport Influence Area.  
25  
26  
27

1 5. I attended the Alameda County Airport Land Use Commission meeting on October 17,  
2 2007 for the Tierra Energy Eastshore Energy Center. The Commissioners voted as stated  
3 in their Resolution 02-2007 – At Meeting Held October 17, 2007 to strike the proposed  
4 NOTAM, but only require Tierra Energy Eastshore Energy Center to select an alternate  
5 site for the proposed project outside of the Airport Influence Area for the Hayward  
6 Executive Airport. The proposed mitigation for Tierra was modeled after the RCEC  
7 mitigations but the Commissioners agreed that a “NOTAM” was not a mitigation. The  
8 RCEC site needs to be relocated as well because the NOTAM is not a substitute of  
9 restricted buffer or airspace.  
10

11 6. I have reviewed the letter dated September 25, 2007 from Federal Aviation  
12 Administration to California Energy Commission posted on the Russell amendment web  
13 page at 5 p.m. on September 25, before the hearing set for September 26, 2007 on Russell  
14 before the CEC. It alleges that “The proposed RCEC is located 1.56 miles southwest of  
15 the Hayward Executive Airport”. This is the first time over the past seven months that the  
16 Russell plant has been stated as that being located 1.56 miles and not 1.5 miles from the  
17 Hayward Executive Airport. The horizontal distance now required to remain a safe  
18 horizontal distance from the plume as required by the NOTAM in Trans-10 now  
19 encroaches into the Buffer zone or Airport Influence Area.  
20

21 7. Attached Exhibits B are true and correct copies of information I gathered related to  
22 Hazardous Material releases:

23 a. County of Riverside –Health Services Agency Department of Environmental Health  
24 Hazardous Materials Management Division Emergency Response, Complaint,  
25 Investigation Report. This shows that after the Hazardous Materials release at the Blythe I  
26 Power Plant the decision was made to close the freeway but no attempt was made to  
27

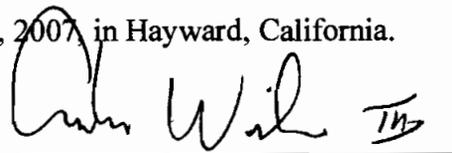
1 either measure the air above the power plant, to close the Blythe I power plant or to warn  
2 pilots. This power plant is the same technology as Russell City Energy Center.

3 b. Los Medanos Energy Center Bulk Chemical Offload incident Root Cause Analysis.

4 Pittsburg, CA. Air analysis was made at ground level but no attempt was made to  
5 conduct measurements above the power plant or to warn pilots in the area. The power  
6 plant uses the same technology as the Russell City Energy Center.

7  
8 8. The Hayward Executive Airport operations have grown over the past two years. In  
9 addition more hanger space has been constructed. Bud Fields has proposed construction  
10 of additional hanger space and a new fuel island. Closing or restricting air space in or  
11 around the Hayward Executive Airport by the use of NOTAMS does not ensure a safe  
12 airport environment, nor is it a mitigation for loss of the utility of the airport, but may  
13 push pilots over neighborhoods in avoiding the Russell thermal plume.

14 I declare under penalty of perjury under the laws of the State of California that the foregoing is  
15 true and correct. Executed this 18 day of October, 2007, in Hayward, California.

16  
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18 Andrew Wilson III

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# SUTTER POWER PROJECT FACT SHEET

**The Sutter Power Plant Application For Certification can be viewed at the Sutter County Community Services Department at 1160 Civic Center Blvd., Suite E, at the office of George Carpenter.**

**Applicant:** Calpine Corporation

**General Description:** The electric power project, proposed by Calpine Corporation, is a 540 megawatt (MW), natural gas-fired, combined cycle facility.

**Project Location:** The Sutter Power Project will be located adjacent to Calpine's Greenleaf Unit 1, a gas-fired, cogeneration power plant located approximately seven miles southwest of Yuba City on South Township Road at its intersection with Best Road. The land dedicated for the facility will comprise 10-12 acres of Calpine's existing 77-acre parcel (Sutter County Assessor's Parcel Number 21-230-25). The legal description of the 77 acres is: the north half of the northeast quarter of Section 24, Township 14 North, Range 2 East, Sutter County. **{We Will Eventually Link To Project Maps}**

**Project Cost:** Calpine estimates the capital cost of the Sutter Power Project at approximately \$250-285 million. The project will contribute to the local economy by employing about 256 workers during peak construction and about 20 permanent jobs during plant operations.

**Permitting Process:** The California Energy Commission is responsible for permitting the proposed Sutter Power Project. The Energy Commission will carefully examine public health and safety, environmental impacts and engineering aspects of the proposed power project including all related facilities such as electric transmission lines, natural gas pipeline lines, etc. The Energy Commission responsibilities are similar to those of a lead agency under the California Environmental Quality Act (CEQA).

The permitting process is open to the public and includes input from the public and all interested parties as well as working in consultation with other local, state and federal agencies.

*Exhibit A*

Because the project will interconnect with the Western Area Power Administration's high voltage transmission line, the review will be completed jointly with WAPA, the federal lead agency for this project.

Since the project site is currently zoned for agricultural uses, Calpine will request Sutter County to permit a rezone of the 77-acre parcel to a Planned Development site thus allowing this industrial use. Sutter County and the Energy Commission reviews will occur concurrently to ensure no delay in the review processes. **{We will soon link to the project calendar.}**

- Construction Schedule:** Calpine anticipates starting construction in 1999.
- Operation Schedule:** Calpine anticipates beginning commercial operation by the end of 2000.
- Electricity Sales:** Electrical energy produced from the proposed power plant will be sold in California's newly created electricity market.
- Facility Operation:** Calpine expects the project to have an overall availability of between 90 and 95% and could operate up to 8,322 hours per year. Since the project will be selling electricity into the emerging California market, the plant will be designed to provide electricity during peak load periods as well as operate as an intermediate or baseload facility. The project will be capable of 300 start-ups and shut-downs during the year as it responds to the market.
- Project Design:** The combined cycle design consists of two combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs) with duct burners and a steam turbine generator (STG). Each CTG will produce approximately 170 MW of electricity. The CTG's exhaust gases will be used to generate steam in the HRSGs. The HRSGs will be reheat design with duct firing. Steam from the HRSGs will be admitted to a condensing steam turbine for an additional 160 MWs of electrical power generation.
- Electric** A new 4.0 mile 230 kilovolt (kV) overhead electric transmission

- Transmission Line:** line will be built to a switching station which will interconnect to the Western Area Power Administration electrical transmission system. The line will be configured to minimize electromagnetic fields (EMF).
- Natural Gas Fuel Line:** A new 12 mile natural gas pipeline will be constructed to provide fuel for the project. The 16 inch gas pipeline will connect to an existing PG&E natural gas supply line located to the west of the facility site. PG&E will construct the gas supply line.
- Emission Controls:** Nitrogen oxide (NOx) emissions from the combustion process will be reduced to 25 parts per million by volume dry (ppmvd), at 15 percent oxygen by utilizing dry low NOx combustion technology. The HRSGs will incorporate an 84% effective selective catalytic reduction (SCR) system to control NOx emissions to 4 ppmvd at 15% oxygen. The SCR will use anhydrous ammonia and a precious metal catalyst to convert NOx molecules into nitrogen and water. Each HRSG's exhaust to the atmosphere will be through 18-foot diameter, 185-foot tall exhaust stacks.
- Water Supply:** Potable water and cooling water will be provided by an on site well system that will be developed as part of the project. It is expected that three wells will be developed to provide approximately 3,000 gallons per minute of water that will be needed during peak operating conditions.
- Waste Water:** Sanitary waste will be disposed to an on-site septic system. All other wastewater generated in the operation of the plant will be discharged to the existing surface drainage system requiring a National Pollutant Discharge Elimination System (NPDES) Permit.
- Applicant's Web Site:** <http://www.calpine.com>

[Return to Sutter Power Project Main Page.](#)

Exhibit B

Blythe



COUNTY OF RIVERSIDE HEALTH SERVICES AGENCY  
 DEPARTMENT OF ENVIRONMENTAL HEALTH  
 HAZARDOUS MATERIALS MANAGEMENT DIVISION  
 EMERGENCY RESPONSE, COMPLAINT, INVESTIGATION REPORT

OFFICE RECEIVING AGENCY:	INITIAL REPORT TAKEN BY:	DATE REPORTED:	TIME REPORTED (USE MILITARY TIME):	SPECIALIST ASSIGNED:	CODE NUMBER:	CONTROL NUMBER:
Indio	ECC	9-25-04	0400	Bobby Riggs	5520	20950
LOCATION OF INCIDENT:		THOMAS BROS. MAP:	TYPE OF PLACE:	DATE OCCURRED:	TIME OCCURRED (USE MILITARY TIME):	
15560 W. Hobsonway Blythe		392B-10	Power Plant	9-25-04	0400	
NATURE OF COMPLAINT OR INCIDENT: Anhydrous ammonia release.						

OFFICE USE ONLY					
HAZMAT FILE	HAZMAT INVOICE	CDF INVOICE	MPDES INVOICE	FORM 33 COMPLETED	INVESTIGATIONS SECTION

CODES: RP=RESPONSIBLE PARTY C=COMPLAINANT V=VICTIM W=WITNESS O=OTHER

CODE:	NAME (FIRST, MIDDLE, LAST):	DOB:	RACE:	SEX:		
RP	Blythe Energy					
ADDRESS: (HOME)		PHONE: (H)	HT:	WT:	HAIR COLOR:	EYES:
ADDRESS: (WORK)		PHONE: (W)	IDENTIFICATION NUMBER: (CDL)			
15560 W. Hobsonway Blythe		760-922-9950				

CODES: RP=RESPONSIBLE PARTY C=COMPLAINANT V=VICTIM W=WITNESS O=OTHER

CODE:	NAME (FIRST, MIDDLE, LAST):	DOB:	RACE:	SEX:		
ADDRESS: (HOME)		PHONE: (H)	HT:	WT:	HAIR COLOR:	EYES:
ADDRESS: (WORK)		PHONE: (W)	IDENTIFICATION NUMBER: (CDL)			

FURTHER ACTION / FOLLOWUP REQUIRED?			IS IT POSSIBLE TO LOCATE OR IDENTIFY A RESPONSIBLE PARTY FOR THE INCIDENT?			IS A PROPOSITION 65 REPORT TO BE COMPLETED?		
YES	NO	x	YES	x	NO	YES	x	NO

**DISPOSITION OR ACTION:**

0400 Hours 9-25-04 I received a tone from the ECC to respond to an anhydrous ammonia release at Blythe Energy, 15560 W. Hobsonway in Blythe.

0600 Hours I arrived on scene at the Quik Chek West gas station at 14021 W. Hobsonway, the command center. I met with the following: CDF Battalion Chief Bill Zimmerman, CHP Officer Michael King, CDF Hazmat Capt. Reeves and Operations Manager Gary McIntire. CHP Officer King and CDF Battalion Chief Zimmerman made the decision to close the freeway at Desert Center to Blythe. Capt. Reeves reported that there was a release of anhydrous ammonia in the chiller room while employees were changing a filter, the scrubber had come on when the ammonia alarm came on. Capt. Reeves stated we would need to make entry to see what would need to be done to shut off the release. I informed Capt. Reeves I was familiar with the facility because I had recently done an inspected the facility.

I went to Gary McIntire and asked what had happened and what it would take to stop the release. Gary reported that two employees were changing a filter on one of the compressors, they had gone thru the safety procedures paper work and had performed the lock out procedure and had bled the filter of ammonia into a water can before starting the work. One of the employee's took five to six bolts off of the flange and caused the ammonia release. All three employees working in the compressor room evacuated the area. The ammonia alarm went off and the scrubber automatically came on. To stop the leak a valve would need to be closed and the flange bolts replaced. I advised if they had personnel trained to make an entry, Gary stated that they all had the training to make entry. Capt. Reeves and I made the decision to stage on the northwest side of the chiller room to don suits so we could have visual contact with the entry team. Hazmat personnel gave Rick Deabenderfer, plant employee, a lesson on the hazmat unit SCBA to make entry. At approximately 0700

W

Jm 041220

Hours the wind changed and we moved to the southwest corner of the chiller room and entry would be made from the south doors. Hazmat personnel and plant personnel suited out in modified level "B" with two hazmat personnel suited out in modified "B" as back up. The entry team entered the chiller room and closed the valve to the filter and put the bolts back in the flange. They opened all the doors to help vent the chiller room. When the entry team exited the building they reported that the wrong flange had been opened and the line was hot. We used an ammonia meter from the power plant and made another entry fifteen minutes later. The monitor read 90 PPM ammonia. We waited another fifteen minutes and took another reading of 15 PPM of ammonia. At 0915 I called CHP Officer Michael King to reopen the freeway. Plant personnel will monitor the ammonia and wear proper equipment to pick up the oil on the floor for proper disposal. We rehydrated the hazmat team and packed up all the equipment, hazmat team off scene at 1115 hours. I gathered information for my report and made sure that plant employees were monitoring the area properly while absorbing the spilled oil. 1215 Hours I left the scene arriving home at 1430 Hours.

1330 Hours 9-27-04 I met with the City of Blythe and Blythe Energy to discuss the incident. Chris Allen, Blythe Energy Plant General Manager, informed the group that 405 pounds of ammonia was released from the system and that the scrubber had caught 400 pounds of ammonia back into the system, losing five pounds of ammonia into the air, they had also lost 70 to 100 gallons of oil onto the floor. The chiller system holds 55,000 pounds of anhydrous ammonia. The City of Blythe, Blythe Energy and Riverside County Hazmat will have meetings in the future to coordinate emergency plans.

DRUG-LAB NOTIFICATION DATE:			
OTHER AGENCIES NOTIFIED:	None	ADDITIONAL HAZMAT SPECIALISTS:	TOTAL INCIDENT TIME (ALL STAFF):
	None	None	10.5 hours
SPECIALIST PREPARING REPORT:	DATE:	REVIEWED / APPROVED BY:	DATE:
Bobby Riggs <i>Bobby Riggs</i>	12-3-04	<i>John A. Day</i>	12/16/04
DEH-HEH-001 (REV 1/2000)			

Exhibit B

Pittsburg

The logo for Exponent, featuring the word "Exponent" in a serif font with a registered trademark symbol. The background of the entire page is a dark, textured pattern with a repeating circular motif at the bottom.

Exponent®

**Los Medanos Energy Center  
Bulk Chemical Offload  
Incident  
Root Cause Analysis**



**Los Medanos Energy Center  
Bulk Chemical Offload Incident  
Root Cause Analysis**

Prepared for

Los Medanos Energy Center, LLC  
750 East Third Street  
Pittsburg, CA 94565

Prepared by

Exponent  
149 Commonwealth Drive  
Menlo Park, CA 94025

July 16, 2007

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# Contents

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	<u>Page</u>
<b>Acronyms and Abbreviations</b>	<b>iv</b>
<b>Executive Summary</b>	<b>1</b>
<b>1 Background</b>	<b>4</b>
<b>2 Scope of Study</b>	<b>5</b>
<b>3 Results</b>	<b>7</b>
3.1 Assembly of Root Cause Analysis Team	7
3.2 Definition of Problem Statement	7
3.3 Document Review	8
3.4 Interviews	9
3.5 Timeline Development	11
3.6 Process Flow Chart	12
3.7 Barrier Analysis	13
<b>4 Root Cause Determination</b>	<b>15</b>
4.1 Apparent Cause	15
4.2 Root Cause	15
4.3 Contributing Cause #1 – Chemical Ordering Process	16
4.4 Contributing Cause #2 – Procedure and Checklist	16
4.5 Contributing Cause #3 – Operator Training	16
4.6 Contributing Cause #4 – Contractor Orientation	17
<b>5 Recommendations</b>	<b>18</b>
5.1 Near Term Mitigation Action Recommendations	18
5.2 Long Term Corrective Action Recommendations	18
5.3 Follow-up Activity Recommendations	19
5.4 Review for Extent of Condition Recommendations	19

<b>6</b>	<b>Actions Considered but Not Recommended</b>	<b>21</b>
6.1	Chemical Alternatives to Sodium Hypochlorite	21
6.2	Different Size Fill Connectors for Different Chemicals	21
6.3	Add a Fill Valve that Must be Opened by the Control Room	21
6.4	pH Controlled Fill Valve	22
6.5	Scheduling a Work Order in Maximo for each Delivery	22
6.6	Only Accept Deliveries on Date Scheduled	22
6.7	Provide 2 Operators at Fill Site for each Delivery	22
6.8	Provide Management Oversight at Fill Site for each Delivery	22
6.9	Reduce the Number of Bleach Deliveries to the Site	22
	<b>Appendix A – Chemical Company Initial Alert and Root Cause Analysis Report</b>	<b>24</b>

## **Acronyms and Abbreviations**

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<b>RCA</b>	<b>Root Cause Analysis</b>
<b>LMEC</b>	<b>Los Medanos Energy Center</b>
<b>A Operator</b>	<b>Control Room Operator</b>
<b>B Operator</b>	<b>Field Operator</b>
<b>C Operator</b>	<b>Water Treatment Operator</b>
<b>Bleach</b>	<b>Sodium Hypochlorite</b>
<b>Corrosion Inhibitor</b>	<b>Nalco 3DT177 (Phosphoric Acid)</b>
<b>Maximo</b>	<b>Plant Computerized Maintenance Management System (CMMS)</b>
<b>PI</b>	<b>Plant Historian</b>
<b>SOP</b>	<b>System Operating Procedure</b>

## Executive Summary

---

On May 24, 2007, a truck delivering chemicals to the Los Medanos Energy Center (LMEC) incorrectly offloaded its cargo, resulting in the generation and venting of chlorine gas. The appropriate agencies were notified and emergency response actions were taken.

As a result of the incident, three plant employees were sent to the local hospital for observation. No off-site complaints were received. The Contra Costa Health Services (CCHS) Response Team conducted air monitoring outside of the affected building with the highest level of chlorine at 0.15 parts per million (ppm). The OSHA permissible 8-hour exposure limit is 0.50 ppm. Air sampling at various locations on the plant perimeter indicated non-detectable levels of chlorine.

As part of completing their investigation, LMEC decided to conduct a Root Cause Analysis (RCA) of the incident. In order to perform that analysis, they assembled an independent team made up of representatives from the company's safety and engineering departments, under the guidance of an outside consultant, who acted as the RCA facilitator. The problem statement that the team chose for the root cause analysis of the above condition is:

**“A chemical was offloaded into the wrong tank causing a chemical reaction affecting human health and the environment.”**

This problem statement was specifically designed to both focus and limit the scope of the Root Cause Analysis. In this case, the scope does not include an assessment of the performance of the emergency response to the event once the chlorine was released. The emergency response effectiveness will be the subject of a separate review performed by LMEC and the agencies participating in that response. The RCA team felt that loading that chemical into the wrong tank is an event that must be prevented. Therefore, the team chose to focus this analysis on identifying the people, process, equipment, and management barriers that must be in place to prevent recurrence. In addition, the scope did not include a detailed review of the adequacy of the barriers provided by the people, processes, and equipment provided by the trucking company or the chemical supply company. While these barriers were reviewed and discussed with the two companies involved in this particular incident, the team felt that the barriers provided by the plant alone must be sufficient to prevent recurrence. Lastly, the team chose to include the offloading of chemicals in general rather than limiting the focus to the Corrosion Inhibitor and Sodium Hypochlorite that were involved in this particular incidence.

The root cause analysis sought to answer the following questions:

- Why did the event occur?
- What barriers (people, process, equipment, and management) were in place to prevent occurrence? Did any of these barriers fail and, if so, why?
- Are there any additional barriers not currently in place, but which if they had been, would have prevented the problem from occurring?

- What near-term mitigation actions and long-term corrective actions need to be taken to prevent recurrence?
- For the long-term corrective actions, what follow-up and monitoring activities need to be put in place to verify that they are working effectively to prevent recurrence?

The analysis showed that the Apparent Cause of the incident was the fact that the truck driver failed to follow his procedure while making the delivery. If he had performed the required steps in that procedure, the event would have been prevented. The problem was compounded by the fact that a plant operator failed to perform certain critical steps in the plant procedure that controls chemical offloads.

However, the Root Cause of the event was determined to be that the plant did not have sufficient barriers in place to prevent a human performance error (the truck driver and an operator each failing to perform a critical step in a procedure) from creating an incident with unacceptable consequences. The plant had no internal second line of defense when the truck driver and operator failed to follow their procedures.

In addition to the Apparent and Root Causes, Contributing Causes were identified in the areas of weaknesses in the chemical ordering process, the chemical offload procedure and checklist, operator training, and contractor orientation. All of the causes are described in more detail in Section 4 of this report.

The intent of the Root Cause Analysis was to identify actions that can be taken to prevent the occurrence of similar events in the future. The actions fall into three categories:

- Near term mitigation actions.
- Long term corrective actions.
- Follow-up activities.

Near term mitigation actions are things that can be done quickly to provide a temporary barrier against recurrence. In that regard, they should be looked upon as temporary fixes or “band-aids.” They cannot be relied upon to provide a long term or permanent barriers against recurrence. The recommended near term actions are:

1. Discipline, counsel, and retrain the Water Treatment Operator involved in this incident.
2. Retrain all operators in the Chemical Safety and the Bulk Chemical Unloading Procedure.
3. In addition to actions by LMEC, the RCA team was informed that the truck delivery company has terminated the driver involved in this incident and has increased the level of training for their drivers. Therefore this near term action has already occurred. See Appendix A.

Long term corrective actions are designed to provide permanent barriers against recurrence. They are designed to address the weaknesses identified in the Root Cause and Contributing Causes. The recommended long term corrective actions are:

1. Put the Chemical Offload Process under the control of the Safe Work Permit Process. Taking this action will make the Control Room Operator an active participant in the process along with the Water Treatment Operator. For each offload, the Safe Work Permit Process requires that the three parties involved (driver and both operators) do a job safety briefing that includes, among other things, a review of the truck Bill of Lading and the MSDS for the chemical involved. The Safe Work Permit is a process that is audited on a periodic basis. That will bring chemical offloads under the scrutiny of those audits.
2. Make the Chemical Ordering Process a formal site process. Develop a procedure (SOP) to describe all of the steps in the process including the step that notifies the Control Room of expected delivery dates, and the specific location in the Control Room where those expected deliveries are displayed.
3. Review the Chemical Offload Procedure and the Chemical Receiving Checklist and revise to incorporate the lessons learned during this analysis. Combine the two documents into a single document, and clarify the description of what is required at each step. For example, the checklist should make the operator write down the name of the chemical being offloaded based on the job briefing. As part of this review, also review the procedures of chemical suppliers and delivery companies to see if there are any good ideas or useful steps that should be added to the revised Los Medanos Energy Center SOP.
4. Review the process for training all operators on changes in safety procedures, as well as the documentation of who needs to be trained on what, and when and how that training occurred.

Follow-up activities are those ongoing monitoring activities necessary to provide assurance that the long term corrective actions are: (a) implemented, executed and maintained, and (b) are effective in preventing recurrence. The recommended follow-up activities are:

1. Develop and implement an auditing process to review how the Chemical Receiving Checklist and Procedure are being used and filled out. The purpose of the audit should be to review compliance, consistency of documentation, and to determine steps that need further clarification.
2. Chemical offloads will be audited as part of the auditing process that already exists for the Safe Work Permit Process.
3. Perform quarterly surveillance of documentation and actual offloads as part of the Contractor Safety Audit process. Schedule these surveillances in the plant computerized maintenance management system (Maximo).

# 1 Background

---

On May 24, 2007, a Chemical delivery truck containing Nalco 3DT177 Corrosion Inhibitor (phosphoric acid) arrived at the Los Medanos Energy Center in Pittsburg, California, for a scheduled delivery. The truck driver announced himself to the Control Room Operator and was granted access to the site. The driver, who was unfamiliar with the site, parked in a temporary location, and entered the Control Room. The Control Room Operator directed the driver back to his truck and radioed the Water Treatment Operator to notify him that there was a chemical truck delivery to be done. At this time and for a variety of reasons, both operators believed that the truck was carrying Sodium Hypochlorite (bleach) rather than Corrosion Inhibitor. The Water Treatment Operator directed the driver to the Sodium Hypochlorite fill line location and went back to the Control Room to obtain the key needed to unlock the Sodium Hypochlorite fill connection. The connections were made and the offload of the Corrosion Inhibitor into the Sodium Hypochlorite tank began. The Control Room Operator was notified by the Water Treatment Operator that the offloading had begun. The reaction between the two chemicals created chlorine gas which was released into the building in which the Sodium Hypochlorite is housed through the vent on the Sodium Hypochlorite tank. Workers smelled the chlorine and the offload was terminated. At the time of termination, approximately 300 gallons of corrosion inhibitor had been transferred from the truck to the Sodium Hypochlorite tank. The tank contained approximately 300 gallons of Sodium Hypochlorite at the time.

Once the offload operation was stopped, the appropriate agencies were notified and emergency response actions were taken. These are described in detail in the 72 Hour Follow-up Notification Report Form that was submitted to Contra Costa Health Services (CCHS).

As a result of the incident, three plant employees were sent to the local hospital for observation. (Note that the Chemical Company Initial Alert Report in Appendix A erroneously states that two were taken to the hospital). No off-site complaints were received. The CCHS Response Team conducted air monitoring outside of the affected building. The highest level of chlorine detected by the monitoring was 0.15 ppm. The OSHA permissible 8-hour exposure limit is 0.50 ppm. Air sampling at various locations on the plant perimeter indicated non-detectable levels of chlorine.

As part of completing their investigation, LMEC decided to conduct a Root Cause Analysis (RCA) of the incident. In order to perform that analysis, they assembled an independent team made up of representatives from the company's safety and engineering departments, under the guidance of an outside RCA facilitator from Exponent. The Exponent facilitator provided the methodology and experience in performing complex Root Cause Analyses as well as an independent and objective assessment of the issues and the actions taken over the timeframe of the evaluation. The company representatives provided subject matter expertise in the areas of plant operations and chemical offloads.

This report documents the methodology and the results of the Root Cause Analysis.

## 2 Scope of Study

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The problem statement for the Root Cause Analysis of the above condition is:

**“A chemical was offloaded into the wrong tank causing a chemical reaction affecting human health and the environment.”**

This problem statement was specifically designed to both focus and limit the scope of the Root Cause Analysis. In this case, the scope does not include an assessment of the performance of the emergency response to the event once the chlorine was released. The emergency response effectiveness will be the subject of a separate review performed by LMEC and the agencies participating in that response. The RCA team felt that loading that chemical into the wrong tank is an event that must be prevented. Therefore, the team chose to focus this analysis on identifying the people, process, equipment, and management barriers that must be in place to prevent recurrence.

In addition, the scope did not include a detailed review of the adequacy of the barriers provided by the people, processes, and equipment provided by the trucking company or the chemical supply company. While these barriers were reviewed and discussed with the two companies involved in this particular incident (see Appendix A), the team felt that the barriers provided by the plant on its own must be sufficient to prevent recurrence.

Lastly, the team chose to include the offloading of chemicals in general rather than limiting the focus to the Corrosion Inhibitor and Sodium Hypochlorite that were involved in this particular incidence.

The Root Cause Analysis sought to answer the following questions:

- Why did the event occur?
- What barriers (people, process, equipment, and management) were in place to prevent occurrence? Did any of these barriers fail and, if so, why?
- Are there any additional barriers not currently in place which, if they had been, would have prevented the problem from occurring?
- What near-term mitigation actions and long-term corrective actions need to be taken to prevent recurrence?
- For the long-term corrective actions, what follow-up and monitoring activities need to be put in place to verify that they are working effectively to prevent recurrence?

The following tasks were undertaken to perform the Root Cause Analysis:

Task 1: Definition of the Problem Statement (see Section 3.2).

- Task 2: Data Collection (Document Review and Interviews) (see Sections 3.3 and 3.4).**
- Task 3: Root Cause Analysis (see Sections 3.5 -3.7).**
- Task 4: Validate and Verify the Root Cause Analysis (see Section 4).**
- Task 5: Develop Recommendations (see Section 5).**
- Task 6 Document Other Actions Considered but Not Recommended (Section 6).**
- Task 7: Prepare and Issue Final Report.**

██████████  
██████████  
  
ALERT #: 20070524 00105  
Date: 24 May 2007 10:51 CDT  
Customer: ██████████ Los Medanos Power Plant  
Location: Pittsburg, CA  
Carrier: ██████████

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**INITIAL ALERT REPORT**

Type of Incident: Transportation  
Date: 05/23/2007, 10:51 A.M., CDT  
Location: ██████████ Los Medanos Power Plant, Water Treatment building - Pittsburg, CA  
Consignee: ██████████ Los Medanos Power Plant - Pittsburg, CA  
Carrier: ██████████  
Order #/POO: 200048532 / BOL 115115879 / Plant 111  
Containers: Customer Bulk Tank (Tank # TKCF02) - 7000 gallon tank  
Sales District: NW33-01  
DAR Category: 1B  
Failure Mode: Mis-Delivery  
Product: 3DT177 mixed with 12.5% solution Sodium Hypochlorite  
Amount Released: None  
Hazardous: OSHA, RCRA, DOT  
DOT 5800.1 Required: No  
Medical Exposure: 4 people by inhalation of Chlorine gas, two taken to Diablo Medical Center.  
Description:

ALL TIMES LISTED ARE Pacific Daylight Savings Time.

██████████ Representative ██████████ contacted ALERT to report of a chlorine gas release from a mis-delivery of product by the carrier, ██████████. The driver arrived at 7:30 A.M., stating that he was there to deliver a load of acid. The operator asked if it was the bleach shipment and the driver agreed it was. The operator and the driver were at the bleach tank off-loading 3DT177. The driver stopped delivery when they smelled a Chlorine odor at around 8:30 A.M. The driver and operator realized that it was the wrong tank and purged the fill line and connected to the 3DT177, but had not started to unload. Approximately 300 gallons of 3DT177 had already been off-loaded to the 376 gallons of Sodium Hypochlorite at that point. ██████████ Plant Engineer ██████████ had arrived at the water treatment building and inhaled a strong Chlorine odor at about 8:30 A.M. He evacuated and coordinated the evacuation of personnel from the water treatment building area, isolating the location.

██████████ contacted ██████████ at 8:40 A.M. to request assistance on how to respond to



3- July 16, 2007

██████████ COMPANY

the incident. At 9:13 A.M. ██████████ advised contacting the local city emergency response team. Toxicologist ██████████ advised ██████████ on the technical information regarding the reaction between the two chemicals.

The Pittsburg Fire Department arrived on-site at 9:47 A.M., with the Health Department monitoring the air of the surrounding area. Commercial neighbors, ██████████ and ██████████ were notified and sheltered away from the affected area. The following ██████████ Personnel had been notified of the incident: ██████████

██████████ Safety personnel ██████████ was notified of the incident. ██████████ personnel ██████████ is coordinating with ██████████ on the removal of the mixed product and clean up of the tank.

The water treatment building is still not accessible because of the high concentration of chlorine within the building. The sheltered area was lifted at 1 P.M. The fire department hazardous material crew and plant personnel agreed to monitor with Greiger tubes for Chlorine levels to give clearance for the use of the building.

Preventable:	Yes, by carrier
Coordinators Time/Est Contractor	1 hour
Cost:	
Waste Generated:	Yes, tba

#### ROOT CAUSE

On June, 8 2007 I met with ██████████ and representatives of ██████████ at the Los Medanos Power Plant in Pittsburg, CA. The customer had already performed a root cause analysis and invited ██████████ and ██████████ to participate. Although there were several contributing factors that lead to the incident, many of which had already been identified by the customer, the ultimate cause of the incident was the failure of the ██████████ driver to perform his Zero Defect Delivery verification. At a minimum of three separate times during the transfer, the driver had the opportunity to perform ZDD.

When I visited the tanks involved with ██████████, ██████████ we immediately realized that the driver should have realized the problem. Neither of the two tanks were labeled with ██████████ labels and should have alerted the driver to a potential problem. The driver also failed to compare both products and tank numbers with what was present to what his bill of lading called for.

Despite the fact that the ██████████ Operator believed that product should have been delivered into the tank, all ██████████ drivers that deliver ██████████ products are trained to perform ZDD verification and if there is even the smallest discrepancy, they should call for further assistance.

3- July 18, 2007

██████████ COMPANY

CORRECTIVE ACTIONS

According to ██████████, the driver involved was terminated for this incident. Apparently this driver had a history of previous incidents before this ALERT. On at least two separate occasions since this incident, ██████████ has contacted ██████████ to request additional training material on the ZDD process. ██████████ has made an increased effort to raise the awareness of their drivers of the requirements for making ██████████ deliveries and has increased the emphasis of ZDD in their training program. ██████████ is currently waiting for the final root cause analysis and corrective action from ██████████.