Pacific Gas and Electric Company

Lawrence F. Womack
Vice President
Nuclear Services

Diablo Canyon Power Plant
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Avila Beach, CA 93424

805 545 4600
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February 14, 2003

PG&E Letter DIL-03-002

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 72-26
Diablo Canyon Independent Spent Fuel Storage Installation
Revised and Supplemental Responses to NRC Request for Additional Information for the Diablo Canyon Independent Spent Fuel Storage Installation Application (TAC No. L23399)

Dear Commissioners and Staff:

By letter dated December 21, 2001, the Pacific Gas and Electric Company (PG&E) submitted an application to the U. S. Nuclear Regulatory Commission (NRC) for a 10 CFR 72 site-specific license to build and operate an independent spent fuel storage installation (ISFSI) at the Diablo Canyon Power Plant (DCPP) site. The application included a Safety Analysis Report (SAR), Environmental Report, and other required documents in accordance with 10 CFR 72.

By letter dated August 29, 2002, the NRC staff requested additional information needed to continue their review of the Diablo Canyon ISFSI License Application. PG&E submitted its response to the NRC staff by letter dated October 15, 2002 (PG&E Letter DIL-02-009).

Enclosure 1 contains PG&E's revised response to question 2-5 from the October 15, 2002 response. PG&E's response to question 2-5 was revised to incorporate updated aircraft hazards information reflecting the local air traffic.

Enclosure 2 provides supplemental information regarding aircraft hazards. A list of attachments is contained in Enclosure 3 followed by the attachments.

Enclosure 4 contains a draft of the Diablo Canyon ISFSI SAR, Section 2.2. The draft contains material responding to items contained in Enclosures 1 and 2. The draft will be incorporated into the Diablo Canyon ISFSI SAR, Amendment 2, and submitted to the NRC at a later date coincident with final responses to all outstanding NRC information requests and open items.

If you have any questions regarding this response, please contact Mr. Terence Grebel at (805) 545-4160.

NMSS01

Sincerely,

Lawrence F. Womack
Vice President - Nuclear Services

gwh/4162
Enclosures
cc: Diablo Distribution
Thomas D. Green, Esq.
Darcie L Houck
Christopher Helenius
Sheldon L. Trubatch
cc/enc: Diane Curran, Esq.
Brian Gutherman
James R. Hall (10)
David A Repka, Esq.
John Stamatakos (2)
Robert K Temple, Esq.
Robert R. Wellington, Esq.
Jacquelyn Wheeler

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of PACIFIC GAS AND ELECTRIC COMPANY Diablo Canyon Independent Spent Fuel Storage Installation	Docket No. 72-26

AFFIDAVIT

Lawrence F. Womack, of lawful age, first being duly sworn upon oath states that he is Vice President, Nuclear Services of Pacific Gas and Electric Company; that he is familiar with the content thereof; that he has executed this revised and supplemental information to an NRC request for additional information regarding the Diablo Canyon Independent Spent Fuel Storage Installation license application on behalf of said company with full power and authority to do so; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

Lawrence F. Womack
Vice President, Nuclear Services

Subscribed and sworn to before me this 14th day of February 2003

Notary Public
State of California
County of San Luis Obispo

SANDRA L RECTOR
Commission # 1339380
Notary Public - California
San Luis Obispo County
My Comm Expires Jan 12, 2006

Revised Response to Request for Additional Information for Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI) License Application

Chapter 2. Site Characteristics

Question 2-5

Provide reasonable estimates for future aircraft activities in the vicinity of the proposed ISFSI facility and an estimate of the cumulative crash hazard of all types of aircraft that may fly in the vicinity of the proposed site. These analyses should follow an established methodology, such as the one documented in NUREG–0800 (NRC, 1987).

This information is necessary to determine compliance with 10 CFR §72.94(a), §72.94(b), §72.94(c), and §72.98(a).

Revised Response to Question 2-5

Pacific Gas and Electric Company estimated the projected growth of civilian flights based on Federal Aviation Administration (FAA) long-range forecast (FAA, 1999). Commercial aircraft operations include air carriers and commuter/air taxi takeoff and landings at all towered and non-towered airports in the U.S.. Based on the FAA forecasts, the commercial aircraft operations are projected to increase from 28.6 million in 1998 to 47.6 million in 2025, which results in a projected increase of 66 percent by 2025.

In addition, the annual number of general aviation operations at all towered and non-towered airports in the U.S. is projected by the FAA to increase from 87.4 million in 1998 to 99.2 million in 2025, which results in a projected increase of 14 percent by 2025.

Based on the above potential increases in traffic, the crash probability for local traffic on VR-27 would increase to 8.82×10^{-7} and for commercial traffic not landing locally to 1.08×10^{-8} by the year 2025.

The FAA also predicts that the military traffic will not increase appreciably, if at all, in the foreseeable future. As a result the probability of a crash on VR 249 will remain at 4.68×10^{-8}.

Based on the FAA projections, the cumulative aircraft crash probabilities increases to 9.4×10^{-7} in 2025, which is still less than the threshold of 1×10^{-6} specified in the Safety Evaluation Report concerning the Private Fuel Storage Facility, Docket No. 72-22, as an acceptable frequency for impact into the facility from all types of aircraft.

Supplemental Information to Request for Additional Information for Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI) License Application

NRC Comment No. 1

San Luis County Regional Airport does not have Runway 19. It has Runways 7, 25, 11, and 29. Only runway equipped for instrument landing is Runway 11. Need clarification.

PG&E Response

PG&E concurs that San Luis Obispo County Regional Airport does not have Runway 19. The Diablo Canyon ISFSI SAR was revised to indicate that V-27 use for local aircraft is usually limited to instrument landings for aircraft arriving from the south and instrument departures to the south from runway 11, or circle to land approaches on runway 29, and instrument departures to the south from runway 29 at San Luis Obispo County Regional Airport. Refer to draft Diablo Canyon ISFSI SAR, Section 2.2.1.3, in Enclosure 4 to PG&E Letter DIL-03-002, dated February 14, 2003.

NRC Comment No. 2

PG&E assumed that "50 percent of the commercial traffic is coming from or departing to the south and 10 percent of the commercial aircraft are using this route under instrument conditions." What is the basis for this assumption? When and where from did they get this information? Need some documentation on this.

PG&E Response

The assumed 50 percent was based on the number of scheduled airline flights that arrived or departed from San Luis Obispo County Regional Airport in the year 2000. However, PG&E has identified more current data that shows today's scheduled commercial flight arrivals and departures have been reduced to 40 per day with 26 to or from Los Angeles, and 14 per day to or from San Francisco or Phoenix. The aircraft flying to Phoenix generally avoid the Los Angeles air traffic control area and arrive in a similar manner to San Francisco aircraft during instrument meteorological conditions (IMC). This information on the current San Luis Obispo County Regional Airport arrivals and departures schedules is found on website: http://www.sloairport.com/flightinfo.html. As a result of this updated information, the assumed 50 percent of commercial traffic being from the south is not valid and our analyses have been modified to support the assumption that 65 percent of the total commercial traffic is from the south. However, this change in the percentage from the south does not affect the analysis because the actual total number of flights from the south has not changed, only the total number of flight to and from the airport.

The instrument approach percent was based on discussions with San Luis Obispo

County Regional Airport management and the control tower personnel. Since that time, PG&E has identified a Federal Aviation Agency (FAA) data source at website:

http://www.apo.data.faa.gov/faaatadsall.HTM

This website provides FAA statistics on aircraft operations. However, to access the correct data on this website the following procedure must be followed. The web site gives an "Approach Operations" link to a report generator for obtaining the numbers of approach operations (i.e., landings under IMC) at control towers by aircraft type. Note that a search by facilities, i.e., control towers (San Luis Obispo County Regional Airport is SBP) generates a no data available error. The search must be performed by Regions and SBP is in the APW – Western Pacific region. The report then gives the data for each tower in the APW region. The "Towers" link can generate reports for a specific tower by aircraft type. Also on this website are available reports on "Instrument Operations", which provide total number of flights performed under an instrument flight plan. However, these numbers do not accurately represent the numbers of landings and takeoffs under IMC, since all commercial, air taxi, and a significant number of general aviation flights are performed under an instrument flight plan using Instrument Flight Rules (IFR), when Visual Flight Rules (VFR) conditions exist. As a result, the data provided from the "Approach Operations" link is more accurate and is used in support of the PG&E analyses.

In addition, for the approach operations analysis, PG&E combined military and general aviation traffic. San Luis Obispo County Regional Airport is not capable of landing large military aircraft and the military traffic consists mostly of National Guard helicopters and observation planes from Camp O'Sullivan near Cuesta College. The combination is conservative since military aircraft have a lower crash rate than general aviation per the DOE report "Data Development Technical Support Document for the Aircraft Crash Risk Analysis Methodology Standard" (ACRAM). The appropriate general aviation crash rate per mile is 1.550×10^{-7} (ACRAM Table 3.37) and military crash rate per mile for small military aircraft is 2.48×10^{-8} (ACRAM Table 4.5).

Based on the above data, air transport (AT), which is defined by the ACRAM as commercial or air taxi operations at the San Luis Obispo County Regional Airport for the years 1998-2001 have averaged 16,100 operations. (An operation is a take off or a landing). AT approach operations, defined as landing when IMC exists, averaged 1,781 landings per year for the same period. Using the current ratio of scheduled flights to or from the south, $1,781 \times 0.65 = 1,157$, which is the average number of landings per year for traffic on V-27 under IFR conditions. The number is conservatively doubled to account for takeoffs that might depart via Morro VOR and V-27. A VOR is a very high frequency omnidirectional range (an unmanned FAA ground station). As a result, the Diablo Canyon ISFSI SAR analyses were revised using 2,314 flights per year for the base case. Refer to draft Diablo Canyon ISFSI SAR, Section 2.2.1.3, in Enclosure 4 to PG&E Letter DIL-03-002, dated February 14, 2003.

Sensitivity analysis on the numbers used in the draft Diablo Canyon ISFSI SAR shows that doubling the IFR commercial traffic increases the total aircraft hazard from 8.26×10^{-7} to 8.28×10^{-7}.

NRC Comment No. 3

PG&E assumed that 50 percent of private aircraft are from or to the south. Additionally, PG&E assumed that 'because of limited instrument landing capability and qualification, conservatively only about 5 percent would be flying under instrument conditions and on this route." What is the basis for this assumption? When and where from did they get this information? Need some documentation on this.

PG&E Response

PG&E assumed that the general aviation traffic distribution would be similar to air transport (AT), which was based on discussions with the tower and pilots. From the FAA data provided on the website listed in the response to comment 2, for the 4-year period 1998-2001, there were approximately 90,700 general aviation operations per year and the total number of approaches under actual IMC averaged 1,430 per year (including local, itinerant, and military). Using the same percentage from the south as actual commercial traffic, and conservatively doubling it to account for takeoffs, the flights per year would be 0.65 x 1,430 x 2 = 1,860 per year. This resultant number of flights is considerably below the previous number of 3,000 used in the Diablo Canyon ISFSI SAR calculations. The SAR has been revised to indicate 1,860 per year. Refer to the draft Diablo Canyon ISFSI SAR, Section 2.2.1.3, in Enclosure 4 to PG&E Letter DIL-03-002, dated February 14, 2003.

As additional support of the assumptions used, some discussion is provided of the commercial aircraft landing patterns at the San Luis Obispo County Regional Airport to help in understanding the additional conservatism in the general aviation and AT approach numbers. Except when the area is under "heavy IMC" (IMC is where the conditions are near the minimums for precision approaches) aircraft arriving from the south do not normally use V-27. They fly to the CADAB intersection and then under visual control straight in to runway 29. This route does not pass by DCPP and does not require a separate evaluation per NUREG-0800 criteria.

When the San Luis Obispo County Regional Airport is under IMC and the ceiling is above 900 to 1,100 ft (depending on type of aircraft), southern-approaching aircraft have a choice and may either fly the RNAV (GPS) RWY 29 approach chart in the same manner or use the ILS RWY 11 approach, which does put them on V-27. However, when the winds are out of the south and/or the ceiling is below 900 to 1,100 ft, the ILS RWY 11 approach is used by all southern area aircraft. The ILS RWY 11 approach uses the V-27 route that crosses over the Morro Bay VOR. As a result of these various approaches and their limited use of V-27, a large portion of the aircraft from the south

do not fly the V-27 approach. However, to ensure conservatism in the evaluation, all aircraft were counted as approaching from the south as using V-27.

NRC Comment No. 4

Need plot for holding patterns for arrivals and missed approach (e.g., CREPE and CADAB intersections and Morro Bay VOR) relative to the proposed site.

PG&E Response

The terminal procedures are included as Attachment 1 to this submittal. DCPP is not shown on approach charts, but its location has been marked.

NRC Comment No. 5

Provide basis for assuming that 5 percent of all instrument landing approaches are missed.

PG&E Response

The five percent number was a conservative estimate based on discussions with the San Luis Obispo County Regional Airport tower personnel and commercial and private pilots regarding the specific approaches available to San Luis Obispo County Regional Airport. The FAA data does not include missed approaches.

San Luis Obispo County Regional Airport has limited instrument landing facilities and generally does not have "heavy IMC", except during major storm fronts and during the summer when the fog can close the airport. Most instrument approaches into the San Luis Obispo County Regional Airport are near basic VFR weather minimums and result in "circle to land" with a visual landing under an IFR approach. This type approach has essentially zero missed landings.

When wind and fog results in downwind landing conditions on runway 11, the only runway with a precision approach available, commercial aircraft will not depart for San Luis Obispo County Regional Airport. Only one IFR runway 29 approach is available, "RNAV (GPS) RWY 29" and has minimums above 1,000 ft and is therefore unavailable in heavy IMC. These conditions can result from fog, which usually arrives in late afternoon from the Morro Bay area and has simultaneous strong winds.

NRC Comment No. 6

Provide details of the aircraft flown nearby.

Page 2.2-2 says commercial commuter aircraft are turbo-prop aircraft. Would the C value in NUREG–0800 be appropriate here?

Are "private aircraft" same as General Aviation aircraft? Are they single-engine, multiple-engine, piston engine, etc? Please specify as the crash rate depends on the aircraft type.

PG&E Response

Diablo Canyon ISFSI SAR, Section 2.2.1.1, indicates that the commercial aircraft landing and taking off at San Luis County Regional Airport are primarily turbo-prop commuter aircraft, which hold no more than 41 people and weigh no more than 30,000 pounds. These aircraft are flown by United, American Eagle, and America West airlines. These are commercial aircraft and, as such, are maintained and operated as commercial aircraft. When reviewing NUREG-0800 C values, the NUREG does not differentiate between types of commercial aircraft, only between who is flying them, such as commercial or general aviation. The differences in the crash rates between commercial and general aviation are not merely based on type of aircraft. These differences are really a function of how these aircraft are maintained, and the experience and training of the pilots. As a result of these factors, even the same type of aircraft would be expected to have a different crash rate based on whether they were commercial and general aviation aircraft. Since the subject turbo-prop aircraft are commercial aircraft, the C value of 4×10^{-10} is considered conservative as stated in the NUREG.

However, sensitivity studies show that even doubling the C value for commercial aircraft does not significantly affect the total crash probability. It increases it from 8.26×10^{-7} to 8.28×10^{-7}.

PG&E considers private aircraft to be included in general aviation. The general aviation aircraft using the airways and airports in the area of the plant are diverse and include small single and duel engine aircraft; helicopters, and small corporate aircraft powered by either prop or jet. The majority of the aircraft are small single or duel engine privately owned aircraft as indicated in the Diablo Canyon ISFSI SAR.

NRC Comment No. 7

What is the basis for using a crash rate of 1 x 10^{-8} per mile for all "private aircraft?" Justify why this crash rate is conservative given the type(s) of aircraft fly to these airports (See Comment #6). This crash seems low; the crash rate per mile for General Aviation aircraft are much higher. The DOE ACRAM study gives rates of the order of 3.543 x 10^{-7} per mile for all rotary engine aircraft.

PG&E Response:

PG&E has reviewed the DOE ACRAM study and determined that it is more conservative to use crash rates for general aviation from the DOE ACRAM study. However, based on PG&E's review, the value provided in the NRC question is from the DOE ACRAM Table 3.36, "General Aviation Total Rotary Wing Crash Rates by Flight Phase", which would be for cruise/enroute helicopters and rotary winged aircraft. PG&E believes that a more appropriate value would be from the DOE ACRAM Table 3.37, "General Aviation Total Powered Aircraft Crash Rates by Flight Phase", which provides the cruise/enroute crash value of 1.55 x 10^{-7} for all powered general aviation aircraft. As stated in the Diablo Canyon ISFSI SAR, the area airports are more than 12 miles from the site and these aircraft are considered to be in their cruise/enroute flight phase at the points when they would be closest to the site. As a result, using this DOE ACRAM value is considered appropriate and conservative.

The Diablo Canyon ISFSI SAR is revised to the use of this crash value. Refer to draft Diablo Canyon ISFSI SAR, Section 2.2.1.3, in Enclosure 4 to PG&E Letter DIL-03-002, dated February 14, 2003.

NRC Comment No. 8

In page 2.2-5, a value of wingspan of 223 ft was used. Please specify whether it is appropriate for turbo-prop or other types of General Aviation aircraft.

PG&E Response:

The wingspan of 223 ft was used to ensure conservatism, not to indicate that there are aircraft of that size flying into these airports. It was the largest wingspan noted in the DOE-STD-3014-96 used to determine effective crash area. As stated in the Diablo Canyon ISFSI SAR, Section 2.2.1.1, most of the aircraft using airports are privately owned small aircraft holding no more than eight people and weighing no more than 12,000 pounds, or commuter aircraft containing no more than 41 people and weighing no more than 30,000 pounds. As such, the wingspan of these aircraft would conservatively all be less than 90 ft. As a result of the SAR revisions required to incorporate the crash values in PG&E's response to comment 7, the wingspans have also been modified to better reflect the actual potential wingspans for the aircraft in this

area. For general aviation a wingspan of 73 ft is used, for commercial 98 ft is used, and for military 110 ft is used per DOE-STD-3014-96.

NRC Comment No. 9

Different types of aircraft (e.g., mostly F-18s, limited number of C-130s, F-16s, and EA6Bs) fly military training route VR-249. Justify why a crash rate of 2.736 x 10^{-8} per mile would be appropriate for this case.

PG&E Response:

Although there are other aircraft that fly VR-249, the F-18s and F-16s are the most common and have the higher crash rates. The aircraft using this route are considered to be in normal in-flight mode and are transiting the area. No combat training operations are performed by any aircraft on this route in the area of the Diablo Canyon ISFSI.

PG&E believes that the two aircraft with the highest in-flight crash rates are the F-16 and F-18 aircraft. PG&E has not been able to find specific data for in-flight mode crashes of F-18s. The F-16 and F-18 are high performance aircraft and PG&E believes that their crash rates in normal in-flight mode would be similar. As a result, PG&E used the normal in-flight crash rate data for F-16s, provided in the Private Fuels Storage Facility Safety Evaluation Report (SER), for aircraft on this route. As there could be a difference in the F-18 and F-16 crash rates, PG&E verified the sensitivity of this crash rate value in its analyses and found that doubling or tripling the F-16 crash rate will not significantly change the total probability of a crash at the site and that the resulting crash probability will remain under the 1 x 10^{-6} threshold provided in the Private Fuels Storage Facility SER.

List of Attachments

Attachment No.	TITLE
1	Terminal Procedures • ILS RWY 11 • RNAV (GPS) RWY 11 • RNAV (GPS) RWY 29 • Avila Three Departure • Crepe Three Departure • Wynnr Two Departure

SAN LUIS OBISPO, CALIFORNIA

AL 989 (FAA)

ILS RWY 11

SAN LUIS COUNTY REGIONAL (SBP)

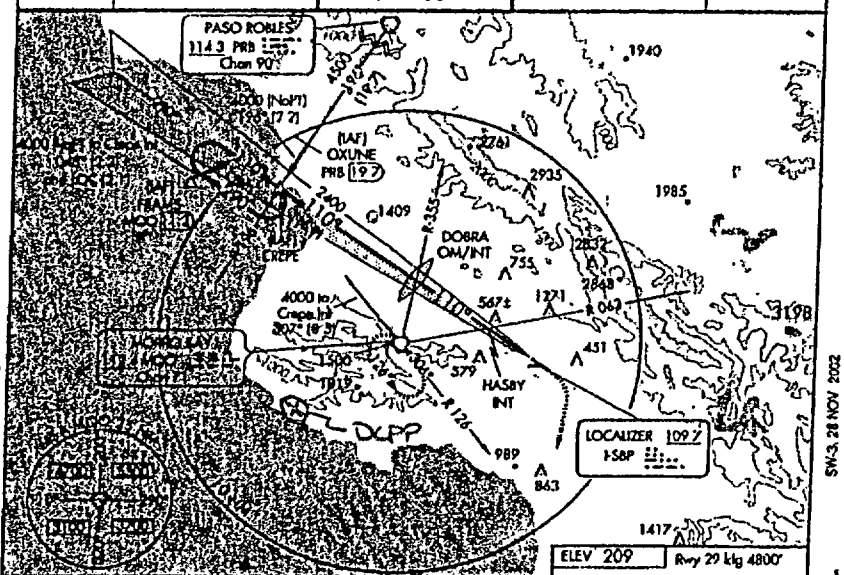
LOC I SBP	APP CRS	Rwy Idg	5300
109.7	110°	TDZE	195
		Apt Elev	209

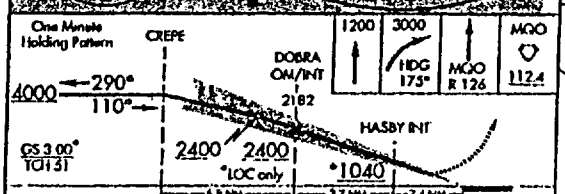
Circling not authorized north of Rwy 11-29

MALSR

MISSED APPROACH Climb to 1700, then climbing right turn to 3000 via heading 175° and MQO R-126 to MQO VORTAC and hold

ATIS*	LOS ANGELES CENTER	SAN LUIS TOWER*	GND CON	UNICOM
120.6	119.05 269.5	124.0 (CTAF) 379.9	121.6	122.95

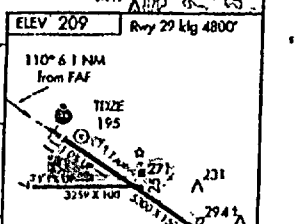




CATEGORY	A	B	C	D
S-ILS 11	395-½ 200 (200-½)			
S-LOC 11	1040 ½ 845 (900 ½)	1040-¾ 845 (900-¾)	1040 2 845 (900-2)	1040 2¼ 845 (900-2¼)
CIRCLING	1040-1 831 (900-1)	1040-1¼ 831 (900-1¼)	1120-2¼ 911 (1000-2¼)	1220-3 1011 (1100-3)

HASBY INT MINIMUMS

S LOC 11	540-½ 345 (400-½)			540-¾ 345 (400-¾)
CIRCLING	840-1 631 (700-1)	920-1 711 (800-1)	1120 2¼ 911 (1000 2¼)	1220-3 1011 (1100-3)



HIRL Rwy 11-29

IAF to MAP 6.1 NM

Knots	60	90	120	150	180
Min Sec	6:06	4:04	3:03	2:26	2:02

SAN LUIS OBISPO, CALIFORNIA

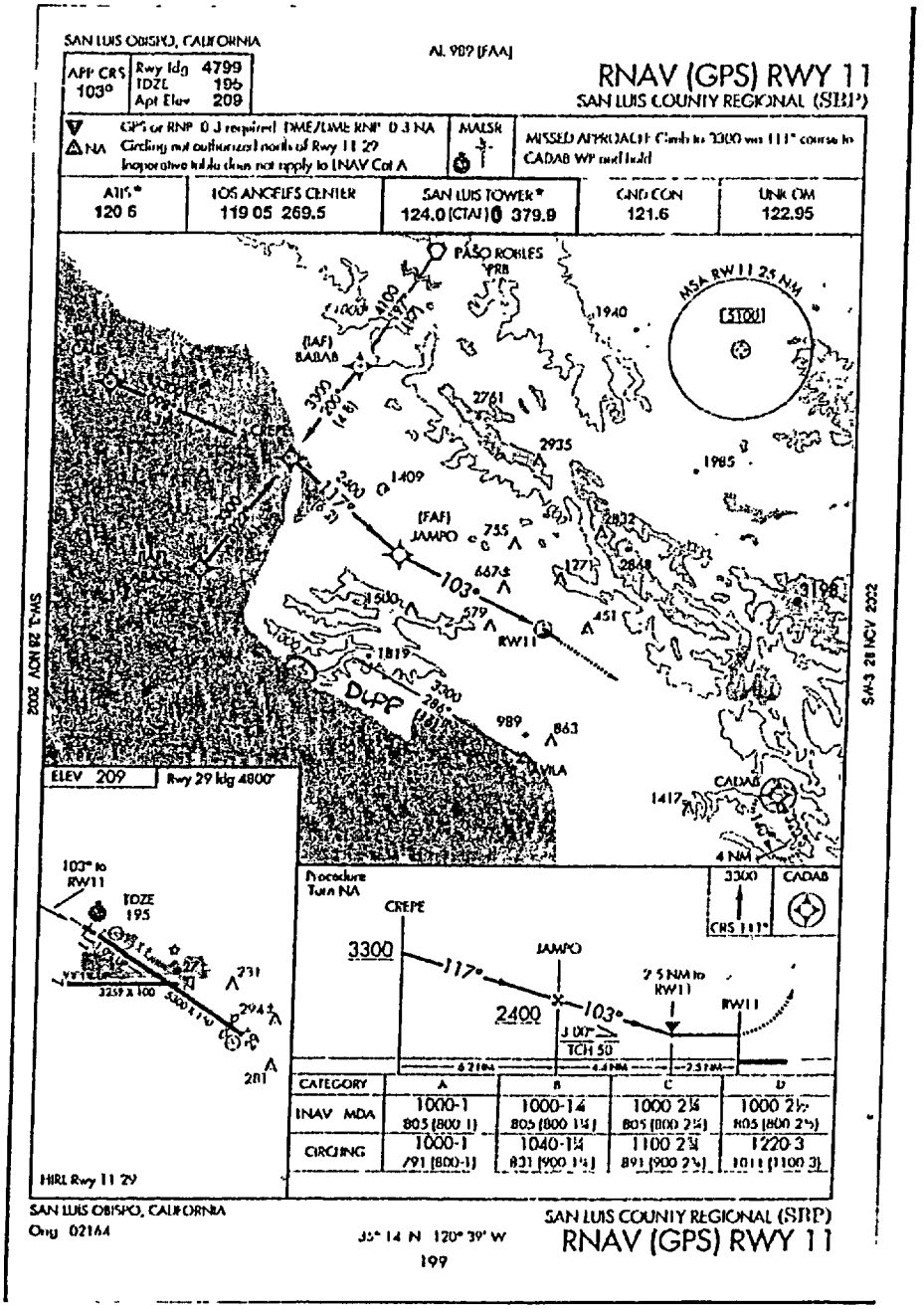
Amdt 1 02276

35°14'N 120°39'W

SAN LUIS COUNTY REGIONAL (SBP)

ILS RWY 11

SW-3, 28 NOV 2002


SAN LUIS OBISPO, CALIFORNIA
AL 989 (FAA)
RNAV (GPS) RWY 11
SAN LUIS COUNTY REGIONAL (SBP)
APP CRS 103°
Rwy Idg 4799
TDZE 195
Apt Elev 209
GPS or RNP 0.3 required DME/DME RNP 0.3 NA
NA Circling not authorized north of Rwy 11 29
Inoperative table does not apply to LNAV Cat A
MALSR
MISSED APPROACH: Climb to 3300 via 111° course to CADAB WP and hold
ATIS* 120.6
LOS ANGELES CENTER 119.05 269.5
SAN LUIS TOWER* 124.0 (CTAF) 379.9
GND CON 121.6
UNK OM 122.95
PASO ROBLES PRB
MSA RW11 25 NM
(IAF) BADAB
CREPE
(FAF) JAMPO
DUPPE
AVILA
CADAB
RW11
ELEV 209
Rwy 29 Idg 4800'
103° to RW11
TDZE 195
HIRL Rwy 11 29
Procedure Turn NA
3300
CADAB
CRS 111°
CREPE
JAMPO
2400
2.5 NM to RW11
TCH 50
4.2 NM
4.4 NM
2.5 NM
CATEGORY A B C D
LNAV MDA 1000-1 805 (800-1) 1000-1¼ 805 (800-1¼) 1000-2¼ 805 (800-2¼) 1000-2½ 805 (800-2½)
CIRCLING 1000-1 791 (800-1) 1040-1¼ 831 (900-1¼) 1100-2¼ 891 (900-2¼) 1220-3 1011 (1100-3)
SAN LUIS OBISPO, CALIFORNIA
Orig 02164
35° 14' N 120° 39' W
SAN LUIS COUNTY REGIONAL (SBP)
RNAV (GPS) RWY 11
199
SW-3, 28 NOV 2002
SW-3 28 NOV 2002

SAN LUIS OBISPO, CALIFORNIA

AL 989 (FAA)

RNAV (GPS) RWY 29

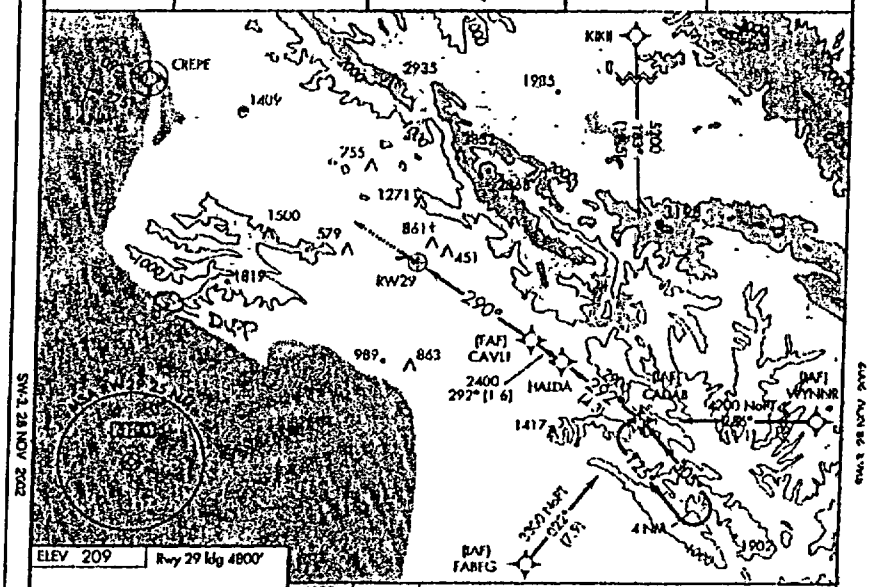
SAN LUIS COUNTY REGIONAL (SBP)

APP CRS	Rwy Idg	4799
290°	TDZE	209
	Apt Elev	209

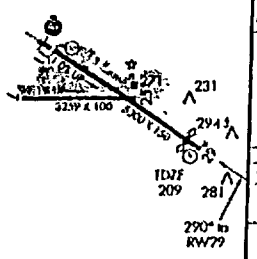
GPS or RNP 0.3 required. DME/DME RNP 0.3 NA.
Circling not authorized north of Rwy 11 29

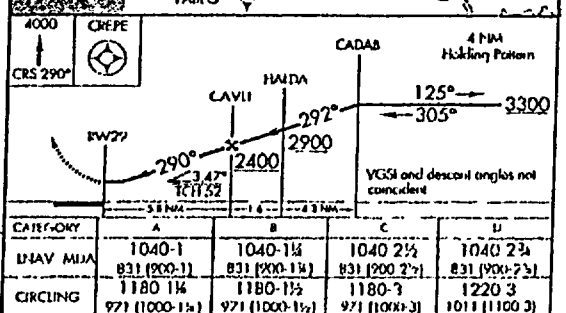
MISSED APPROACH: Climb to 4000 via 290° course to CREPE WP and hold.

ATIS*	LOS ANGELES CENTER	SAN LUIS TOWER*	GND CON	UNICOM
120.6	119.05 269.5	124.0 (CTAF) 379.9	121.6	122.95



ELEV 209 | Rwy 29 Idg 4800'





CATEGORY	A	B	C	D
LNAV MDA	1040-1 831 (900-1)	1040-1¼ 831 (900-1¼)	1040 2½ 831 (900 2½)	1040 2¾ 831 (900-2¾)
CIRCLING	1180 1¼ 971 (1000-1¼)	1180-1½ 971 (1000-1½)	1180-3 971 (1000-3)	1220 3 1011 (1100 3)

IBRL Rwy 11 29

SAN LUIS OBISPO, CALIFORNIA

Orig 02164

35° 14' N - 120° 39' W

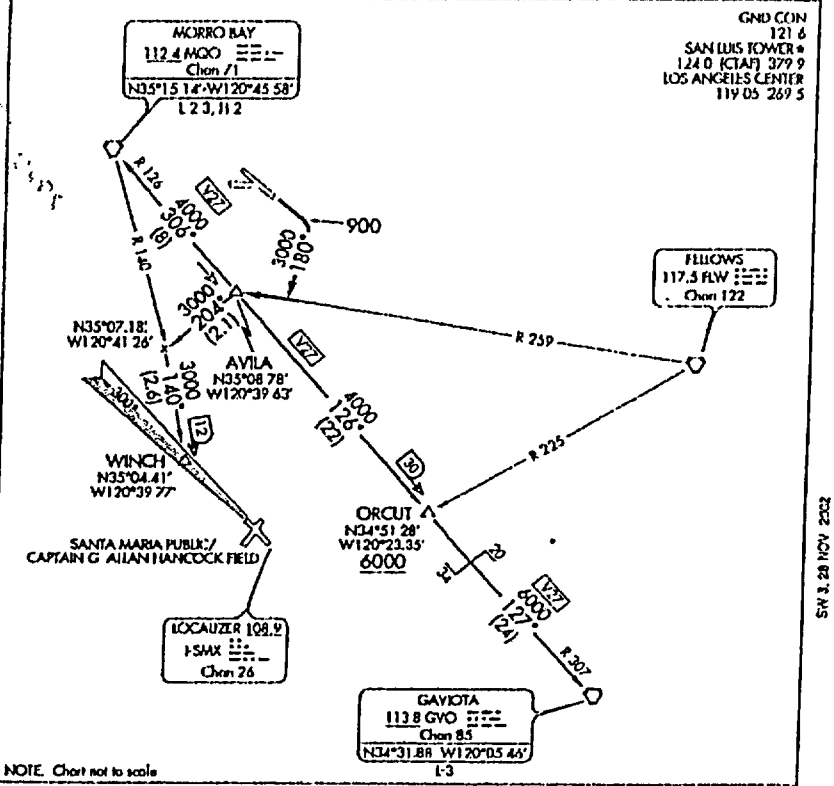
SAN LUIS COUNTY REGIONAL (SBP)

RNAV (GPS) RWY 29

(AVILA3.AVILA) 02276

AVILA THREE DEPARTURE

SAN LUIS OBISPO COUNTY REGIONAL (SBP)
SL 989 (FAA) SAN LUIS OBISPO, CALIFORNIA



DEPARTURE ROUTE DESCRIPTION

TAKE OFF RUNWAY 11: Maintain runway heading to 900', then climbing right turn to 3000' or assigned altitude, heading 180° to intercept FLW R-259 to AVILA INT, then via (transition) or (assigned route).

GAVIOTA TRANSITION (AVILA3.GVO). From over AVILA INT via V27 to GVO VORTAC.

MORRO BAY TRANSITION (AVILA3.MQO). From over AVILA INT via V27 to MQO VORTAC.

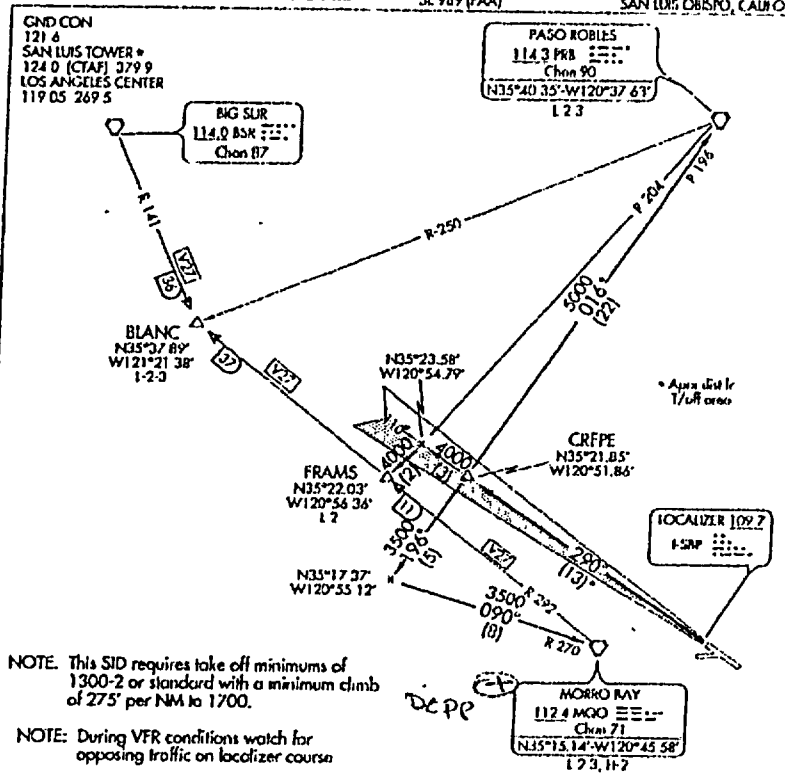
WINCH TRANSITION (AVILA3.WINCH). From over AVILA INT via heading 204° 2.1 NM, to intercept MQO R-140 to WINCH INT 2.6 NM.

AVILA THREE DEPARTURE
(AVILA3.AVILA) 02276

SAN LUIS OBISPO, CALIFORNIA
SAN LUIS OBISPO COUNTY REGIONAL (SBP)

CREPE THREE DEPARTURE

SAN LUIS OBISPO COUNTY REGIONAL (SBP)
SL 909 (FAA) SAN LUIS OBISPO, CALIFORNIA



NOTE. This SID requires take off minimums of 1300-2 or standard with a minimum climb of 275' per NM to 1700.

NOTE: During VFR conditions watch for opposing traffic on localizer course

NOTE: This procedure applicable to Runway 29 departures only.

NOTE Chart not to scale.

SW-3, 28 NOV 2002

SW-3, 28 NOV 2002

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 29. Climb via San Luis Obispo localizer I-SBP west course to CREPE INT; thence via (transition) or (assigned route)

FRAMS TRANSITION (CREPE3 FRAMS) From over CREPE INT via I SBP LOC west course and PRB R-204 to FRAMS INT.

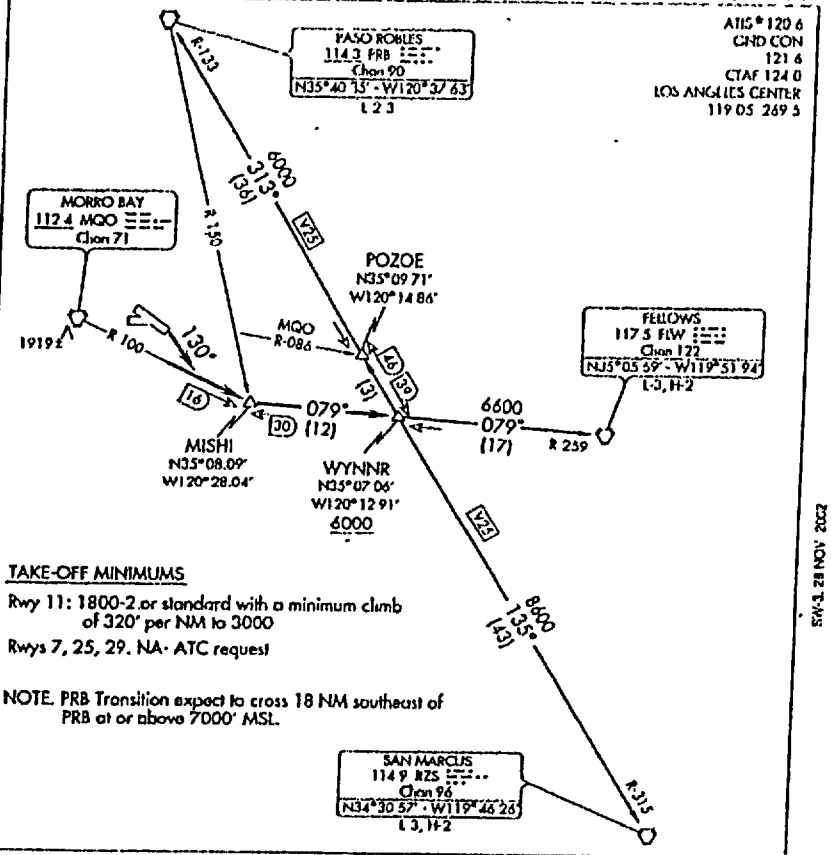
MORRO BAY TRANSITION (CREPE3.MQO) From over CREPE INT via PRB R-196 and MQO R-270 to MQO VORTAC.

PASO ROBLES TRANSITION (CREPE3 PRB) From over CREPE INT via PRB R-196 to PRB VORTAC.

(WYNNR2.WYNNR) 02332 SL 989 (FAA)

WYNNR TWO DEPARTURE (OBSTACLE)

SAN LUIS COUNTY REGIONAL (SBP)
SAN LUIS OBISPO, CALIFORNIA



SW-3, 28 NOV 2002

SW-3, 28 NOV 2002

TAKE-OFF MINIMUMS

Rwy 11: 1800-2 or standard with a minimum climb of 320' per NM to 3000

Rwys 7, 25, 29. NA- ATC request

NOTE. PRB Transition expect to cross 18 NM southeast of PRB at or above 7000' MSL.

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 11: Turn right heading 130° to intercept and proceed via MQO R-100 to MISHI INT, then via FLW R-259 to WYNNR INT. Thence via (transition) or assigned route

FELLOWS TRANSITION (WYNNR2.FLW). From over WYNNR INT via FLW R-259 to FLW VORTAC.

PASO ROBLES TRANSITION (WYNNR2.PRB). From over WYNNR INT via PRB R-133 to PRB VORTAC.

SAN MARCUS TRANSITION (WYNNR2.RZS). From over WYNNR INT via RZS R-315 to RZS VORTAC.

WYNNR TWO DEPARTURE (OBSTACLE)
(WYNNR2.WYNNR) 02332
SAN LUIS OBISPO, CALIFORNIA
SAN LUIS COUNTY REGIONAL (SBP)

Draft Diablo Canyon Independent Spent Fuel Storage Installation Safety Analysis Report

2.2 NEARBY INDUSTRIAL, TRANSPORTATION, AND MILITARY FACILITIES

2.2.1 OFFSITE POTENTIAL HAZARDS

2.2.1.1 Description of Location and Routes

Industry in the vicinity of the Diablo Canyon ISFSI site is mainly light and of a local nature, serving the needs of agriculture in the area. Food processing and refining of crude oil are the major industries in the area, although the numbers employed are not large. Less than 8 percent of the work force in San Luis Obispo County is engaged in manufacturing. The largest industrial complex is Vandenberg Air Force Base, located approximately 35 miles south-southeast of the DCPP site in Santa Barbara County.

Port San Luis Harbor and the Point San Luis Lighthouse property are located approximately 6 miles south-southeast of the DCPP site. The Point San Luis Lighthouse is located on a 30-acre parcel of land. Until 1990, the US Coast Guard owned the lighthouse property. In 1990 the Port San Luis Harbor District, owners and operators of the Port San Luis Harbor, were granted ownership of the lighthouse and the 30 acres, except for approximately 3 acres of land, in 3 parcels, which the Coast Guard retained as owners in order to operate and maintain the modern light station and navigating equipment located on those 3 acres.

Located approximately 6 miles east-southeast of the DCPP site is the Port San Luis tanker-loading pier. The pier is located on property that is owned by the Port San Luis Harbor District and leased by UNOCAL, which built and owns the pier. However, this pier is no longer active as tanker traffic into Port San Luis has been discontinued.

US Highway 101 is the main arterial road serving the coastal region in this portion of California. It passes approximately 9 miles east of the site, separated from it by the Irish Hills. US Highway 1 passes approximately 10 miles to the north and carries moderate traffic between San Luis Obispo and the coast. The nearest public access from a US highway is by county roads in Clark Valley, 5 miles north, and See Canyon, 5 miles east. Access to the site is by Avila Beach Drive, a county road, to the entrance of the PG&E private road system.

The Southern Pacific Transportation Company provides rail service to the county by a route that essentially parallels US Highway 101. It passes approximately 9 miles east of the site, separated from it by the Irish Hills. There is no spur track into the DCPP site.

Coastal shipping lanes are approximately 20 miles offshore. Prior to 1998, there were local tankers coming into and out of Estero Bay, which is north of the DCPP site. There is no further tanker traffic in either Port San Luis or Estero Bay. The local tanker

terminal at Estero Bay closed in 1994, and Avila Pier ceased operation in 1998. Petroleum products and crude oil are no longer stored at Avila Beach since the storage tanks there were removed in 1999. However, some petroleum products and crude oil continue to be stored at Estero Bay, approximately 10 miles from the DCPP site.

The San Luis Obispo County Regional Airport is located 12 miles east of the DCPP site. The airport served, as a four-year average between 1998 and 2001, approximately 16,000 air transport (AT) (i.e., commercial or air taxi) landing and departure operations per year. Air transport was provided primarily by turbo-prop or smaller aircraft that seat no more than 41 people with a gross weight of no more than 30,000 pounds. The airport also served, as a four-year average between 1998 and 2001, approximately 7,560 total landings and departures of private aircraft per month. These consisted mostly of aircraft that seat no more than 8 people, with an average gross weight of less than 12,500 pounds. Although there are no specific air traffic restrictions over DCPP, most air traffic into and out of the San Luis Obispo County Regional Airport does not approach within 5 miles of the ISFSI site because of the mountainous terrain.

There is a federal flight corridor (V-27) approximately 5 miles east of the ISFSI that is used for aircraft flying between Santa Barbara and Big Sur areas, with an estimated 20 flights per day. The majority of the aircraft using this route is above 10,000 ft. Sometimes this corridor is used also for traffic in to San Luis Obispo County Regional Airport and, in this case, has traffic that passes as close as 1 mile of the ISFSI site at an elevation of 3,000 ft. However, this portion of the route is normally only used for aircraft to align for instrument landing. The more commonly used approach route for visual landings passes 8 miles from the Diablo Canyon ISFSI site on the far side of the San Luis Range.

There is also a military training route (VR-249), which runs parallel to the site and its center is approximately 2 miles off shore. This training route is not frequently used. (estimated at less then 60 flights per year). Its use requires a minimum of 5 miles visibility, and the flights are to maintain their altitude between sea level and 10,000 ft.

There is a municipal airport near Oceano, located 15 miles east-southeast of the DCPP site, which accommodates only small (12,500 pounds or less) private planes. The traffic at this airport is estimated to be no more than 2,200 flights per month. The Camp San Luis Obispo airfield is located 8 miles northeast of the DCPP site, but is now shown as helicopter use only.

The peak Vandenberg Air Force Base employment is approximately 4,400 people, including 3,200 military and 1,200 civilian personnel. Missiles fired to the Western Pacific Missile Range are not directed north or northwest, and are thus away from the DCPP site. Missile launch sites are approximately 25 miles south of DCPP. Polar orbit launches are in a southerly direction. Vandenberg Air Force Base is a designated alternate landing site for the space shuttles, but has not been used for that purpose to

date. The landing approach is normally west to east, and does not bring the shuttles within 30 miles of the ISFSI site.

The nearest US Army installation is the Hunter-Liggett Military Reservation located in Monterey County, approximately 45 miles north of the DCPP site. The California National Guard (CNG) maintains Camp Roberts, located on the border of Monterey County and San Luis Obispo County, southeast of the Hunter-Liggett Military Reservation and approximately 30 miles north of the DCPP site. The CNG also maintains Camp San Luis Obispo, located in San Luis Obispo County, approximately 10 miles northeast of the DCPP site. In addition, as noted earlier, a US Coast Guard Light station is located in Avila Beach on property commonly known as the Point San Luis Lighthouse property.

No significant amounts of any hazardous products are commercially manufactured, stored, or transported within 5 miles of the DCPP site. Within 6 to 10 miles of the site, up to 1998, 1 to 2 local tankers per month offloaded oil for storage at Avila Beach. However, such shipments no longer occur and oil is no longer transported through or stored at Avila Beach. Due to very limited industry within San Luis Obispo County and the distances involved, any hazardous products or materials commercially manufactured, stored, or transported in the areas between 5 and 10 miles from the site are not considered to be a significant hazard to the ISFSI.

2.2.1.2 Hazards from Facilities and Ground Transportation

The ISFSI is located in a remote, sparsely populated, undeveloped area. The ISFSI site is in a canyon, which is east and above DCPP Units 1 and 2, and is directly protected on two sides by hillsides. There are no industrial facilities (other than DCPP), public transportation routes, or military bases within 5 miles of the ISFSI. Therefore, activities related to such facilities do not occur near the ISFSI and, thus, do not pose any hazard to the ISFSI.

Local shipping tankers may come within 10 miles of the DCPP site, but will remain outside of a 5-mile range. Coastal shipping lanes are approximately 20 miles offshore. Therefore, shipping does not pose a hazard to the ISFSI.

No commercial explosive or combustible materials are stored within 5 miles of the site, and no natural gas or other pipelines pass within 5 miles of the site. Therefore, there is no potential hazard to the ISFSI from any explosions or fires involving such materials.

Since there are no rail lines or public transportation routes within 5 miles of the ISFSI location, no credible explosions involving truck or rail transportation events need to be considered, pursuant to Regulatory Guide 1.91 (Reference 1). Similarly, explosions involving shipping events offshore at the DCPP site are unlikely. Although the shortest distance from the ISFSI location to the ocean is approximately 1/2-mile, there is no shipping traffic within 5 miles of this location. Therefore, consistent with the guidance of

Regulatory Guide 1.91, explosions involving shipping events are not considered credible accidents for the ISFSI.

2.2.1.3 Hazards from Air Crashes

Aircraft crashes were assessed in accordance with the guidance of NUREG-0800, Section 3.5.1.6, Aircraft Hazards (Reference 2). Although this guidance applies to power reactor sites, the analysis of aircraft crash probabilities on the site is not dependent on the nature of the site other than size of the facility involved and, thus, the guidance of NUREG-0800 can be applied to the Diablo Canyon ISFSI site.

As specified in NUREG-0800, the probability of aircraft crashes is considered to be negligibly low by inspection and does not require further analysis if the three criteria specified in Item II.1 of Section 3.5.1.6 are met. In particular, Criterion 1 of Section 3.5.1.6 specifies that the plant-to-airport distance, D, must be greater than 10 statute miles, and the projected annual number of operations must be less than $1,000D^2$. San Luis Obispo County Regional Airport is at a distance of 12 miles, with annual flight totals of approximately 92,330, which is less than $1,000(12)^2$ or 144,000. The airport at Oceano is 15 miles away, with flight totals of no more than approximately 26,400 per year, which is less than $1,000(15)^2$ or 225,000. Vandenberg Air Force Base is 35 miles away and flight totals there are not expected to be more than $1,000(35)^2$ or 1,225,000 per year (or more than 3,300 each day). Therefore, based on current data, Criterion 1 is met. However, the airways that are in the vicinity of the Diablo Canyon ISFSI have been analyzed below.

Criterion 2 specifies that the facility must be at least 5 statute miles from the edge of military training routes. There is a military training flight corridor (VR-249) that is within approximately 2 miles of the Diablo Canyon ISFSI site. This route is evaluated below.

Criterion 3 specifies that the facility must be at least 2 statute miles beyond the nearest edge of a federal airway, holding pattern, or approach pattern. There is a federal airway (V-27) whose edge is within approximately 1 mile east of the ISFSI site. As a result, this route is evaluated below.

Evaluation of Airways

For situations where federal airways or aviation corridors pass through the vicinity of the ISFSI site, the probability per year of an aircraft crashing into the site (P_{fa}) is estimated in accordance with NUREG-0800. The probability depends on factors such as altitude, frequency, and width of the corridor and corresponding distribution of past accidents. Per NUREG-0800, the following expression is used to calculate the probability:

$$P_{fa} = C \times N \times A/w$$

Where:

C = Inflight crash rate per mile for aircraft using airway
w = Width of airway (plus twice the distance from the airway edge to the site when the site is outside the airway) in miles
N = Number of flights per year along airway
A = Effective area of the site in square miles

The following analysis was completed per DOE-STD 3014-96 (Reference 5) to determine effective crash area. In this analysis conservative factors have been used for maximum skid distance and maximum wingspan. Based on the available information on aircraft type, size, and the location of the site these factors are very conservative.

In DOE-STD-3014-96:

The effective crash area is: $A_{eff} = A_f + A_s$

where:

$A_f = (WS + R)(H\cot\Phi) + (2)(L)(W)(WS)/R + (L)(W)$

and

$A_s = (WS + R)(S)$

where:

A_f	=	effective fly-in area;
A_s	=	effective skid area;
WS	=	aircraft wingspan; (reference Table B-16 of DOE-STD 3014-96)
R	=	length of diagonal of the facility,
H	=	facility height;
$\cot\Phi$	=	mean on the cotangent of the aircraft impact angle; (reference Table B-17 of DOE-STD 3014-96)
L	=	length of facility;
W	=	width of facility;
S	=	aircraft skid distance; (reference Table B-18 of DOE-STD 3014-96)

For Commercial Aircraft:

$A_f = (98 + 511)(20)(10.2) + (2)(500)(105)(98)/511 + (500)(105)$
$A_f = 196{,}872 ft^2/(5{,}280 \text{ ft/mile})^2 = 0.0071$ sq miles

and

A_s = (WS + R)(S) = (98 + 511)(700) = 426,300 ft^2/(5,280 ft/mile)^2 = 0.0153 sq miles

For General Aviation Aircraft:

A_f = (73 + 511)(20)(10.2) + (2)(500)(105)(73)/511 + (500)(105)
A_f = 186,636 ft^2/(5,280 ft/mile)^2 = 0.0067 sq miles

and

A_s = (WS + R)(S) = (73 + 511)(700) = 408,800 ft^2/(5,280 ft/mile)^2 = 0.0147 sq miles

For Military Aircraft:

A_f = (110 + 511)(20)(10.2) + (2)(500)(105)(110)/511 + (500)(105)
A_f = 201,787 ft^2/(5,280 ft/mile)^2 = 0.0072 sq miles

and

A_s = (WS + R)(S) = (110 + 511)(700) = 0.0156 sq miles

For calculating A_s the skid distance is based on the layout of the facility which is surrounded on three sides by hills and is actually up against one of these hills, which limits the potential crash angle and limits the possible skid distance. The fourth side is protected by a drop off in terrain with a slope of greater than 1:1. The maximum distance on the unprotected side is estimated at less than 700 ft. Since the site is protected and limited from skidding aircraft on three sides, the use of the 700 ft is conservative.

Commercial = A_{eff} = A_f + A_s = 0.0071 + 0.0153 = 0.0224 sq miles
General Aviation = A_{eff} = A_f + A_s = 0.0067 + 0.0147 = 0.0214 sq miles
Military = A_{eff} = A_f + A_s = 0.0072 + 0.0156 = 0.0228 sq miles

<u>For local traffic on V-27:</u>

V-27 use for local aircraft is usually limited to a instrument landings for aircraft arriving from the south and instrument departures to the south from runway 11, or circle to land approaches on runway 29, and instrument departures to the south from runway 29 at San Luis Obispo County Regional Airport. As stated above, there are on average approximately 16,100 AT landings and takeoffs per year. It is estimated, using the San Luis Obispo County Regional Airport scheduled airline flight information located at the web address: http://www.sloairport.com/flightinfo.html, that 65 percent of the AT traffic is coming from or departing to the south. Based on airport data over a four-year period from 1998 to 2001 there was an average of 1,781 AT landings per year at San Luis

Obispo County Regional Airport under instrument conditions. This would result in (1,781 x 0.65) or 1,157 landings per year, which is doubled to 2,314 operations to account for takeoffs. For the private aircraft usage, there are on average approximately 7,560 total landings and takeoffs per month at the San Luis Obispo County Regional Airport of which it is estimated that 65 percent are from or to the south. Based on airport data over a four-year period from 1998 to 2001 there was an average of 1,430 general aviation landings per year at San Luis Obispo County Regional Airport under instrument conditions. As a result, N for general aviation (1,430 x 0.65) or 930 landings, which is doubled to 1,860 operations to account for takeoffs.

Published holding patterns exist for arrivals a CREPE and CADAB intersections and for missed approaches, at Morro Bay VOR. The CREPE Intersection is 11 miles and the CADAB Intersection 21 miles from the ISFSI site. Both holding patterns place the aircraft further from the ISFSI site and therefore do not need to be considered. The ISFSI site distance to the Morro Bay VOR is approximately 6 miles and the holding pattern places the aircraft closer to the ISFSI. Since the Morro Bay VOR holding pattern is used for missed approaches, it is conservatively estimated that 5 percent of all instrument landing approaches are missed and each aircraft remains in the holding pattern for ten passes. For commercial traffic N is increased by 579 flights (2,314/2 x 0.05 x 10) and general aviation by 465 flights (1,860/2 x 0.05 x10).

Per NUREG-0800, C for commercial aircraft is provided as 4×10^{-10}. Per the Aircraft Crash Risk Analysis Methodology Standards (ACRAM), a C value of 1.55×10^{-7} was used in this analysis. Per federal guidelines, the width of the airway is 8 miles and the center is approximately 5 miles from the site. As a result, (w) is conservatively taken to equal 10 miles.

For commercial flights:

$$P1a_{fa} = CxNxA/w = (4 \times 10^{-10}) \times (2,314 + 579) \times (0.0224)/(10) = 2.59 \times 10^{-9}$$

For general aviation flights:

$$P1b_{fa} = CxNxA/w = (1.55 \times 10^{-7}) \times (1,860 + 465) \times (0.0214)/10 = 7.7 \times 10^{-7}$$

Total local aircraft crash potential:

$$P1_{fa} = P1a_{fa} + P1b_{fa} = 2.59 \times 10^{-9} + 7.7 \times 10^{-7} = 7.72 \times 10^{-7}$$

<u>For commercial traffic flying on V-27 and not landing locally:</u>

V-27 is a federal flight route from the Santa Barbara area northwest to the Big Sur area. Most of the aircraft on this route are normally flying at altitudes above 10,000 ft, with some smaller aircraft at elevations as low as 3,500 ft. Per the FAA Standards Office,

the number of aircraft on this route is conservatively estimated at 20 per day or 7,300 per year. Using the same data as above and adjusting for the number of flights:

$$P2_{fa} = CxNxA/w = (4 \times 10^{-10}) \times (7,300) \times (0.0224)/(10) = 6.53 \times 10^{-9}$$

For military aircraft flying on VR-249:

VR-249 is a military training route, which requires 5 miles visibility and the ceilings above 3,000 ft. The aircraft may be traveling between sea level and 10,000 ft. The route is used very infrequently and is estimated to have approximately 50 flights a year. In the area of the Diablo Canyon ISFSI this route is provided for normal flight modes and is not expected to include any high-stress maneuvers. The majority of the aircraft flying this route over the past 12 months were F-18s. In addition, there have been a limited number of C-130, F-16 and EA6B aircraft and some helicopters using this route. For this calculation, N is conservatively taken to be 75 flights. The center of the route is approximately 2 miles off shore; therefore, (w) is conservatively set at 1 mile in this calculation. There was no data provided in the NUREG for military aircraft that would support this route and as a result the in flight crash probability for F-16s accepted in the Private Fuel Storage SER of 2.736×10^{-8} was used.

$$P3_{fa} = CxNxA/w = (2.736 \times 10^{-8}) \times (75) \times (0.0228)/(1) = 4.68 \times 10^{-8}$$

Military ordinance on aircraft on VR-249

Based on information provided by the Naval Air Station at Lenore, which flies a majority of the flight on VR-249, aerial bombs are not carried. However, because of recent events, other ordinance such as air-to-air missiles and cannon/machine guns might be carried on a very small number of the military aircraft on this route. Accidental firings of air-to-air missiles or aircraft guns have not been reported. In addition, air-to-air ordinance does not have a large explosive charge and would not be expected to cause major damage to non-aircraft targets.

VR-249 is a visual route, which requires a minimum of 5 miles of visibility and minimum ceilings of 3,000 ft. Aircraft using this route normally remain offshore and do not fly directly over the Diablo Canyon Power Plant or the Diablo Canyon ISFSI. Based on the type of ordinance the miniscule probability of an accidental discharge, and the visual requirements of the route the potential for any possible interaction between the ordinance and the ISFSI is not credible.

Summary of aircraft hazards

As stated above, and with the exception of the traffic related to VR-249, Morro Bay VOR and from V-27, the landing patterns and distance to the local airports would not significantly increase the probability of a crash at the ISFSI site. In addition, there are no designated airspaces, which are within the limits of Criterion 2 of NUREG-0800. As

result, the total aircraft hazard probability at the Diablo Canyon ISFSI site is equal to the sum of the individual probabilities calculated above.

$$\text{Total} = P1_{fa} + P2_{fa} + P3_{fa} = (7.72 \times 10^{-7}) + (6.53 \times 10^{-9}) + (4.68 \times 10^{-8}) = 8.26 \times 10^{-7}$$

Based on the above calculation, the total aircraft hazard probability is determined to be approximately 8.26×10^{-7}, which is less than the threshold of 1×10^{-6} specified in the Private Fuel Storage SER for acceptable frequency of aircraft impact into a facility from all types of aircraft.

PG&E is aware the NRC is considering revising security regulations, which may affect aircraft hazard requirements relating to aircraft hazards. Following adoption of any new security regulations by the NRC, PG&E will comply with any such revised requirements as appropriate.

2.2.2 ONSITE POTENTIAL HAZARDS

2.2.2.1 Structures and Facilities

At the DCPP site, including the ISFSI storage site, there are no cooling towers or stacks with a potential for collapse. Therefore, such hazards need not be considered for any potential effects on the ISFSI.

There are 500-kV transmission lines that run in close proximity of the ISFSI storage site and on the hill above it (Figure 2.2-1). A 500-kV transmission line drop is postulated as a result of a transmission tower collapse or transmission line hardware failure near the ISFSI storage site and the cask transfer facility (CTF), as discussed on Section 8.2.8. The worst-case fault condition for a cask is that which places a cask in the conduction path for the largest current. This condition is the line drop of a single conductor of one phase with resulting single line-to-ground fault current and voltage-induced arc at the point of contact.

It is concluded that the postulated transmission line break will not cause the affected cask components to exceed either normal or accident condition temperature limits and that localized material damage at the point of arc on the shell of the overpack and transfer cask water jacket is bounded by accident conditions discussed in Sections 8.2.2 (tornado missile) and 8.2.11 (loss of shielding, HI-TRAC transfer cask water jacket). As a result of the considerations, it is apparent that the postulated transmission line break does not adversely affect the thermal performance of either system.

In addition to the 500-kV lines, the towers that support these lines were evaluated for any potential effect (Figure 2.2-1). They have been evaluated, and although the towers could fail as a result of a severe wind event, there would be no separation of the towers from their foundations, and the towers on the hillside would not have credible contact with the ISFSI storage site. However, the towers, which are located near the ISFSI

storage site could, in these events, collapse and strike either the MPC while at the CTF or the loaded overpacks stored on the pads. As a result, as discussed in Section 8.2.16, this impact potential has been evaluated, and it does not adversely affect the MPC or the loaded overpacks.

2.2.2.2 Hazards from Fires

The ISFSI or the fuel storage systems have no credible exposure to fires caused by offsite transportation accidents, pipelines, or manufacturing facilities because of the distance to these transportation routes and the lack of facilities in the proximity of the site. However, there are onsite sources that were evaluated.

Fires are classified as human-induced or natural phenomena design events in accordance with ANSI/ANS 57.9, Design Events III and IV (Reference 3). To identify sources and to establish a conservative design basis for onsite exposure, a walkdown was performed of the CTF, ISFSI storage site, and the complete transportation route from the FHB/AB to the CTF and ISFSI storage site. Based on that walkdown, the following fire events are postulated:

(1) Onsite transporter fuel tank fire

(2) Other onsite vehicle fuel tank fires

(3) Combustion of other local stationary fuel tanks

(4) Combustion of other local combustible materials

(5) Fire in the surrounding vegetation

The potential for fire is addressed for both the HI-STORM 100 overpack and the HI-TRAC transfer cask. Locations where the potential for fire is addressed include the ISFSI storage pad; the area immediately surrounding the ISFSI storage pad, including the CTF; and along the transport route between DCPP and the ISFSI storage pad. These design-bases fires and their evaluations are detailed in Section 8.2.5.

For the evaluation of the onsite transporter and other onsite vehicle fuel tank fires (Events 1 and 2), it is postulated that the fuel tank is ruptured, spilling all the contained fuel, and the fuel is ignited. The fuel tank capacity of the onsite transporter is limited to a maximum of 50 gallons of fuel. The maximum fuel tank capacity for other onsite vehicles in proximity to the transport route and the ISFSI storage pads is assumed to be 30 gallons. Any transient sources of fuel in larger volumes, such as tanker trucks, will be administratively controlled to provide a sufficient distance from the ISFSI storage pads (at all times), the CTF (while transferring an MPC), and the transport route during the cask transport. As discussed in Section 8.2.5, the results of analyses indicate that neither the storage cask nor the transfer cask undergoes any structural degradation and

that only a small amount of shielding material (concrete and water) is damaged or lost. This analysis bounds the 30-gallon onsite vehicle fuel tank fire (Event 2).

All onsite stationary fuel tanks (Event 3) are at least 100 ft from the nearest storage cask, the transport route, and the CTF (Figure 2.2-1). Therefore, there is at least a 100-ft clearance between combustible fuel tanks and the nearest cask in transport, at the CTF, or on the ISFSI storage pads. These existing stationary tanks have been evaluated, but due to their distances to the transport route or the storage pads, the total energy received by the storage cask or the transporter is insignificant compared to the design basis fire event.

No combustible materials will be stored within the security fence around the ISFSI storage pads at any time. In addition, prior to any cask operation involving fuel transport, a walkdown of the general area and transportation route will be performed to assure all local combustible materials (Event 4), including all transient combustibles, are controlled in accordance with administrative procedures.

The native vegetation surrounding the ISFSI storage pad is primarily grass, with no significant brush and no trees. Maintenance programs will prevent uncontrolled growth of the surrounding vegetation. As discussed in Section 8.2.5, a conservative fire mode! was established for evaluation of grass fires, which has demonstrated that grass fires are bounded by the 50-gallon transporter fuel tank fire evaluation.

In summary, as discussed in Section 8.2.5, the potential effects of any of these postulated fires have been found to be insignificant or acceptable. The physical layout of the Diablo Canyon ISFSI and the administrative controls on fuel sources ensure that the general design criteria related to fire protection specified in 10 CFR 72.122(c) are met (Reference 4).

2.2.2.3 Onsite Explosion Hazards

The storage site has no credible exposure to explosion caused by transportation accidents, pipelines, or manufacturing facilities because of the distance to these transportation routes and the lack of facilities in the proximity of the site. However, there are potential onsite hazards that must be evaluated.

Explosions are classified as human-induced or natural phenomena design events in accordance with ANSI/ANS 57.9 Design Events III and IV. To determine the potential explosive hazards, which could affect the ISFSI or the fuel transportation system, a walkdown of the ISFSI storage area and the transportation route from the FHB/AB was completed. The following explosion sources and event categories have been identified and evaluated in Section 8.2.6:

(1) Detonation of a transporter or an onsite vehicle fuel tank

(2) Detonation of a propane bottle transported past the ISFSI storage pad

(3) Detonation of an acetylene bottle transported past the ISFSI storage pad

(4) Detonation of large stationary fuel tanks in the vicinity of the transport route

(5) Detonation of mineral oil from the Unit 2 main bank transformers

(6) Explosive decompression of a compressed gas cylinder

(7) Detonation of the bulk hydrogen storage facility

(8) Detonation of acetylene bottles stored on the east side of the cold machine shop

Figure 2.2-1 shows the location of the stationary potential sources (sources 4, 5, 7, and 8). Events 1, 2, 3, and 6 are assumed to occur in the vicinity of the ISFSI storage pads, CTF, or transport route and potentially affect both the loaded overpack and the transfer cask. The assumed distance between the source of detonation and the nearest loaded overpack is 50 ft. This is based on: (a) no gasoline-powered vehicles being allowed within the ISFSI protected area, and (b) the minimum distance between the storage casks and the north side of the ISFSI protected area fence (where the road is) being 50 ft. Detonation sources in the vicinity of the CTF or transporter during fuel transportation or storage operations will be controlled by administrative procedures to provide sufficient distance. Events 4 through 8 occur in the vicinity of the transport route and affect only the transfer cask.

In all of the above evaluations, the effect on the loaded overpacks or transport cask is minimal, and there will be no loss of function. For Events 1 through 3, the size of the fuel tanks, number of cylinders, how they are transported, when they are transported, and the physical distance to the storage pads, CTF, or transporter are controlled by administrative procedures. For Event 4, the distance of the existing fuel tanks from the transportation route precludes any effect on the transportation of the spent fuel to the storage pads or CTF. Event 5 involves the mineral oil in the Unit 2 main bank transformers. The detonation of this oil is normally not considered credible because of its flash point. However, there is some potential for an electrical short or other ignition source to be the cause of ignition. As a result, this was evaluated as discussed in Section 8.2.6 and found to be risk insignificant based on Regulatory Guide 1.91 acceptance criteria. Event 6 concerns decompression of gas cylinders and the possible missile damage to the transfer cask and overpack. The evaluation performed in Section 8.2.6 shows that there would be no significant damage or loss of function by this event. Event 7 involves the transportation of the transfer cask past a potential hydrogen explosion hazard (Figure 2.2-1). Section 8.2.6 discusses the evaluation that was performed for this event. The evaluation shows that the probability of a detonation at the moment the transporter is in the vicinity is so small that it is not credible per the

guidelines of Regulatory Guide 1.91. Event 8 was evaluated, as discussed in Section 8.2.6, where it is shown that the number of acetylene bottles that would have to be stored on the east side of the cold machine shop and detonate to degrade the structural integrity of the transfer cask far exceeds the available bottle storage space.

The Cask Transportation Evaluation Program will be developed, implemented, and maintained to ensure that no additional hazards are introduced either at the storage pads, CTF, or on the transportation route during onsite transport of the loaded overpacks or transfer cask. That program will include limitation on hazards and will require a transportation route walkdown prior to any movement of the transporter with nuclear fuel between the FHB/AB and the CTF, and between the CTF and the storage pads. The walkdown will require the evaluation or removal of any identified hazards prior to the movement of the transporter. The program will also control all movement of vehicles or activities during onsite transport that could have an adverse effect on the loaded overpacks or transfer cask.

2.2.2.4 Chemical Hazards

A walkdown of all chemical hazards was performed in the ISFSI storage pad and CTF areas, and along the transportation route. Chemical hazards were identified that could have an effect on the ISFSI or the transportation system. To ensure minimum potential for chemical hazards, the administrative program provided to control fire and explosive hazards will also include identification, control, and evaluation of hazardous chemicals.

2.2.3 SUMMARY

In summary, there are no credible accident scenarios involving any offsite industrial, transportation, or military facilities in the area around the DCPP site that will have any significant adverse impact on the ISFSI. In addition, there are no potential onsite fires, explosions, or chemical hazards that would have a significant impact on the ISFSI.

2.2.4 REFERENCES

1. Regulatory Guide 1.91, Evaluations of Explosions Postulated to Occur on Transportation Routes near Nuclear Power Plants, US Nuclear Regulatory Commission, February 1978.

2. Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, USNRC, NUREG-0800, July 1981.

3. ANSI/ANS 57.9, 1992, Design Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type), American National Standards Institute.

4. 10 CFR 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste.

5. DOE-STD-3014-96 Accident Analysis for Aircraft Crash Into Hazardous Facilities, US Department of Energy, October 1996.