

The Approach Chart Rules!

If you think sectional charts are a complex art, look at what goes into an approach procedure.

By Wally Roberts

ONE OF THE MOST PERPLEXING and complex procedural aspects of instrument flying is the approach chart. Some charts are relatively straight-forward while others are complex and subject to much discussion and debate among instrument pilots, and instrument flight and ground instructors.

FAR 91.175(a) requires us to use an FAR 97 standard instrument approach procedure (SIAP) "when an instrument letdown to a civil airport is necessary." There is also an "unless otherwise authorized by the Administrator" escape clause in 91.175(a). Interpretations and policy statements by the FAA over the years have made it quite clear that a SIAP is necessary when arriving at an airport on an IFR flight plan with only three exceptions: (1) a contact approach, (2) a visual approach, (3) or a special instrument approach procedure specifically issued to the operator.

So, where do Jeppesen and NOS get the SIAP from, and what really is the regulatory status of the approach chart included with a standard approach chart package? (For those of you who might say "who cares?" read on nonetheless for hidden nuggets of wisdom.)

Procedure is an FAR

This article will use two public SIAPs for Salinas Municipal Airport (SNS), CA. The ILS RWY 31 (Figure 1 on right) and LOC/DME RWY 31 (Figure 2, page 11) are good examples because the terrain and nav aids at this locale required the FAA to separate the precision ILS procedure from the non-precision localizer procedure. This was necessary to take maximum advantage of TERPs criteria without causing undue chart clutter or imposition of a mandatory DME equipment requirement for the precision ILS procedure.

Every SIAP represents an individual amendment to FAR 97. The minimum

altitudes and segment lengths result from application of TERPs vertical and lateral obstacle clearance airspace requirements to the approach and missed approach paths. Sometimes, segment altitudes must be higher than required for obstacle clearance in order to assure reception of a mandatory crossing ra-

dial or, in unusual circumstances, the primary navaid itself.

TERPs criteria further require that descent gradients be to each of the initial, intermediate, and final approach segments not be exceeded in the design of the procedure. Also, alignment limitations and turning requirements be-

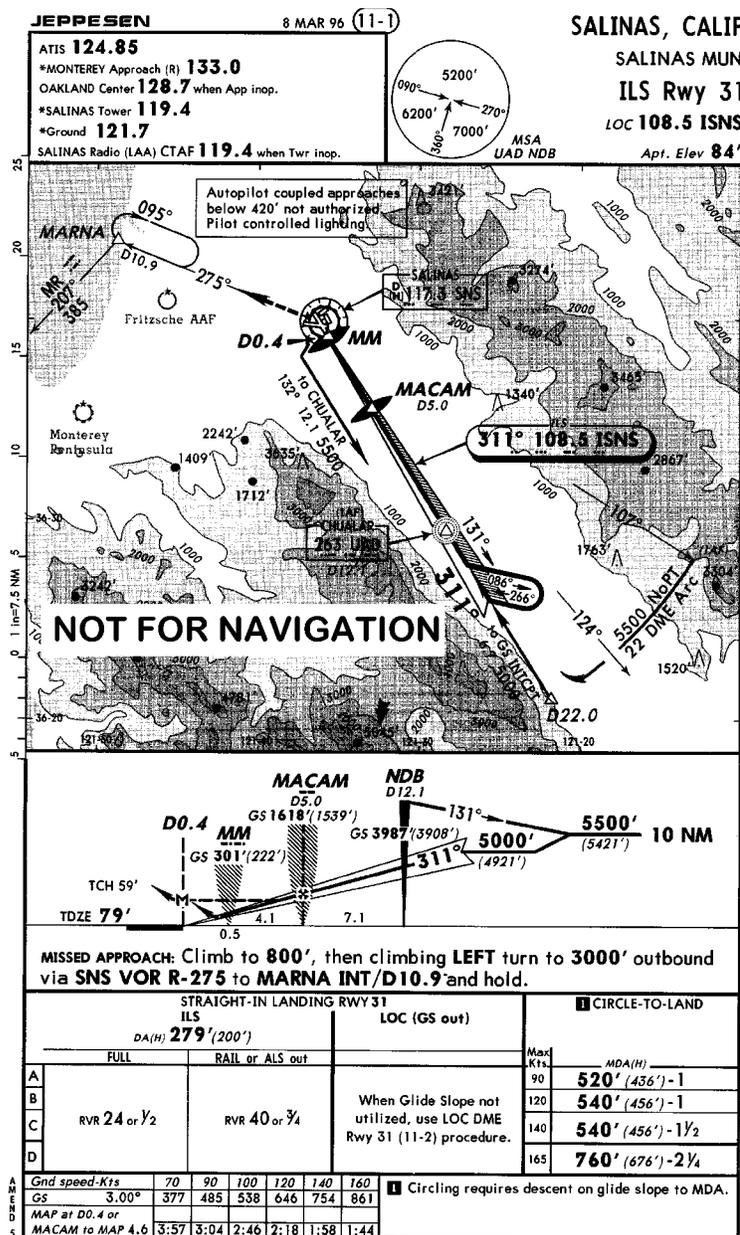


Figure 1. Terrain and nav aids require separate ILS and localizer procedures at SNS. DME isn't required to use the ILS.

The Approach Chart

(continued from page 11)

an instrument approach chart (or, for that matter, an IFR en route chart) binds the pilot a lot more than a lowly Sectional chart. What might not be quite as apparent, though, is that ATC doesn't possess the training nor the authority to amend any part of the chart, except for the authority given to it by "the Administrator" to substitute an otherwise required initial approach segment with a radar vector to the intermediate segment (a.k.a.: "final approach course") at an altitude compatible with the SIAP. It's all that use of radar by ATC that gives the incorrect impression that controllers are experts in instrument approach procedures.

When ATC clears you for an ap-

proach, all it is saying, in effect: "the airspace required to fly this approach and missed approach is free of conflicting IFR traffic." Once you begin the approach, you're in a deal with the Form 8260-3 or -5, as represented on your approach chart. ATC is out of picture, except to assure continued IFR traffic separation and, at towered airports, provide runway and local area services.

Of course, ATC can wave you off in the event of an unexpected traffic conflict, but this means flying only the published missed approach with a couple of very limited exceptions: (1) there is sometimes a second, alternative non-radar missed approach set forth on the 8260-3/5 where ATC has an occasional need for a second missed approach route. (This alternative missed approach isn't charted, but is considered to be

"published" in the legalese of the feds.) (2) Where radar exists, ATC can vector you for the missed. Where you are below the MVA (almost always the case inside the FAF) the radar missed should only occur near the airport or MAP, or off to the side of the localizer in the very special case of simultaneous ILS approaches.

Details of the 8260 form

Note that the SNS Forms 8260-3/5 look a lot alike, except that the -5 form for the LOC/DME jumps from Line 4 to Line 8. The form is divided into 6 major areas: plan view terminal routes, profile view distances and altitudes, minimums, notes, missed approach procedure(s) and additional flight data. Lines 5 through 7 appear only on the ILS form, because they provide addi-

U.S. Department of Transportation Federal Aviation Administration		ILS - STANDARD INSTRUMENT APPROACH PROCEDURE FAR PART 97.29				Bearings, headings, courses, and radials are magnetic. Elevations and altitudes are in feet MSL, except HAT, HAA, TCH, and RA. Altitudes are minimum altitudes unless otherwise indicated. Ceilings are in feet above airport elevation. Distances are in nautical miles unless otherwise indicated, except visibilities which are in statute miles or in feet RVR.											
TERMINAL ROUTES				MISSED APPROACH													
FROM	TO	COURSE AND DISTANCE	ALTITUDE	LS: AT THE DH. LOC: CIRCLING 4.6	MILES AFTER												
SNS VORTAC	UAD NDB/ SNS 12.1 DME	132/ 12.1	5500	MACAM OM/SNS 5DM OR AT 0.4	DME FDC.												
R-107 SNS VORTAC CW (IAF)	I-SNS LOC CRS (NoPT)	22 DME ARC (SNS LR-124)	5500	CLIMB TO 800, THEN CLIMBING LEFT TURN TO 3000 VIA SNS R-275 TO MARNA INT/ 10.9 DME AND HOLD. ADDITIONAL FLIGHT DATA: HOLD E, RT, 275 INBOUND. FAS OBST: 2419 TREE 362537/1212831													
22 DME ARC	GLIDE SLOPE INTERCEPT	311/ 6.7 (I-SNS)	5000														
1. PT <u>L</u> SIDE OF COURSE <u>131</u> OUTBOUND <u>5500</u> FT WITHIN <u>10</u> MILES OF <u>UAD NDB/ SNS 12.1 DME</u> (IAF) 2. 3. FAF: <u>311</u> FAF: <u>MACAM OM/ SNS 5.0 DME</u> DIST FAF TO MAP: <u>4.6</u> THLD: <u>4.6</u> 4. MIN. ALT: 5. DIST TO THLD FROM OM: <u>4.6</u> MM: <u>0.5</u> M: <u>150</u> HAT: <u>100</u> HAT: <u>---</u> GS ANT: <u>1152</u> 6. MING S INCP: <u>5000</u> GS ALT AT: <u>UAD/ NDB/ DME 3987</u> CM: <u>1618</u> MM: <u>301</u> M: <u>---</u> 7. GS ANGLE: <u>3.00</u> TCH: <u>59</u> 8. MSA FROM: <u>UAD NDB 090-180 7000, 180-270 6200, 270-090 5200</u>				MAG VAR: <u>17E</u> EPOCH YEAR: <u>65</u>													
MINIMUMS																	
TAKEOFF:	STANDARD	<input checked="" type="checkbox"/>	SEE FAA FORM 8260-15 FOR THIS AIRPORT		ALTERNATE: NA	ILS STANDARD#CAT D 700-2 1/4 LOC N/A											
CATEGORY	A			B			C			D			E				
S-ILS 31	DH/MDA 279	VIS 2400	HAT/HAA 200	DH/MDA 279	VIS 2400	HAT/HAA 200	DH/MDA 279	VIS 2400	HAT/HAA 200	DH/MDA 279	VIS 2400	HAT/HAA 200	DH/MDA	VIS	HAT/HAA		
S-LOC	WHEN	GS NOT USED,	USE	LOC/DME	RWY 31	PROCEDURE.											
CIRCLING	520	1	436	540	1	456	540	1 1/2	456	760	2 1/4	676					
NOTES: CIRCLING REQUIRES DESCENT ON GLIDE SLOPE TO MDA.																	
CITY AND STATE		ELEVATION:	TDZE:	FACILITY IDENTIFIER:	PROCEDURE NO./AMDT NO./ EFFECTIVE DATE:		SUP										
SALINAS, CA		64	79	I-SNS	ILS RWY 31, AMDT. 5		AMDT: 4										
		AIRPORT NAME: SALINAS MUNI						DATED: 9-6-87									

FAA FORM 8260 - 3 (computer generated)

Figure 3. The Form 8260-3 is used for ILS and MLS approach procedures. This form is an amendment to FAR Part 97.

TERPS REVIEW

tional information necessary to chart the precision profile view.

Where there's a procedure turn (or course reversal holding pattern) the profile automatically begins with the PT. Because the SNS LOC/DME doesn't have a PT, the starting point of the profile is at the discretion of the design specialist, provided it includes at a minimum all of the intermediate and final segments.

The nuances of the Forms 8260-3/5 to the chartmakers at Jeppesen and NOS are extensive. Note, for example, the three dashes after DIST FAF TO MAP on Line 3 of the LOC/DME 8260-5, as well as the lack of a mileage from the FAF to MAP in the missed approach box. This "tells" the chartmakers to omit the missed approach timing table, because the MAP is a DME fix on a SIAP with DME required in the title of the procedure.

The note "Inoperative Table Does Not Apply to CAT D" on the LOC/DME 8260-5 does not appear on the Jeppesen chart, because—unlike NOS—Jepp incorporates the inopera-

tive components table into its minima format. This is one major reason why I prefer Jeppesen charts over their NOS counterpart. Another is the fact that Jeppesen is free to chart temporary ("T") Flight Data Center (FDC) notams at its discretion, whereas NOS only charts permanent ("P") FDC notams. Note the autopilot restriction note near the top of Jeppesen's SNS ILS chart. This resulted from a T-notam issued early this year:

!FDC 6/0979 SNS FI/T SALINAS MUNI SALINAS CA.

ILS RWY 31 AMDT 5

ADD NOTE: AUTOPILOT COUPLED APPROACHES BELOW 420 FEET NOT AUTHORIZED.

With the NOS chart for SNS, you must ferret out this notam from the system. If the notam is a 200-foot temporary increase in MDA because of a construction crane, or such, it's helpful to have a chart that reflects the change.

NOS doesn't lose on every count, however. The NOS chart for the SNS ILS RWY 31 (not illustrated) clearly shows

the source of the non-located DME.

Nuances of chart notams

T-notams are issued for conditions that are expected to last less than 90 to 120 days. P-notams trigger a mandatory chart change from both NOS and Jeppesen. Jeppesen picks up and charts any T-notam that will last for an "appreciable" length of time in their view. A P-notam supersedes the existing Form 8260-3/5 and thus carries the next higher amendment number. The T-notam carries the existing amendment number, as in the autopilot note above. P-notams are referenced, after the fact, in the Federal Register. Unlike routine amendments, though, major user groups are denied the opportunity to comment on the "P" change to the SIAP.

Finally, there is a subset of the P-notam, known internally within the FAA as the Chart Change-Permanent (CCP) notam. Regular P-notams require a complete review by the FAA procedures staff of the affected SIAP, but a CCP notam is for ostensibly more

(continued on next page)

Subscribe to *IFR Refresher* today!

Yes, please enter my order for:

- 1 year of *IFR Refresher* for \$60 (U.S. and International).
- 2 years of *IFRR* for \$110 (U.S. and International).
- The back issues I've listed below, for just \$7.50 each, plus \$2.00 shipping and handling per total order. (For a listing of feature articles in each issue, see other side; cash or check only for back issue orders.)

IFR Refresher Permanent Binder—just \$5.95 (plus \$2.50 for shipping and handling).

\$ _____ Total for items selected above.

\$ _____ Shipping & handling (not applicable to subscriptions)

\$ _____ CT residents add 6.0% sales tax (binders only)

\$ _____ Total this order

Name _____

Address _____

City _____

State _____ Zip _____

Please bill my: MC/Visa _____ American Express _____

Card # _____ Exp. Date _____

Signature _____

Daytime Phone # (required for MC/V) _____

Mail to *IFR Refresher*, 75 Holly Hill Lane, Greenwich, CT 06836-2626

***IFR Refresher* Guarantee**

If you are not completely satisfied with any item you order from us, you may cancel or return the item for a cheerful refund.

The Approach Chart

(continued from page 13)

limited permanent changes, and can get out the door quicker without a complete review of the SIAP. CCP notams use the existing amendment number with an alpha suffix, e.g., "Amendment 5A."

The nub of the legalese

Until approximately 20 years ago, the complete SIAP form for each and every original/amended approach appeared verbatim in the FR. This grew to be too much, even for the most avid readers of legalese, so the rules were changed in the early 1970s to just publish the title and effective dates in the FR. The following boilerplate legalese appears in the FR every two weeks, or

so, along with the current batch of new/amended SIAPs:

"SUPPLEMENTARY INFORMATION: This amendment to Part 97 of the Federal Aviation Regulations (14 CFR Part 97) establishes, amends, suspends, or revokes Standard Instrument Approach Procedures (SIAPs). The complete regulatory description on each SIAP is contained in the appropriate FAA Form 8260 and the National Flight Data Center (FDC)/Permanent (P) Notices to Airmen (NOTAM) which are incorporated by reference in the amendment under 5 U.S.C. 552(a), 1 CFR Part 51, and Sec. 97.20 of the Federal Aviation Regulations (FAR). Materials incorporated by reference are available for examination or purchase as stated above.

"The large number of SIAPs, their

complex nature, and the need for a special format make their verbatim publication in the Federal Register expensive and impractical. Further, airmen do not use the regulatory text of the SIAPs, but refer to their graphic depiction of charts printed by publishers of aeronautical materials. Thus, the advantages of incorporation by reference are realized and publication of the complete description of each SIAP contained in FAA form documents is unnecessary."

Over the years, I've heard some pilots boast that the 8260-3/5 is the legal form of the SIAP, thus it's legal to fly the approach using only this form. "Lot's of luck" is the kindest retort that comes to my mind. Also, through the efforts of AOPA many years ago, it's still technically "legal" to ask the controller to read you the chart, if you're

These back issues of *IFR Refresher* are available...

If you don't have a complete file of *IFR Refresher*, you may have missed vital information and good reading.

May 1992—Vol. 6, No. 5
Flying IFR in Canada
June 1992—Vol. 6, No. 6
Bahamas & Caribbean IFR
July 1992—Vol. 6, No. 7
Flying Current Approaches
August 1992—Vol. 6, No. 8
Circling Approaches Revisited
September 1992—Vol. 6, No. 9
Situational Awareness
October 1992—Vol. 6, No. 10
Coping With Pitot-Static Failures
November 1992—Vol. 6, No. 11
Instrument Competency
December 1992—Vol. 6, No. 12
Holding Entries Simplified
January 1993—Vol. 7, No. 1
Straight-in or Procedure Turn?
March 1993—Vol. 7, No. 3
Human Performance Accidents
April 1993—Vol. 7, No. 4
Where the Heck am I?
May 1993—Vol. 7, No. 5
Planning a Zero-Zero Takeoff
June 1993—Vol. 7, No. 6
Hazards of Night IFR
July 1993—Vol. 7, No. 7
Approach Chart Checklist
August 1993—Vol. 7, No. 8
Watching Weather Progress
September 1993—Vol. 7, No. 9
Non-Precision Approach Tactics
October 1993—Vol. 7, No. 10
Which Way Should I Depart?
November 1993—Vol. 7, No. 11
Logging Ground Time
December 1993—Vol. 7, No. 12
How GPS Works

January 1994—Vol. 8, No. 1
Flying With GPS
February 1994—Vol. 8, No. 2
Egg-in-Hand Routine
GPS Overlay Approaches
Planning Your Next Approach
March 1994—Vol. 8, No. 3
Are You IFR or VFR?
Radar Service Terminated
When the Glideslope Fails
April 1994—Vol. 8, No. 4
Ensuring a Safe Departure
Flying the ILS with Style
May 1994—Vol. 8, No. 5
Alternate of Choice
June 1994—Vol. 8, No. 6
Cross-checking the Gauges
Lost Comm in Motion
July 1994—Vol. 8, No. 7
When ATC Loses Track of You
When the Instruments Lie
August 1994—Vol. 8, No. 8
Approach Transitions
Attitudes and Decision-Making
Pilot Attitude Profile
September 1994—Vol. 8, No. 9
At The Bottom of the Approach
Initial Approach Fixes
October 1994—Vol. 8, No. 10
Avoiding Spatial Disorientation
Weather Briefing Checklist
November 1994—Vol. 8, No. 11
Keeping Your Cockpit Organized
Partial Panel Proficiency
December 1994—Vol. 8, No. 12
Organizing Your Scan
Who's Responsibility is it?

January 1995—Vol. 9, No. 1
How the Airlines Fly IFR
On Being PIC
February 1995—Vol. 9, No. 2
Complying With ATC Instructions
Understanding TAF Reports
When IFR & VFR Traffic Mix
March 1995—Vol. 9, No. 3
ABCs of an Arrival
Comments From Examiners
Lost Com Occurrences
April 1995—Vol. 9, No. 4
Checking for Notams
Flying the Final Approach
Learning From Others
May 1995—Vol. 9, No. 5
Completing the Missed
Departing IFR Safely
June 1995—Vol. 9, No. 6
Establishing Visibility Minimums
Knowing When to Fold
Organizing Your IFR Training
July 1995—Vol. 9, No. 7
GPS For Positional Awareness
Pilots You Love To Hate-Part 2
Where To Miss The Approach
August 1995—Vol. 9, No. 8
Questionable Vectors
When are You a Non-radar Arrival?
Why Pilot-induced Accidents?
September 1995—Vol. 9, No. 9
How to Beat the Weather
Thinking About Basic Instruments
Threading the Needle Properly
October 1995—Vol. 9, No. 10
Airway Operations
Basic Instruments & Partial Panel
Well Executed Forced Landing?

November 1995—Vol. 9, No. 11
Negotiating Clearances
Perishable Skills
Vectors Below the Hilltops
December 1995—Vol. 9, No. 12
Peculiarities of Holding
Pilot Idiosyncrasies
Transition Training
January 1996—Vol. 10, No. 1
Best IFR Training?
Circling and the Visual Segment
Is There a Runway Out There?
Proposed Training Changes
February 1996—Vol. 10, No. 2
Cali Accident Update
En Route Arrival Clearances
Go/No-Go Decisions
Precedent-Setting Cases
March 1996—Vol. 10, No. 3
Infamous NDB Approach
Lost Com: Let's Get Real
One Good Characteristic
When You Can't Get In
April 1996—Vol. 10, No. 4
Forty Minutes in the Life
Insidious Illusions
Low Visibility Operations
What's Below MDA and DH?
May 1996—Vol. 10, No. 5
Improving The Odds At Night
Safe Approach Procedures
Set In The Approach Mode
When Are You Established?

Plus—every issue has a different and challenging "IFR Quiz"! See form on reverse side to order.

TERPS REVIEW

not-for-hire. For that, I say, would you want the IRS to read you all the tax forms over the phone, where paying the wrong tax could cost you your life?

I'll defer to you attorney pilots for the last word, but it seems clear to me that not only do you need the current chart, you need to faithfully follow all terminal routes applicable to your arrival onto the approach, and then follow the profile view faithfully, including any required procedure turn, excepting only the ATC radar vector to the "final approach course."

Note that the Form 8260-3/5 contains any restrictions to alternate minimums and sets forth whether standard or FAR 97 takeoff minimums apply for commercial operators. The Takeoff Form 8260-15 is a non-rule-making form that contains any IFR departure procedure and/or non-standard takeoff minimums.

Supposedly, the appearance of the checked "See FAA Form 8260-15 For This Airport" triggers FAR 97 takeoff minimums, although it seems as clear as mud to me. Nowhere is the 8260-15 referenced in the FR, although it does find its way to the chartmakers, like the 8260-3/5, via the National Flight Data Center, an arm of the FAA.

Other stuff on and off the chart

Also note that the Form 8260-3/5 has no information about radio frequencies, identifiers, etc. It's the task of the chartmakers to pick those essential ancillary data from other official sources. Often, official sources contain errors, even the Forms 8260-3/5 themselves. I can say without question that Jeppesen is first-rate at catching many of these errors—far better than NOS. But, no chartmaker can catch an error in im-

proper application of obstacle clearance, or ambiguous meaning and purpose of some chart notes. For these critical factors, we hope the FAA audits and "QCs" its procedures design function.

The FAA documents controlling obstacles for each segment of the SIAP on Form 8260-9. Although this form is an FAA internal "work record," it's an essential part of any meaningful review of the 8260-3/5 that might be necessary because of an accident or other investigation. The 8260-9s for SNS would take up too much space for this article, but are available on my web site.

Wally Roberts is a retired airline pilot, former chairman of the ALPA TERPs committee, and an active CFII in San Clemente, CA. His e-mail: terps@terps.com Wally's web site: <http://www.terps.com/terps/>

U.S. DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION															
STANDARD INSTRUMENT APPROACH PROCEDURE										25					
LOC/DME										Bearings, headings, courses, and radials are magnetic. Elevations and altitudes are in feet, MSL, except HAT, HAA, TCH, and RA. Altitudes are minimum altitudes unless otherwise indicated. Ceilings are in feet above airport elevation. Distances are in nautical miles unless otherwise indicated, except visibilities which are in statute miles or in feet RVR.					
TERMINAL ROUTES						MISSED APPROACH									
FROM		TO		COURSE AND DISTANCE		ALTITUDE		MAP:							
R-107 SNS VORTAC CW (IAF)		I-SNS LOC CRS		SNS 22 DME ARC (SNS LR-124)		5500		SNS 0.4 DME							
22 DME ARC		SNS 17 DME FIX		311/ 5.0 (I-SNS)		5300		CLIMB TO 800, THEN CLIMBING LEFT TURN TO 3000 VIA SNS R-275 TO MARNA INT/ 10.9 DME AND HOLD.							
SNS 17 DME FIX		SNS 13 DME FIX		311/ 4.0 (I-SNS)		4700									
SNS 13 DME FIX		SNS 10.3 DME FIX		311/ 2.7 (I-SNS)		4000									
ADDITIONAL FLIGHT DATA:															
HOLD E, RT, 275 INBOUND.															
FAS OBST: 169 TREE 363620/ 1213238 179 TREE 363607/ 1213223															
CHART: VDP AT 1.5 DME. DISTANCE VDP TO THLD 1.1 MILES.															
1. PT NA SIDE OF COURSE OUTBOUND FT WITHIN MILES OF (IAF)															
2. PROFILE STARTS AT I-SNS SE CRS/ SNS 22 DME															
3. FAC: 311 FAF: SNS 10.3 DME DIST FAF TO MAP: --- THLD: 9.9															
4. MIN. ALT: SNS 22 DME 5500, 17 DME 5300, 13 DME 4700, 10.3 DME 4000, 5 DME 1900															
8. MSA FROM: SNS VORTAC 100-220 6200, 220-310 4000, 310-100 5200						MAG VAR: 17E EPOCH YEAR: 65									
MINIMUMS															
TAKEOFF:	STANDARD	<input checked="" type="checkbox"/> SEE FAA FORM 8260-15 FOR THIS AIRPORT		ALTERNATE: NA		STANDARD * * CAT D 800 - 2 1/4									
CATEGORY	A			B			C			D			E		
	MDA	VIS	HAT/HAA	MDA	VIS	HAT/HAA	MDA	VIS	HAT/HAA	MDA	VIS	HAT/HAA	MDA	VIS	HAT/HAA
S-31	420	2400	341	420	2400	341	420	2400	341	420	5000	341			
CIRCLING	520	1	436	540	1	456	540	1 1/2	456	760	2 1/4	676			
NOTES:															
INOPERATIVE TABLE DOES NOT APPLY TO CAT D. SIMULTANEOUS RECEPTION OF I-SNS AND SNS DME REQUIRED.															
CITY AND STATE				ELEVATION:		TDZE:		FACILITY IDENTIFIER:		PROCEDURE NO./AMDT NO./ EFFECTIVE DATE:				SUP	
SALINAS, CA				SALINAS MUNI		I-SNS		LOC/DME RWY 31, AMDT. 4				AMDT: 3			
														DATED: 8-18-86	

FAA FORM 8260 - 5 (computer generated)

Figure 4. The Form 8260-5 is used for non-precision approaches. In this example, the SNS LOC/DME RWY 31.