National Transportation Safety Board
Washington, DC 20594

Printed on : 8/26/2009 9:08:56 AM

Brief of Accident

Adopted 09/09/1992

LAX89LA270
File No. 2339 | 08/09/1989 | BAKERSFIELD, CA | Aircraft Reg No. N90296 | Time (Local): 11:15 PDT

Make/Model: Bell / 206B
Engine Make/Model: Allison / 250-C20
Aircraft Damage: Destroyed
Number of Engines: 1
Operating Certificate(s): On-demand Air Taxi; Aircraft External Load
Type of Flight Operation:
Reg. Flight Conducted Under: Part 91: General Aviation

	Fatal	Serious	Minor/None
Crew	0	1	0
Pass	0	1	1

Last Depart. Point: VAN NUYS, CA
Destination: Local Flight
Airport Proximity: Off Airport/Airstrip

Condition of Light: Day
Weather Info Src: Witness
Basic Weather: Visual Conditions
Lowest Ceiling: None
Visibility: 20.00 SM
Wind Dir/Speed: Calm
Temperature (°C): 29
Precip/Obscuration:

Pilot-in-Command Age: 51

Certificate(s)/Rating(s)
Commercial; Multi-engine Land; Single-engine Land; Helicopter

Instrument Ratings
Airplane; Helicopter

Flight Time (Hours)

Total All Aircraft: 8000
Last 90 Days: 55
Total Make/Model: 5000
Total Instrument Time: UnK/Nr

THE HELICOPTER CREW WAS FILMING A COGENERATION PLANT. THE HELICOPTER ORBITED THE PLANT THREE TIMES. DURING THE THIRD ORBIT, THE HELICOPTER PASSED OVER THE EXHAUST CHIMNEY OF THE PLANT WHICH WAS OPERATING AT THE TIME. THERE WAS NO VISIBLE INDICATION THAT EXHAUST GASES WERE EMANATING FROM THE CHIMNEY. THE GASES WERE REPORTED TO BE 350 DEGREES FAHRENHEIT WITH A 3.6 PERCENT OXYGEN CONTENT. THE HELICOPTER TURBOSHAFT ENGINE LOST POWER OVER THE CENTER OF THE CHIMNEY. THE PILOT ENTERED AUTOROTATION TOWARDS AN OPEN AREA OF A PARKING LOT. DURING THE FLARE, THE HELICOPTER STRUCK A VEHICLE, AND LANDED HARD, SEVERED THE TAILBOOM, AND ROLLED ON TO ITS SIDE. THE CERTIFICATION STANDARD FOR THE ENGINE WAS 120 DEGREES FAHRENHEIT.

Attachment J

LAX89LA270
File No. 2339 | 08/09/1989 | BAKERSFIELD, CA | Aircraft Reg No. N90296 | Time (Local): 11:15 PDT

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: MANEUVERING

Findings
1. (F) WEATHER CONDITION - TEMPERATURE EXTREMES
2. (C) MISCELLANEOUS - STARVATION
3. (F) VISUAL LOOKOUT - NOT POSSIBLE - PILOT IN COMMAND
4. (F) TURBOSHAFT ENGINE - FAILURE,TOTAL
5. (F) DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED - PILOT IN COMMAND
6. (C) INFORMATION UNAVAILABLE - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Findings
7. (F) AUTOROTATION - PERFORMED - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings
8. OBJECT - VEHICLE

Occurrence #4: HARD LANDING
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings
9. (F) PROPER DESCENT RATE - NOT POSSIBLE - PILOT IN COMMAND

Findings Legend: (C) = Cause, (F) = Factor

The National Transportation Safety Board determines the probable cause(s) of this accident as follows.
THE LOSS OF ENGINE POWER DUE TO THE HELICOPTER BEING FLOWN IN EXHAUST GASES EMANATING FROM A COGENERATION PLANT CHIMNEY STACK THAT EXCEEDED THE CERTIFICATION STANDARDS OF THE POWERPLANT. CONTRIBUTING TO THE ACCIDENT WAS INVISIBLE NATURE OF THE EXHAUST GASES WHICH MADE THE DETECTION OF THEIR PRESENCE UNLIKELY.

Attachment K

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-4959
FAX (916) 653-9531
TTY 711

Byron Airport
Contra Costa County

Flex your power!
Be energy efficient!

October 14, 2009

Ms. Lashun Cross
Airport Land Use Commission
Contra Costa County
651 Pine Street, North Wing 4th Floor
Martinez, CA 94553

VIA ELECTRONIC MAIL

Dear Ms. Lashun:

In response to notification that the Department of Transportation, Division of Aeronautics has received regarding the proposed construction of a power plant in the vicinity of Byron Airport, we offer the following comments.

The California Public Utilities Code, Section 21659 prohibits the construction of structures that may be considered hazardous to aircraft operating in navigable airspace, as defined in Title 14 of the Code of Federal Regulations, Federal Aviation Regulation (FAR), Part 77, Subpart C. In part, FAR Part 77.13(a) (1) through (4) requires sponsors to submit a Notice of Proposed Construction (Form 7460-1) to the Federal Aviation Administration (FAA) at least 30 days before the earlier of the following dates: (1) The date the proposed construction or alteration is to begin, or (2) The date an application for a construction permit is to be filed. It is important to note that the FAA aeronautical study process does not formally evaluate the effects that thermal plumes have upon overflying aircraft; it evaluates only the height of the structure(s) themselves.

In several instances, power plants that emit thermal plumes have been constructed near airports, and have resulted in numerous safety related complaints by pilots regarding the negative effects that the high velocity plumes have had upon aircraft control and maneuverability, and in some instances pilot visibility. As a result, the Division of Aeronautics conducted a nonscientific flight over a local power plant emitting thermal plumes to determine the effects the plumes might have upon the operation of the aircraft. We were informed the plant was operating at 100% of peak capacity at the time. The Beechcraft Bonanza F-33 aircraft, having a maximum gross weight of 3600 pounds, overflew the power plant towers beginning at an altitude of 1200 feet above ground level, in calm wind conditions. The altitude of subsequent passes was decreased in 200 foot intervals. Minor turbulence was experienced at the 1000 foot and 800 foot elevations. However, the most significant turbulence was experienced at the 600 foot elevation. The turbulence from the plumes did effect aircraft control and maneuverability to the extent that further lower passes were not conducted because of potential aviation safety concerns. At this elevation, we felt there was inadequate altitude to regain full aircraft control in the event of an aerodynamic stall of one or both wings.

We recommend that an objective, scientifically based approach be used to thoroughly analyze the aerodynamic effects that this particular proposed power plant would have upon aircraft approaching or departing the traffic pattern at Byron Airport. Parameters should include, but not be limited to: type, weight, altitude, and speed of aircraft; temperature, velocity and moisture content of the thermal plume(s) and surrounding air; height and shape of the emitting stacks, etc. The Division of Aeronautics believes such information would be helpful in determining the potential impact of the proposed power plant on the Byron Airport, and useful in your decision-making process.

Sincerely,

GARY CATHEY, Chief
Division of Aeronautics

cc: FAA ADO SFO677
Jim Adams, CA Energy Commission
Keith Freitas, Director of Airports

Attachment L

SignOnSanDiego.com
THE SAN DIEGO UNION-TRIBUNE

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More North County news

Power struggle

City wants new energy plant built near airport, but aviation expertsand others say that could have disastrous consequences

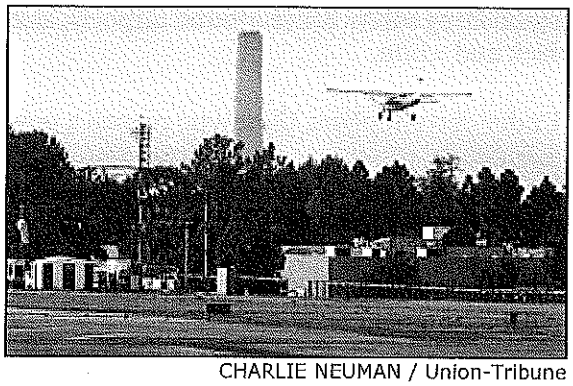
By Michael Burge
UNION-TRIBUNE STAFF WRITER

November 23, 2008

The city of Carlsbad's fight to shift a proposed power plant away from the coast, where the owner wants to build it, to eastern Carlsbad faces a serious obstacle: airplanes.

The city's favored site, the Carlsbad Oaks North industrial park in eastern Carlsbad, is within a mile and a half of McClellan-Palomar Airport's runway, posing potential trouble for air navigation. And one of Carlsbad's backup sites, the city's police and fire safety center, is even closer.

Building a power plant near an airport can be dangerous because the stacks would stand 140 feet tall, creating a physical and visual hazard for aircraft. Also, hot exhaust emanating from the stacks could cause turbulence for planes landing at the airport.



CHARLIE NEUMAN / Union-Tribune
With the Encina Power Station's 400-foot-tall smokestack visible about four miles away, a small private plane came in for a landing at McClellan-Palomar Airport in Carlsbad. Hot exhaust from smokestacks at a power plant proposed for a site near the airport could cause turbulence for planes landing there.

"Both of those areas are in the arrival area of light aircraft, where they're descending," said Ron Cozad, an attorney and regional vice president of the California Pilots Association. "That would be disastrous. It couldn't be done."

There have been 10 accidents since 2000 involving aircraft taking off or landing at McClellan-Palomar Airport, according to the Federal Aviation Administration. Five were fatal crashes that killed a total of 13 people, FAA spokesman Ian Gregor said.

The National Transportation Safety Board has determined probable causes in six of the 10 accidents. All were the result of pilot error, and weather was a factor in three, Gregor said.

NRG Energy, which owns and operates the 54-year-old, oceanfront Encina Power Station, has applied to the California Energy Commission to build a 540-megawatt plant on its coastal property west of Interstate 5 on the south shore of Agua Hedionda Lagoon. It hopes to have the plant operating by 2011.

The city wants any power plant moved off the coast to an inland location in Carlsbad.

"It all comes down to we don't think the coastline is an appropriate site," said Joe Garuba, the city's municipal projects manager. "All we're trying to do is point out there's a whole lot of sites that are better than the coast."

City officials have said the land, with an unobstructed view of the Pacific Ocean, is prime property for a hotel and other developments that would serve the public.

The California Energy Commission – not the city – has authority over issuing permits for power plants. The city can question NRG's data and comment during the application process.

City officials offered two alternative sites – Carlsbad Oaks North and Maerkle Reservoir in the city's northeast – but have since said the reservoir is off the table because it is too close to the Ocean Hills senior community in Oceanside.

Carlsbad Oaks North is a 400-acre business park north of Faraday Avenue and west of Melrose Avenue that is seeking tenants.

NRG has rejected both sites for various reasons.

Tim Hemig, NRG's project manager for the proposed power plant, says the business park falls within a proposed safety zone for the airport where development is limited. The purpose of the zone is to ensure that structures around an airport don't pose hazards to airplanes and people on the ground.

"There's a black-and-white restriction that says no power plant can be sited in (the safety zone)," Hemig said.

Sandi Sawa, manager of airport planning for the San Diego County Regional Airport Authority, which is establishing safety zones around airports, said McClellan-Palomar's zone has not been adopted, so it is not black and white.

"Under current plans, there's no reason a power plant couldn't be allowed there," Sawa said.

A power plant would have to be approved by the FAA and the California Department of Transportation's aeronautics division, she said.

Gregor said developers hoping to build near airports must apply to the FAA, which determines whether a structure's height would interfere with air navigation.

The FAA has no authority to block developments, but its recommendation carries weight with other agencies that can, he said.

Caltrans' aeronautics division has such authority.

"We may look at it and suggest against it ... if we think it creates a hazard," said Phillip Miller of Caltrans' aeronautics division.

Miller said the agency would comment on the proposal to the California Energy Commission.

When Caltrans declared that a 180-foot building under construction in Kearny Mesa endangered airplanes flying into Montgomery Field, San Diego City Attorney Michael Aguirre used that as ammunition to force the developer, Sunroad Enterprises, to shave 20 feet off the building's height last year.

NRG points to the California Energy Commission's recent rejection of a proposed power plant in the San Francisco Bay Area, called Eastshore Energy Center, as an example of why it doesn't want to pursue the

Carlsbad Oaks North location.

The commission found that hot exhaust from the proposed plant would have been hazardous to planes landing at nearby Hayward Executive Airport.

Carol Gold, vice president of the California Pilots Association, said that because of the heavy air traffic around Hayward – Oakland International Airport is to the north and San Francisco International to the west – planes have limited airspace. Any attempt to go around the power plant would have forced them into another airport's traffic pattern.

"You can't avoid it by flying above," Gold said.

Hemig said NRG has determined that a plume from its power plant could go as high as 1,700 feet, and planes fly at a lower altitude near the Carlsbad Oaks North industrial park, creating a hazard.

Garuba said the energy commission's Eastshore Energy Center ruling doesn't apply to Carlsbad.

He said another, larger power plant was approved within a mile of Eastshore and that pilots had to avoid the plant. That left no other space for airplanes to go if Eastshore was built.

"They're boxed in," which is not the case with McClellan-Palomar Airport, Garuba said.

Peter Drinkwater, director of airports for San Diego County, which owns and operates McClellan-Palomar, said a new power plant near the airport would require close scrutiny.

"One thing for certain is if something gets built and it affects the flight path, then one thing that can mitigate (it) is a change in the flight path or pattern, or the approaches," Drinkwater said. "But those things obviously cause other problems."

Some residents who live near the airport complain that planes fly over their homes, and the airport tells pilots to avoid residences to minimize the noise. Many residents say that doesn't take care of the problem.

Garuba said the city contacted the FAA this year about aviation issues regarding a proposed power plant.

"That was one of the first things we did, and ruled out stuff" based on that contact, Garuba said.

He said there is enough space around Carlsbad Oaks North to mitigate the possible impacts.

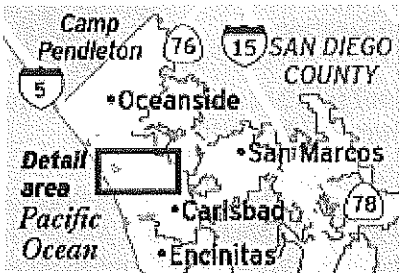
Cozad, of the pilots association, said he doesn't see how the city's chosen site can get off the ground.

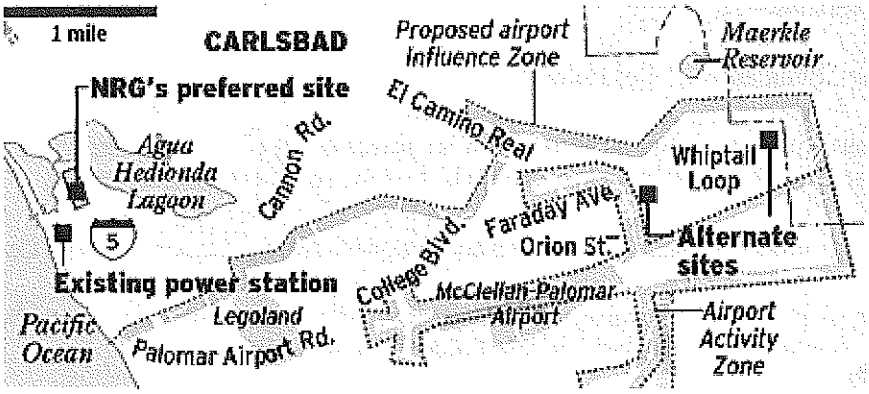
"This is a very scary issue," he said. "You just don't put a power plant at the arrival end of an airport."

Michael Burge: (760) 476-8230; **michael.burge@uniontrib.com**

Power plant sites

The city of Carlsbad has suggested two alternative locations for a new power plant. The alternatives are farther inland than the existing Encina Power Station and NRG Energy's preferred site.





SOURCE: California Energy Commission UNION-TRIBUNE

Find this article at:
http://www.signonsandiego.com/news/northcounty/20081123-9999-lz1mc23power.html

☐ Check the box to include the list of links referenced in the article.

Attachment M

STAFF REPORT -- AIRPORT LAND USE COMMISSION
PROPOSED RUSSELL CITY ENERGY CENTER PROJECT
JULY 18, 2007 – AGENDA ITEM 4

BACKGROUND

The California Energy Commission (CEC) has requested that the Alameda County Airport Land Use Commission (ALUC) review the proposed Russell City Energy Center (RCEC) project to be located in Hayward, approximately 1.5 miles from the Hayward Executive Airport. This project falls within the ALUC Height Referral Area and the Airport Influence Area for the airport.

Calpine Corporation is proposing to develop the RCEC that would be a base-load, 600 megawatt, natural gas-fired power plant, with a nine-cell cooling tower (64 feet tall), and two 145-foot-tall heat recovery steam generator stacks.

CEC CONCERNS AND REQUESTED INFORMATION

CEC staff have published a Preliminary Staff Assessment on potential impacts to Hayward Airport operations (see attached reports) which concluded that the thermal plumes from the cooling tower and heat recovery steam generator stacks will disturb airspace stability to more than 1,000 feet above ground level (agl). This disturbance could be a potential aviation safety hazard to aircraft using Hayward Executive Airport.

The CEC has requested the ALUC make a determination on two questions:

1. Does the ALUC consider the proposed RCEC plumes an aviation safety hazard?
2. Does the project conform to the City of Hayward's Municipal Code?

ALUC staff has consulted with the Office of the County Counsel on these questions, and on the project in general. Counsel has provided the opinion that based on Sections 21674(a) and 21670(a)(2) of the State ALUC Law that it is within the jurisdiction of the ALUC to provide its comments on the proposed power plant project, if it so desires.

However, the ALUC presently has no direct regulatory authority over the proposed project, and probably does not possess sufficient technical expertise to assess the thermal plume question without additional technical assistance. In addition, the question of project conformance with the City of Hayward's Municipal Code is outside the scope of the ALUC's mandate to comment on, and thus will not be addressed by the Commission.

SUMMARY OF RELEVENT BACKGROUND REPORTS

Attached to this staff report are the following documents that discuss the issue of thermal plumes relative to aviation safety. Staff has included a brief summary of each report after each listing below.

1. CALIFORNIA ENERGY COMMISSION
   - Letter from Jim Adams of the CEC requesting ALUC review of project.
   - Preliminary Staff Assessment – Potential Impacts on Hayward Airport Operations
     - Executive Summary
     - Land Use
     - Traffic and Transportation

Summary: CEC staff have conducted an analysis that concludes the plumes generated from this project would present a substantial hazard to aircraft operations at normal traffic pattern altitude (600 – 800 feet agl).

2. CALPINE (PROJECT SPONSOR)
   - Plume Vertical Velocity Assessment of a Proposed Gas-Fired Power Station at Russell City Energy Center

   - Addendum to the Plume Vertical Velocity Assessment

   Summary: Technical report conducted by an Australian firm analyzing the RCEC project specifically, based on guidelines for aviation safety set out by the Australian Civil Aviation Authority (CASA) and presented in *"Guidelines for Conducting Plume Rise Assessments (CASA 2004)."* Analysis conducted for worst case assessment assuming calm winds and neutral atmospheric conditions for the entire length and height of the plume, and for realistic wind scenario using vertical wind profiles generated by a prognostic weather model for a full year simulation. These reports were prepared by members of the group in Australia who developed the only known methodology for accurately modeling thermal plumes. The report concluded that, for realistic wind scenarios the average plume vertical velocities are unlikely to exceed the critical threshold of 4.3 meters per second above the height of 176 meters and a maximum distance of 77 meters from the power station.

3. CITY OF HAYWARD
   - Letter from City Manager to the California Energy Commission addressing the isssue of project compliance with municipal code regulations.

   Summary: The City indicates that the proposed RCEC project does conform to the City's Municipal Code and General Plan. The City endorses the RCEC project.

4. FEDERAL AVIATION ADMINISTRATION (FAA)
   - Safety Study Report: Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes

   - FAA 7460 Aeronautical Studies (2) addressing the potential impact on air navigation of the two thermal stacks included in this project

   - Letter from Joe Rodriguez of the local FAA Airports District Office to Ross Dubarry, Acting Airport Manager of the Hayward Executive Airport urging the City to require the project sponsor to provide a complete project description for all components of the power plant facilities when requesting an FAA 7460 Study, including thermal plumes.

   Summary: The Safety Study Report concludes that the risk associated with thermal plumes on aricraft operations presents an acceptable level of risk comparable to other common potential flight hazards. Recommends addressing the threat posed by vertical plumes by a variety of methods including established procedures for pilot

notification. Makes other recommendations for FAA publications to include the consideration of thermal plumes directly.

The FAA 7460 studies make the finding of "Determination of No Hazard to Air Navigation" for both stacks.

The letter from the FAA to the City requested that City approval requirements include FAA airspace determination as a condition of final building permit approval.

ALUC STAFF RECOMMENED ACTIONS

Staff requests that the ALUC take the following actions at today's meeting:

1. Determine whether to comment to the CEC. A Draft Resolution that reflects any Commission's determination on this issue will be provided at the next ALUC meeting for adoption.

2. Direct staff to agendize for the next ALUC meeting an item discussing whether to include a section on thermal plumes and industrial power plants in the Airport Land Use Policy Plan Update that is currently underway.

STAFF REPORT -- AIRPORT LAND USE COMMISSION
PROPOSED RUSSELL CITY ENERGY CENTER PROJECT
AUGUST 15, 2007 – AGENDA ITEM 4

BACKGROUND

This item is continued from last month's ALUC meeting. At that meeting, the Commission reviewed the proposed Russell City Energy Center Project (hereafter referred to as the RCEC), to be located in Hayward, approximately 1.5 miles from the Hayward Executive Airport. This project falls within the ALUC Height Referral Area and the Airport Influence Area for the airport. Staff provided a number of documents and correspondence as background information for the Commission on this proposed facility, to assist the Commission in their evaluation of the issues.

After presentations by the consultants for the applicant and CEC staff and follow-up discussion, the Commission directed staff to assemble additional information on the project for continued discussion at the next ALUC meeting. To briefly recap, the ALUC received a formal request from the California Energy Commission (hereafter referred to as the CEC) to answer the following question:

→ Does the ALUC consider the proposed RCEC plumes an aviation safety hazard?

Staff has consulted with County Counsel throughout this project review. As you recall, Counsel's opinion is that because this type of facility is not included in the existing ALUC Airport Land Use Policy Plan, our usual and more formal action of a Consistency Determination is not appropriate in this case. However, based on ALUC State Law, the Commission is well within its mandate to comment on the proposed project in response to the CEC request.

This staff report is organized in the following manner:

- Follow-up information requested by the Commission
- Summary of additional information (documents are attached to the end of this report)
- Staff Analysis
- Staff Recommendation
- Draft Resolution
- Attachments

FOLLOW-UP INFORMATION REQUESTED BY THE COMMISSION

The Commission has asked staff to provide more information on the following issue areas:

1. An answer to the local FAA office request to the City to provide more information on thermal plumes as part of their 7460 evaluation of this project.

2. Information on any available technology that could mitigate the impacts of thermal plumes on aircraft.

3. Additional information on the Blythe Energy Facility projects and the CEC evaluation of them.

4. Information on Cumulative Impacts of projects in terms of airspace capacity in the vicinity of Hayward Airport.

5. Flight tracks for Hayward Airport

6. Any additional reports or information on thermal plumes and their potential impacts on aviation, in addition to what staff has already provided.

ADDITIONAL REPORTS AND INFORMATION

This additional information in the form of reports and letters of correspondence have been provided as attachments to this staff report, some of which respond to the follow-up items listed above. Below is a listing and very brief summary of each document.

1. Letter from Aircraft Owners and Pilots Association to Jim Adams, CEC staff – This letter recommends against the placement of the RCEC facility in its current proposed location.

2. Letter from The California Pilots Association to Jim Adams, CEC staff – This letter references Grant Assurances agreed to by the City of Hayward when receiving grants through the FAA that require the City to keep the airport free of hazards and to maintain compatible land use zoning. It also requests that the CEC not approve the amendment for the RCEC and further requests that the CEC not permit this facility to be built within five (5) miles of the Hayward Executive Airport.

3. Letter from the Joe Rodriguez of the FAA Environmental Planning and Compliance Section to Jim Adams of the CEC responding to the issue of the FAA 7460 Study and Thermal Plumes from RCEC. The Letter concurs with the CEC staff assessment, and reiterates the FAA Safety Study Report recommendations to modify notification requirements to pilots. It finds no potential hazard to the Oakland International Airport from the proposed RCEC facility.

4. Letter from Gary Cathey of the Caltrans Division of Aeronautics Office of Airports to Jim Adams of the CEC. This letter states that Caltrans shares the concerns of the CEC staff regarding low-level flight at traffic pattern altitude over the proposed RCEC power plant near the Hayward Airport.

5. Testimony Regarding Thermal Plumes and Aviation – Cumulative Impacts. Submitted by Russell City Energy Center, LLC – Supplemental testimony responding to CEC staff's late-filed Addendum to the staff assessment regarding Cumulative Impacts and Mitigations. Question and answer format that refutes CEC staff analysis regarding potential hazard of thermal plumes on aviation operations.

6. Report of Conversation (3) from Pilots to the CEC staff – Reports based on conversations with pilots who filed complaints about moderate to severe turbulence resulting from overflight of the Blythe I Energy Facility thermal plumes that affected their aircraft operations.

7. Flight Tracks for Hayward Executive Airport - Flight tracks for turbo-prop, single engine, multi-engine aircraft, and helicopters are included as an attachment. Maps also included for Hayward Airport's Land Use Safety Zones and Noise Abatement Flight Procedures.

8. Aviation Safety and Buoyant Plumes- Paper presented at the Clean Air Conference, South Wales, Australia 2003 – Technical analysis of thermal plume effects on aviation safety.

9. Relevant portions of the CEC's Decision on the Blythe Energy Project II facility – Portions pertaining to the thermal plume and aviation hazard discussion of the CEC decision. Includes recommendations for mitigation measures.

10. Land Use Testimony of Shaelyn Strattan, CEC staff - CEC staff analysis of potential hazard of thermal plumes from RCEC relative to the Hayward Executive Airport. Recommends siting facility in another location to avoid potential aviation hazard.

11. Land Use Testimony Errata from Shaelyn Stratton, CEC staff - This document consists of changes that were made to the previously filed Land Use Testimony document above.

STAFF ANALYSIS

The Commission has been asked by the CEC staff to offer its input on the following question:

- Does the ALUC consider the proposed RCEC plumes an aviation safety hazard?

The information provided by the FAA and Caltrans Division of Aeronautics, (both of whom are qualified to answer this question) does not seem to dispute that the thermal plumes represent some level of hazard to aircraft operations at low altitudes (below 1,000 feet AGL). In fact, the Caltrans letter repeats the concerns expressed by CEC staff. The pivotal question is what level of risk is deemed acceptable?

The FAA *Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes* Study from last month's packet acknowledges that the risk posed by thermal plumes exists, but considers that level of risk acceptable and compares it to levels of turbulence routinely experienced by pilots. They suggested a number of mitigations including additional pilot notification of location of industrial plants that emit thermal plumes, warnings to avoid overflight of these facilities, and changes to the 7460 Study to include evaluation of industrial plumes. Perhaps most significantly, the report recommends "amending FAA Order 7400.2 to consider a plume generating facility as a hazard to navigation when expected flight paths pass less than 1,000 feet above the top of the object".

At last month's ALUC meeting commissioners inquired about the availability of technology that could mitigate the potential hazard of high-velocity, high-heat thermal plumes to aircraft flying over them. Staff asked CEC staff and the consultant staff for Calpine (project applicant) to provide any information they were aware of to address this issue. The response was that no feasible technology currently exists to mitigate the effects of thermal plumes on aircraft that wouldn't compromise the operational effectiveness of the power plant.

The commission also inquired about the cumulative impacts to the airspace and aircraft operations from this and other planned facilities in the vicinity of the Hayward Airport. The

only other known potential facility at this time is the Eastshore Energy Center facility that is proposed to be located 1 mile southeast of the Hayward Airport. As of this time, the City of Hayward has stated its opposition to that project; however, I have been contacted by consultants for that project to meet to discuss potential ALUC concerns.

One of the mitigation measures recommended by the FAA and utilized at the Blythe I facility was to change the standard flight pattern to avoid overflight of the plumes. Staff was informed by CEC staff that they investigated this option when evaluating RCEC, but it was deemed not feasible at Hayward due to Noise Abatement Flight Procedures in place currently, which limit available airspace for flight maneuvers. In other words, changing Hayward's flight patterns is not a viable option because it would place more restrictions on an already crowded and restricted airspace.

Another airspace consideration is the flight activity that is generated by the other nearby airports in the region, including Oakland International Airport, and San Francisco International Airport. Oakland has a significant level of General Aviation activity, which is comprised of single, turbo-prop, and multi engine aircraft as well as helicopters. The approach for Oakland overflies the Hayward airspace. Although Oakland-bound aircraft fly at higher altitudes, this traffic further compresses available airspace for the Hayward approach and departure patterns.

In an effort to more fully understand airspace issues, staff looked at the forecasts for flight operations at the Hayward Executive Airport through 2020. According to Exhibit 2E and Table 2M (attached at the end of this report) from the 2002 Hayward Executive Airport Master Plan, General Aviation Operations, which comprise about 98% of all operations at the airport are projected to increase from 187,680 in 2010 to 221,170 in 2020. This represents an expected increase of approximately 3,350 flight operations per year, or 280 per month over current operation levels.

To further illustrate the future trends of activity at Hayward Executive Airport, Page 2-14 of the Airport Master Plan states that

> *Historically, local and itinerant operations accounted for approximately 50 percent each of total annual operations. Since 1990, local operations have grown and accounted for a larger portion of annual operations than itinerant operations. This is representative of continued increases in aircraft training activity at the airport. Consistent with national trends, itinerant operations are forecast to increase through the planning period (in number and as a percentage of total annual operations) due to the expected utilization of business and corporate aircraft at the airport (which are typically itinerant operations).*

STAFF RECOMMENDATION

Based on all the information reviewed and testimony to date, staff recommends the ALUC make the finding, by adopting Resolution 01-2007, that the thermal plumes of the proposed RCEC project are considered to be a potential aviation hazard, and recommend the proposed project be located at a site that will not pose a hazard to aviation safety.

THE AIRPORT LAND USE COMMISSION OF ALAMEDA COUNTY
HAYWARD, CA

RESOLUTION 01-2007 – AT A MEETING HELD AUGUST 15, 2007

Introduced by: Morris
Seconded by: Lockhart

WHEREAS, County Airport Land Use Commissions (ALUCs) were established pursuant to the State ALUC law (Public Utilities Code Article 3.5, State Aeronautics Act, Section 21661.5, Section 21670 et seq., and Government Code Section 65302.3 et seq.) to protect the public health, safety, and welfare by promoting orderly expansion of airports and adoption of land use measures by local public agencies to minimize exposure to excessive noise and safety hazards near airports, and

WHEREAS, state law authorizes ALUCs to coordinate planning at the state, regional and local levels; to prepare and adopt airport land use plans; and to review and make recommendations concerning specified plans, regulations and other actions of local agencies and airport operators including General and Specific Plan amendments, adoption of a Zoning Ordinance or Rezoning, adoption of Building Regulations, revision of Airport Master Plans, and approval of plans to construct a new airport/heliport, and

WHEREAS, Calpine Corporation is proposing to develop the Russell City Energy Center (RCEC) that would be a base-load, 600 megawatt, natural gas-fired power plant, with a nine-cell cooling tower (64 feet tall), and two 145-foot-tall heat recovery steam generator stacks, and

WHEREAS, the power plant would generate invisible high-velocity, high-heat thermal plumes in the Hayward Airport airspace, and

WHEREAS, the RCEC project would be located 1.5 miles from the Hayward Executive Airport within the Airport Influence Area (AIA) for the airport as defined by the Airport Land Use Commission (ALUC) of Alameda County, and

WHEREAS, California Energy Commission (CEC) staff have published a Preliminary Staff Assessment on potential impacts to Hayward Airport operations which concluded that the thermal plumes from the cooling tower and heat recovery steam generator stacks will disturb airspace stability to more than 1,000 feet above ground level (AGL), and

WHEREAS, the (CEC) has asked the ALUC to provide an opinion on the question: "Does the ALUC consider the proposed RCEC plumes an aviation safety hazard?", and

WHEREAS, the FAA *Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes* Study recommends, among other mitigation measures, amending FAA Order 7400.2 to consider a plume generating facility as a hazard to navigation when expected flight paths pass less than 1,000 feet above the top of the object, and

WHEREAS, the California Department of Transportation Division of Aeronautics has stated that it concurs with the CEC staff assessment regarding the potential for a hazard to aviation safety for low altitude flights below 1,000 feet AGL over the thermal plumes that would be generated by the RCEC project in its currently proposed location, and

WHEREAS, The 2002 Hayward Airport Master Plan forecasts an increase in total general aviation operations of approximately 3,350 flights per year, or 280 flights per month between 2010 and 2020 over current operation levels, and

WHEREAS, the expected increase in flight operations for the Hayward Airport represents an increase in aircraft overflight of the thermal plumes to be generated by the proposed RCEC project, and

WHEREAS, the airspace in the vicinity of the Hayward Airport is already restricted due to Noise Abatement Flight Procedures, and

WHEREAS, a mitigation measure that would alter the flight pattern to avoid the thermal plumes generated by the RCEC project is not feasible because it would further restrict the limited airspace, and

WHEREAS, the ALUC has held meetings on July 18 and August 15, 2007 in which this issue was discussed and testimony taken from all interested parties,

NOW THEREFORE BE IT RESOLVED that the Airport Land Use Commission of Alameda County discussed their concerns regarding thermal plumes of the proposed RCEC project relative to aviation safety at the Hayward Executive Airport and makes the following three findings:

1. The Commission recommends an alternate site for the proposed project.
2. If the project is approved at the currently proposed site, that the City of Hayward request that the FAA issue a Notice to Airmen (NOTAM) advising pilots to avoid overflight of the plant.

3. If the project is approved at the currently proposed site, the Commission recommends implementation of Traffic and Transportation Condition of Certification #10 contained in the California Energy Commission Staff Assessment of the Amendment of the RCEC, and additional mitigation measures which include the following:

    - Have the FAA revise any instrument approach that currently directs aircraft directly over the power plant at low elevation
    - Revise the San Francisco Sectional Chart to include a marker showing where the plant is located and adding a recommendation about avoiding overflight
    - Add a new remark to the airport surface observing system (ASOS) equipment that advises pilots, as they approach or depart the airport, to avoid direct overflight of the RCEC
    - Add a marker/remark in the Airport Facility Directory indicating the location of the RCEC facility
    - Have the FAA issue an advisory that a special security TFR (NOTAM FDC 4/0811), strongly advising pilots to avoid flight over or in the proximity of this facility, applies to this location

- Install air traffic hazard lighting at the top of each of the facility's exhaust stacks and non-elevated lights at each corner of the facility that would be visible to an aircraft in flight. Lights shall be operated 24 hours a day, 7 days a week
- Advise the Hayward Executive Airport air traffic control tower, in writing, at least 10 days in advance of any planned tests or start-up procedures that would produce a thermal exhaust plume and prior to the start of normal operations

ADOPTED BY THE FOLLOWING VOTE:

AYES: LOCKHART, HAURI, GROSSMAN, MORRIS

NOES: NONE

ABSENT: NEEDLE, KAMENA

EXCUSED: NEEDLE

ABSTAINED: PERIERA

SIGNED: DATE:

8/16/07

STEVE GROSSMAN
CHAIR, ALAMEDA COUNTY AIRPORT LAND USE COMMISSION

CHRIS BAZAR, ADMINISTRATIVE OFFICER
ALAMEDA COUNTY AIRPORT LAND USE COMMISSION

STAFF REPORT -- AIRPORT LAND USE COMMISSION
PROPOSED EASTSHORE ENERGY CENTER PROJECT
SEPTEMBER 19, 2007 – AGENDA ITEM 4

BACKGROUND

The California Energy Commission (CEC) has requested that the Alameda County Airport Land Use Commission (ALUC) review the proposed Eastshore Energy Center project to be located in Hayward, approximately one mile south of the Hayward Executive Airport. This project falls within the ALUC Height Referral Area and the Airport Influence Area for the airport.

Tierra Energy is proposing to develop the Eastshore Energy Center that would be a nominal gas-fired 115.5-megawatt (MW) power plant located in on 6.22 acre site at 25101 Clawiter Road in the City of Hayward. This facility would have fourteen 70-foot towers that would produce high-velocity thermal plumes in excess of 4.3 meters per second (m/s).

CEC PRELIMINARY STAFF ASSESSMENT (PSA)

CEC staff have published a Preliminary Staff Assessment on, among other things, potential impacts to Hayward Airport operations (see attached Traffic & Transportation and Land Use CEC staff reports). The assessment makes the following findings and recommendations:

- This facility would produce high-velocity thermal plumes in excess of 4.3 meters per second (m/s). However, because plume velocity would dissipate to less than 4.3 m/s below minimum flight altitudes for the Hayward airspace, staff believes the project-generated thermal plumes would not present a substantial hazard to aircraft flying at or above 500 feet above ground level (AGL).

- If the power plant is cited in the proposed location, it will require pilots and air traffic controllers to comply with Temporary Flight Restirctions/Notice to Airmen (TFR/NOTAM) FDC 4/0811 that was created for National Security purposes. CEC staff have determined that this would create an additional obstacle to flight in the southwest quadrant of the Hayward airspace.

- This facility would further limit the use of a significant portion of the airport's usable airspace and further restrict an already restricted airspace for the Hayward Executive Airport, especially when considered with the constraints and potential impacts associated with the proposed Russell City Energy Center (RCEC) project.

- CEC staff does not recommend approval of this facility in its proposed location. However, if the CEC approves the permit for the Eastshore facility, staff recommends condition of certification TRANS-3 (page 4.10-36 in the Traffic & Transportation section of the PSA) be implemented to further reduce the potential of inadvertent overflight of the faicility's thermal plumes, especially by helicopters which fly below 500 feet AGL.

STAFF ANALYSIS

Over the last two months, a significant amount of information on thermal plumes and potential aviation impacts was distributed to the Commission during the review of the Russell City Energy Center (RCEC) Project. These included technical background reports,

letters from Pilot associations, consultant reports, letters from neighbors in the vicinity of the RCEC and Eastshore projects, and letters from FAA and Caltrans Division of Aeronautics.

The thermal plume issue with Eastshore is somewhat different than for the RCEC project. These plumes would dissipate at a much lower altitude than the plumes at the RCEC power plant, and therefore represent less of a potential aviation risk to aircraft. However, helicopters would be susceptable to these risks due to lower flight altitudes.

Airpsace concerns raised by staff at last month's meeting on RCEC are also relevant for the Eastshore Energy Center project. These include: an increase in operations at Hayward Executive Airport over the next 20 years; restricted airspace due to existing Noise Abatement Flight Procedures and the National Security NOTAM warning pilots to avoid overflights of power plants for the RCEC facility; and thermal plumes that would be a potential hazard to helicopter operations.

The cumulative impacts would be significant if both power plants were in operation. The CEC has published the "Presiding Member's Porposed Decision" that gives preliminary approval for the RCEC project to be built. However, as of this writing the FAA has requested more time to evaluate the thermal plume issue and asked the CEC to postpone their decision on the RCEC. The CEC agreed to postpone their decision by several weeks.

STAFF RECOMMENDATION

Based on all the information reviewed regarding potential aviation hazards and thermal plumes, staff recommends the ALUC make the finding, by adopting Resolution 02-2007, that the thermal plumes of the proposed RCEC project are considered to be a potential aviation hazard, and recommend the proposed project be located at a site that will not pose a hazard to aviation safety. As was done for the RCEC Resolution, staff has included CEC staff recommendations in the Eastshore Resolution for mitigation of potential hazards if the project is ultimately approved.

STAFF REPORT -- AIRPORT LAND USE COMMISSION
PROPOSED EASTSHORE ENERGY CENTER PROJECT
OCTOBER 17, 2007 – AGENDA ITEM 4

BACKGROUND

The Commission met last month on this item, but due to lack of a quorum, no action was taken. Several new items have been received regarding this project, and are attached.

****Please review and bring the CEC Preliminary Staff Assessment for Land Use and Traffic & Transportation that was distributed in last month's packet.****

The California Energy Commission (CEC) has requested that the Alameda County Airport Land Use Commission (ALUC) review the proposed Eastshore Energy Center project to be located in Hayward, approximately one mile south of the Hayward Executive Airport. This project falls within the ALUC Height Referral Area and the Airport Influence Area for the airport.

Tierra Energy is proposing to develop the Eastshore Energy Center that would be a nominal gas-fired 115.5-megawatt (MW) power plant located in on 6.22 acre site at 25101 Clawiter Road in the City of Hayward. This facility would have fourteen 70-foot towers that would produce high-velocity thermal plumes in excess of 4.3 meters per second (m/s).

CEC PRELIMINARY STAFF ASSESSMENT (PSA)

CEC staff have published a Preliminary Staff Assessment on, among other things, potential impacts to Hayward Airport operations (see attached Traffic & Transportation and Land Use CEC staff reports). The assessment makes the following findings and recommendations:

- This facility would produce high-velocity thermal plumes in excess of 4.3 meters per second (m/s). However, because plume velocity would dissipate to less than 4.3 m/s below minimum flight altitudes for the Hayward airspace, staff believes the project-generated thermal plumes would not present a substantial hazard to aircraft flying at or above 500 feet above ground level (AGL).

- If the power plant is cited in the proposed location, it will require pilots and air traffic controllers to comply with Temporary Flight Restirctions/Notice to Airmen (TFR/NOTAM) FDC 4/0811 that was created for National Security purposes. CEC staff have determined that this would create an additional obstacle to flight in the southwest quadrant of the Hayward airspace.

- This facility would further limit the use of a significant portion of the airport's usable airspace and further restrict an already restricted airspace for the Hayward Executive Airport, especially when considered with the constraints and potential impacts associated with the proposed Russell City Energy Center (RCEC) project.

- CEC staff does not recommend approval of this facility in its proposed location. However, if the CEC approves the permit for the Eastshore facility, staff recommends condition of certification TRANS-3 (page 4.10-36 in the Traffic & Transportation section of the PSA) be implemented to further reduce the potential of inadvertent overflight of the faicility's thermal plumes, especially by helicopters which fly below 500 feet AGL.

In addition to the CEC report, the following new information/corrrespondence is included:

- PowerPoint Presentation on the Eastshore Energy Center Project from the project owner, Eastshore Energy LLC.
- City of Hayward Correspondence to the CEC Staff dated June 27, 2007 regarding Airport Approach Zoning Regulations (this letter appeared in your Russel City Energy Center (RCEC) packets in July).
- Letter from Joe Rodriguez, FAA, comments on the Eastshore Energy Center 70-foot exhaust stacks. He concurs with the CEC staff assessment that effective mitigation measures to reduce impacts from the EEC exhaust plumes to less than significant levelos wi;; be difficult to implement when combined with the RCEC mitigation.

STAFF ANALYSIS

Over the last two months, a significant amount of information on thermal plumes and potential aviation impacts was distributed to the Commission during the review of the Russell City Energy Center (RCEC) Project. These included technical background reports, letters from Pilot associations, consultant reports, letters from neighbors in the vicinity of the RCEC and Eastshore projects, and letters from FAA and Caltrans Division of Aeronautics.

The thermal plume issue with Eastshore is somewhat different than for the RCEC project. These plumes would dissipate at a much lower altitude than the plumes at the RCEC power plant, and therefore represent less of a potential aviation risk to aircraft. However, helicopters would be susceptable to these risks due to lower flight altitudes.

Airpsace concerns raised by staff at last month's meeting on RCEC are also relevant for the Eastshore Energy Center project. These include: an increase in operations at Hayward Executive Airport over the next 20 years; restricted airspace due to existing Noise Abatement Flight Procedures and the National Security NOTAM warning pilots to avoid overflights of power plants for the RCEC facility; and thermal plumes that would be a potential hazard to helicopter operations.

As a follow-up to last month's reporting on the status of the RCEC project, the CEC has officially given approval at it's meeting on September 26, 2007 for the RCEC facility to be built. The cumulative impacts would be significant if both power plants were in operation.

STAFF RECOMMENDATION

Based on all the information reviewed regarding potential aviation hazards and thermal plumes, staff recommends the ALUC make the finding, by adopting Resolution 02-2007, that the thermal plumes of the proposed RCEC project are considered to be a potential aviation hazard, and recommend the proposed project be located at a site that will not pose a hazard to aviation safety and that is outside of the Airport Influence Area for Hayward Executive Airport. As was done for the RCEC Resolution, staff has included CEC staff

recommendations in the Eastshore Resolution for mitigation of potential hazards if the project is ultimately approved.

THE AIRPORT LAND USE COMMISSION OF ALAMEDA COUNTY
HAYWARD, CA

RESOLUTION 02-2007 – AT A MEETING HELD OCTOBER 17, 2007

Introduced by: Hauri
Seconded by: Needle

WHEREAS, County Airport Land Use Commissions (ALUCs) were established pursuant to the State ALUC law (Public Utilities Code Article 3.5, State Aeronautics Act, Section 21661.5, Section 21670 et seq., and Government Code Section 65302.3 et seq.) to protect the public health, safety, and welfare by promoting orderly expansion of airports and adoption of land use measures by local public agencies to minimize exposure to excessive noise and safety hazards near airports, and

WHEREAS, state law authorizes ALUCs to coordinate planning at the state, regional and local levels; to prepare and adopt airport land use plans; and to review and make recommendations concerning specified plans, regulations and other actions of local agencies and airport operators including General and Specific Plan amendments, adoption of a Zoning Ordinance or Rezoning, adoption of Building Regulations, revision of Airport Master Plans, and approval of plans to construct a new airport/heliport, and

WHEREAS, Tierra Energy is proposing to develop the Eastshore Energy Center that would be a nominal megawatt, gas-fired power plant, with 70-foot towers that would produce high-velocity thermal plumes in excess of 4.3 meters per second (m/s), and

WHEREAS, the power plant would generate invisible high-velocity, high-heat thermal plumes in the Hayward Airport airspace, and

WHEREAS, the Eastshore Energy Center project would be located 1 mile from the Hayward Executive Airport within the Airport Influence Area (AIA) for the airport as defined by the Airport Land Use Commission (ALUC) of Alameda County, and

WHEREAS, California Energy Commission (CEC) staff have published a Preliminary Staff Assessment on potential impacts to Hayward Airport operations which concluded that the thermal plumes from the towers will disturb airspace stability to 500 feet above ground level (AGL), and

WHEREAS, the CEC staff has asked the ALUC to provide an advisory determination of the project's compatibility with the Hayward Executive Airport operations, and

WHEREAS, The 2002 Hayward Airport Master Plan forecasts an increase in total general aviation operations of approximately 3,350 flights per year, or 280 flights per month between 2010 and 2020 over current operation levels, and

WHEREAS, the expected increase in flight operations for the Hayward Airport represents an increase in aircraft overflight of the thermal plumes to be generated by the proposed Eastshore Energy Center project, and

WHEREAS, the airspace in the vicinity of the Hayward Airport is already restricted due to Noise Abatement Flight Procedures, and the National Security NOTAM requesting pilots to

avoid overflight of power plants that will be in effect with the approved Russell City Energy Center (RCEC) project that is also within a mile and a half of the Hayward Executive Airport

NOW THEREFORE BE IT RESOLVED that the Airport Land Use Commission of Alameda County discussed their concerns regarding thermal plumes of the proposed Eastshore Energy Center project relative to aviation safety at the Hayward Executive Airport and makes the following finding:

1. The Commission recommends an alternate site for the proposed project outside of the Airport Influence Area for the Hayward Executive Airport.

ADOPTED BY THE FOLLOWING VOTE:

AYES: HAURI, GROSSMAN, PEREIRA, NEEDLE, MORRIS

NOES: NONE

ABSENT: LOCKHART, KAMENA

EXCUSED: LOCKHART

ABSTAINED: NONE

SIGNED: DATE:

10/26/07

STEVE GROSSMAN
CHAIR, ALAMEDA COUNTY AIRPORT LAND USE COMMISSION

CHRIS BAZAR, ADMINISTRATIVE OFFICER
ALAMEDA COUNTY AIRPORT LAND USE COMMISSION

Attachment N

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08/31/2005

Official Suggests Risk Assessment for Towantic Plant

By: Leda Quirke

OXFORD - A representative of the Federal Aviation Administration advised recently that concerns voiced by Middlebury resident Raymond Pietrorazio about the potential hazards of aircraft flying over vertical plumes that would be emitted by the Towantic Energy Power Plant should be addressed on an analytical risk assessment level.

The suggestion came from the office of James J. Ballough, director of the FAA's Flight Standards Service, in an August 4 letter to U.S. Senator Christopher Dodd.

The letter was subsequently forwarded by Sen. Dodd to Mr. Pietrorazio.

Mr. Pietrorazio, an opponent of the power plant, has been appealing for months to the FAA, the Connecticut Siting Council and state legislators to recognize a June, 2004, report by the Australian Government Civil Aviation Safety Authority claiming that vertical velocity from gas efflux could cause airframe damage and affect the handling characteristics of an aircraft in flight.

In an advisory circular, CASA said that an exhaust plume with an average vertical velocity exceeding 4.3 meters per second should be assessed as a potential hazard to aircraft operations.

Mr. Pietrorazio noted that the proposed plant would have stack emissions in excess of 24 meters per second, nearly six times the benchmark established by CASA.

While Mr. Ballough said he neither agrees or disagrees with CASA's reports, he plans to assign the FAA's Flight Procedure Standards Branch the task of risk analysis for flights over vertical plumes.

Mr. Ballough said it will take at least six months for the analysis to be completed and invites Mr. Pietrorazio, who is Middlebury's representative to the Waterbury-Oxford Airport Master Plan Update project, to comment on its efficacy.

In the same letter, Mr. Ballough notes that Mr. Petrorazio's concerns are currently moot because the FAA , in special security instructions implemented after the 9/11 terrorist attacks, advised pilots to avoid airspace above or in the proximity to sites such as nuclear power plants, power plants, dams, refineries, industrial complexes, military facilities and similar facilities.

"With the above TFRs [Temporary Flight Restrictions] in mind, no direct over flights or maneuvering in the vicinity of large vertical exhaust plumes is currently authorized; therefore, the risk to any aircraft obeying flight rules should be essentially zero with regard to these plumes," Mr. Ballough stated.

At the same time, he said the TFRs may not always be in effect.

Mr. Pietrorazio said last week he was elated that the FAA is moving to do a study.

"It's something I felt was lacking from the beginning," he said.

When it performs the risk analysis for flights over vertical plumes, Mr. Pietrorazio said he hopes that the FAA, in addition to examining CASA guidelines for plume rise assessments, looks at potential visibility impairment to pilots and control towers, the effects of large concentrations of water vapor in navigable airspace, the effects from freezing of water vapor on carburetors and aircraft, the effects from navigable airspace having reduced oxygen content and other issues.

"If they're finally going to get involved, they should do a comprehensive study," Mr. Pietrorazio said.