

# 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

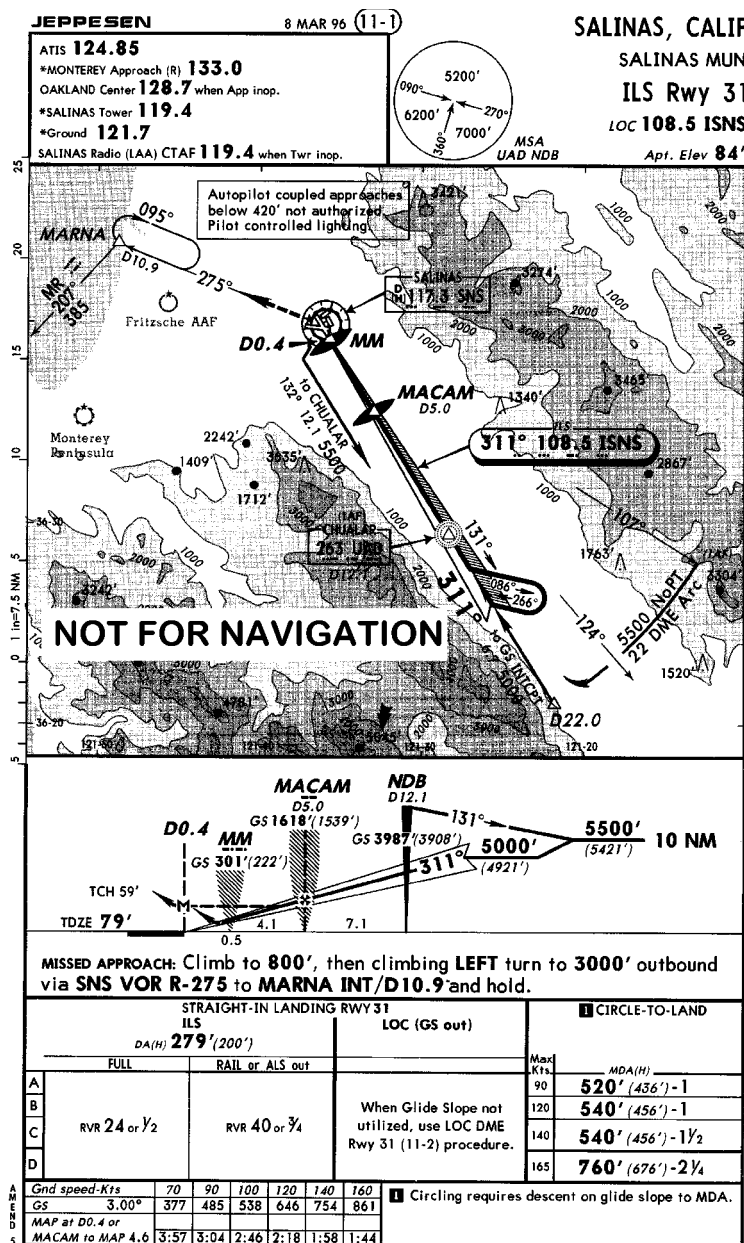
This article will use two public SIAPs for Salinas Municipal Airport (SNS), CA. The ILS RWY 31 (Figure 1 on right) and LOC/DME RWY 31 (Figure 2, page 11) are good examples because the terrain and nav aids at this locale required the FAA to separate the precision ILS procedure from the non-precision localizer 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-



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

# TERPS REVIEW

tween segments and with respect to the runway or airport must be observed by the FAA specialist during design of the approach.

Once all these factors are worked through, and controlling obstacles are carefully documented, then the transmittal form that will provide the information to Jeppesen, NOS and off-shore chartmakers (many foreign airlines use European produced charts, even for U.S. SIAPs) are completed in accordance with very specific directives. This FAA transmittal form will hold its own in any federal intramural complexity contest with the IRS's finest.

Jesting aside, the FAA SIAP transmittal form must not only clearly indicate the segments, minimum altitudes, distances, minimums, missed approach, and procedural notes—it must clearly conform to agreed upon cartographic standards so that essential elements of the graphical approach chart conform to approach chart cartographic standards.

## Beyond the rule to the chart

The cartographic standards are the result of the efforts of the government's Interagency Air Cartographic Committee (IACC), which consists of the Commerce and Defense Departments, in addition to the FAA. The cartographic standards are set forth in an 80-plus-page document entitled, "Low Altitude Instrument Approach Procedures." NOS and the military services are strictly bound to these standards, from what must be in the plan and profile views, to the size type used for icons.

Strictly speaking, Jeppesen isn't bound by these cartographic standards. Two practical constraints, however, effectively bind Jeppesen to the essence of these standards: the form and content of the SIAP regulatory transmittal form itself, and Jeppesen's need to hold its charts out as meeting FAA charting requirements. Even within these constraints Jeppesen is provided considerable wiggle room, which arguably results in a better chart format than that provided by the government's official chartmaker.

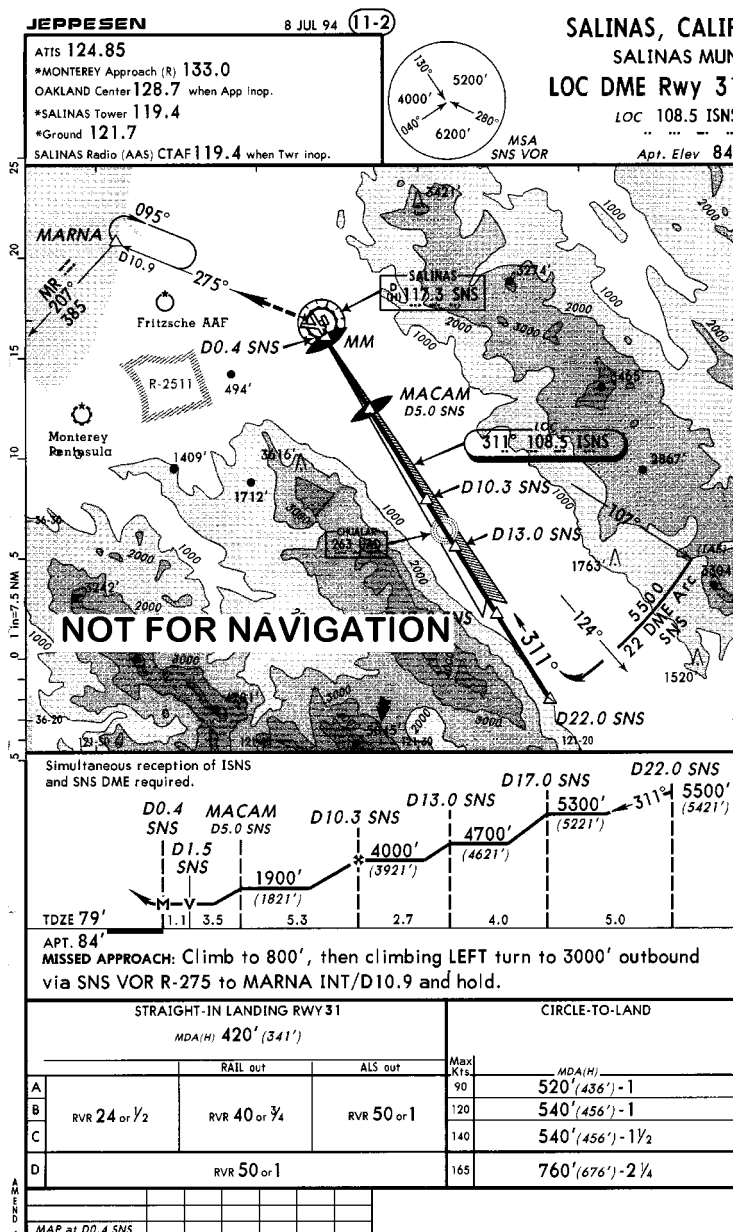
The FAA transmittal forms for SIAPs are: 8260-3 for ILS (or MLS), 8260-5 for all non-precision approaches, other than ASR, and 8260-4 for ASR and PAR approaches. Figure 3 (page 12) is the currently effective 8260-3 for the SNS RWY 31 ILS and Figure 4 (page 15) is the 8260-5 for the LOC/DME approach.

Note the specific FAR 97 reference at the top of each form. Each form represents a specific amendment to FAR 97; i.e., "ILS RWY 31, Amendment 5."

The title, effective date, FAR 97 subpart number, and amendment number (or original) are published in the Federal Register (FR) in accordance with the requirements of the Administrative Procedures Act. This gives every SIAP the same force of law as, for instance, the IRS tax code. (You know what happens if you don't pay your taxes.)

## ATC's minimal role

By now, it should be pretty clear that  
(continued on next page)



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**Figure 2.** DME is required to use this procedure and identify the MAP, therefore, the timing table is omitted.

# TERPS REVIEW

## 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		<b>ILS - STANDARD INSTRUMENT APPROACH PROCEDURE</b> 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 FIX										
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.											
22 DME ARC	GLIDE SLOPE INTERCEPT	311/ 6.7 (I-SNS)	5000												
				ADDITIONAL FLIGHT DATA:											
				HOLD E, RT, 275 INBOUND.											
				FAS OBST: 2419 TREE 362537/1212831											
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> Mx: <u>0.5</u> Mx: <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> CA: <u>1618</u> Mx: <u>301</u> Mx: <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>															
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		
	DH/MDA	VIS	HAT/HAA	DH/MDA	VIS	HAT/HAA	DH/MDA	VIS	HAT/HAA	DH/MDA	VIS	HAT/HAA	DH/MDA	VIS	HAT/HAA
S-ILS	31	279	2400	200	279	2400	200	279	2400	200	279	2400	200		
S-LOC		WHEN	GS NOT	USED,	USE	LOC/DME	RWY 31	PROCE	DURE.						
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: 64 TDZE: 79		FACILITY IDENTIFIER: I-SNS		PROCEDURE NO./AMDT NO./ EFFECTIVE DATE: ILS RWY 31, AMDT. 5				SUP		AMDT: 4		DATED: 9-6-87	
SALINAS, CA		SALINAS MUNI													

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)*

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## 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

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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](mailto:terps@terps.com) Wally's web site: <http://www.terps.com/terps/>*

U.S. DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION															
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TERMINAL ROUTES					MISSED APPROACH										
FROM	TO	COURSE AND DISTANCE	ALTITUDE	MAP: SNS 0.4 DME											
R-107 SNS VORTAC CW (IAF)	I-SNS LOC CRS	SNS 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: 169 TREE 363620/ 1213238 179 TREE 363607/ 1213223 CHART: VDP AT 1.5 DME. DISTANCE VDP TO THLD 1.1 MILES.											
22 DME ARC	SNS 17 DME FIX	311/ 5.0 (I-SNS)	5300												
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												
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 5. 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			84		79	I-SNS		LOC/DME RWY 31, AMDT. 4				AMDT: 3			
			SALINAS MUNI									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.