U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Use of Noncertified Weather Observations in Noncontiguous States

Date: 10/6/20
Initiated by: AFS-200

AC No: 135-45
Change:

1 PURPOSE OF THIS ADVISORY CIRCULAR (AC). This AC provides information and recommendations to air carriers operating under the authority of Title 14 of the Code of Federal Regulations (14 CFR) part 135 and in the noncontiguous States (i.e., Alaska or Hawaii) on the use of noncertified weather information in support of instrument approaches conducted under instrument flight rules (IFR) at airports without destination weather reporting approved by the National Weather Service (NWS) or the Federal Aviation Administration (FAA).

1.1 This AC provides information and examples that may assist operators in developing sources of noncertified supplemental weather information and associated training procedures that can be submitted for approval for use in their operations. Additional procedures not contained in this AC will be considered on a case-by-case basis to determine suitability for approval.

1.2 The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.

2 AUDIENCE. This AC is for existing and prospective part 135 air carriers operating in the noncontiguous States of Alaska and Hawaii and their employees.

3 WHERE YOU CAN FIND THIS AC. You can find this AC on the FAA's website at https://www.faa.gov/regulations_policies/advisory_circulars.

4 RELATED CFR PARTS. Title 14 CFR parts 1, 91, and 135.

5 DEFINITIONS.

5.1 Altimeter Setting Source. An instrument approved by the FAA that displays the current altimeter setting. If it is not available or cannot communicate the current altimeter setting to the pilot conducting an instrument approach at a destination airport, the pilot must apply altitude corrections as shown on the instrument approach procedure (IAP) for that airport.

5.2 General Operations Manual (GOM). A manual setting forth the certificate holder's procedures and policies acceptable to the Administrator, which, as required by part 135, § 135.21, each certificate holder, other than one who uses only one pilot in the certificate holder's operations, must prepare and keep current. The GOM provides relevant information to the certificate holder's flight, ground, and maintenance personnel to use in conducting its operations. Under § 135.23, the manual must include, at a minimum, sections addressing IFR flight planning procedures and an FAA-approved en route and destination weather evaluation procedure (refer to Section 322 of the FAA Reauthorization Act of 2018, Public Law 115-254 (October 5, 2018) (Title 49 of the United States Code (49 U.S.C.) § 44720 note)). The operator's GOM must be acceptable to the FAA (refer to § 135.21(a)), and though it may contain procedures and programs approved by the FAA, these required approvals of individual sections do not supersede the overall acceptance requirements of the manual.

5.3 Instrument Flight Rules (IFR). Rules governing the procedures for conducting instrument flight whether under instrument meteorological conditions (IMC) or visual meteorological conditions (VMC).

5.4 Instrument Meteorological Conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from clouds, and ceiling less than the minimums specified for VMC.

5.5 Noncertified Weather Observer. A person designated by a part 135 air carrier who is equipped, trained, and tested by that air carrier to observe and report specific, estimated weather conditions at a destination airport not served by a Meteorological Aerodrome Report (METAR) to the air carrier's base of operations or to the air carrier's pilot.

5.6 Reasonably Accurate Estimate. A noncertified weather observer's best estimate of ceiling or visibility that is determined by an approved method and is expressed as being above or below the required landing minimums without quantification of ceiling in feet or visibility in fractions of a mile.

6 RELATED READING MATERIAL.

6.1 ACs. Current editions of ACs can be found on the FAA website at https://www.faa.gov/regulations_policies/advisory_circulars.

- AC 00-6, Aviation Weather.
- AC 00-45, Aviation Weather Services.
- AC 120-51, Crew Resource Management Training.

6.2 Other Documents (current editions).

- Aeronautical Information Manual (AIM).
- NWS Training Guide in Surface Weather Observations: https://www.weather.gov/media/surface/SFCTraining.pdf.
- Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25).

6.3 Websites.

- The American Meteorology Society (AMS) Glossary of Meteorology (entry for "rain"): https://glossary.ametsoc.org/wiki/rain.

7 BACKGROUND. Section 322 of the FAA Reauthorization Act of 2018 requires the FAA to permit an air carrier operating pursuant to part 135 "to operate to a destination with a published approach, in a noncontiguous State under instrument flight rules and conduct an instrument approach without a destination Meteorological Aerodrome Report (METAR) if a current Area Forecast, supplemented by noncertified local weather observations (such as weather cameras and human observations) is available, and an alternate airport that has [an FAA-approved] weather report is specified." Section 322 also requires air carriers operating under part 135 that use such noncertified weather information to have approved procedures for departure and en route weather evaluation.

8 DISCUSSION. Section 135.213(b) states that weather observations made and furnished to pilots to conduct IFR operations at an airport generally must be taken at the airport where those IFR operations are conducted. However, the Administrator may approve a deviation through the issuance of operations specifications (OpSpecs) allowing the use of weather observations taken at a location not at the airport where the IFR operations are conducted. The responsible Flight Standards office will issue the OpSpec after an investigation and determination is made by the FAA and the NWS that issuing a deviation from § 135.213(b) would be consistent with the standards for safety for that operation. Operators should use this option first, when it is available. If the FAA does not approve a deviation from § 135.213(b), Section 322 may apply to provide relief. If the FAA approves an alternative weather source in accordance with § 135.213(b), relief under Section 322 is unavailable because it is not necessary.

9 PROCEDURES FOR GAINING FAA APPROVAL. FAA approval of procedures for the evaluation of en route and destination weather will be contingent upon the quality of documented procedures, training, and validation that demonstrates the procedures result in properly evaluated weather reports that both certified sources and noncertified observers provide.

9.1 Appropriate Documents. Each certificate holder should provide its Principal Operations Inspector (POI) with a copy of the certificate holder's procedures for use by noncertified weather observers and interpreters of weather camera images, which the certificate holder will typically incorporate into its appropriate manual. Each certificate holder should also provide a training program syllabus based on these documented methods for personnel who will observe the weather or interpret the weather camera images.

9.2 OpSpec A010, Aviation Weather Information (for 14 CFR parts 121/135 and 135). Certificate holders requesting the use of noncertified weather observers should request amendment of OpSpec A010 to add the pertinent information in subparagraph e of the OpSpec.

10 CHARACTERISTICS OF NONCERTIFIED WEATHER OBSERVATIONS.

Weather characteristics that noncertified weather observers estimate or that are derived by interpretation from weather camera images by image interpreters always include visibility and cloud ceiling height, as the IAP always depicts these elements. The operator may also include other weather characteristics, such as wind speed and direction; type and intensity of precipitation; temperature and dewpoint; and presence of thunderstorms in the vicinity.

10.1 Determining Cloud Ceiling Height. Cloud ceiling height is an important weather element that operators must know when planning the execution of an instrument approach. Cloud ceiling is the base of the bottom-most of the broken (greater than 50 percent sky coverage) or overcast cloud layer. A noncertified weather observer does not estimate ceiling height, but instead determines whether the cloud ceiling is below approach minimums, which will result in the runway remaining obscured by clouds when the pilot has descended to the minimum allowable altitude. Techniques for estimating ceiling heights include, but are not limited to:

10.1.1 Terrain Features or Cultural (Man-Made) Landmarks. Where possible, observations should be based on the ability of the observer to see natural terrain or man-made features with a known height above the destination airport as viewed from a specified location, preferably at the destination airport. Nearby hills of sufficient height, with distinct terrain features (i.e., natural or man-made landmarks), can provide a consistent and repeatable means of estimating ceiling. For example, a notch in a ridgeline or a distinctly shaped outcropping, or a man-made object that is a known height above the airport corresponding to the minimum descent altitude, could be used to verify quickly and effectively that the ceiling is at or above minimums if an observer can see the object at a specified location on the ground. Conversely, if the object is not visible and horizontal visibility is not limiting, the ceiling must be below minimums.

10.1.2 Temperature/Dewpoint Spread. As moist, unstable air rises, clouds often form at the altitude where temperature and dewpoint reach the same value. When lifted, unsaturated air cools at a rate of 5.4 °F per 1,000 feet and the dewpoint temperature decreases at a rate of 1 °F per 1,000 feet. This results in a convergence of temperature and dewpoint at a rate of approximately 4.4 °F per 1,000 feet increase in altitude. Apply the convergence rate to the difference (or spread) between the reported surface temperature and dewpoint to determine the height of the cloud base.

Example: With an outside air temperature (OAT) of 85 °F at the surface and dewpoint at the surface of 71 °F, the spread is 14 °F. Divide the temperature/dewpoint spread by the convergence rate of 4.4 °F, and multiply by 1,000 to determine the approximate height of the cloud base.

85 °F – 71 °F = 14 °F
14 °F ÷ 4.4 °F = 3.18
3.18 × 1,000 = 3,180 feet above ground level (AGL)

The height of the cloud base is estimated to be 3,180 feet AGL.

10.1.3 Other Methods of Determining Ceiling Height. Other methods for determining ceiling height include:

1. Launching small balloons filled with hydrogen or helium and ballasted to a known lifting capacity (i.e., amount of weight the balloon can lift). The observer would launch the balloon and time its ascension, starting the time at release and stopping the time as it begins to disappear into the clouds above, and refer to a lookup table for that lifting capacity to determine the ceiling altitude corresponding to the time required for the balloon to climb into the cloud base. With appropriate simplified technique developed by the operator and with some practice, an observer should be able to determine the ceiling is at or above minimums within a few minutes at minimal cost. This technique is well suited for areas where there is no vertical ground close enough to be able to see a landmark part way up the slope. For example, a ceiling limitation corresponding to the minimum ceiling for an approach is 500 feet AGL. The observer inflates a balloon with helium. The observer attaches a thread to the balloon with a clip or with tape, with known consistent weights tied on intervals along the thread. For example, the observer sees the balloon can lift five weights (e.g., pennies, ½-inch diameter washers, finishing nails, etc.) but not six. The operator devised a lookup table for time to climb to minimums (500 feet) with a lifting capacity of three, four, five, or six weights. The table indicates the balloon that can lift five weights will reach 500 feet in 60 seconds. The observer refers to the appropriate table for a balloon that can lift five weights and removes the weights from the balloon, thus preparing the balloon for release. When the observer releases the balloon, the observer starts a timer (stopwatch or equivalent). When the balloon climbs into the overcast cloud layer, the observer stops the timer. The observer sees the hypothetical balloon took 67 seconds to climb into the overcast cloud layer. The time to climb 500 feet was 60 seconds, so the balloon was visible 7 seconds longer than if the ceiling was 500 feet. Therefore, the ceiling must be higher than 500 feet, and the observer would report the ceiling as greater than minimums.
2. The certificate holder may choose to invest in a ceilometer or a laser range finder capable of detecting the surface of clouds. Such equipment would only need to have the range necessary to reach and estimate the height of the ceiling if it were at or below minimums, probably less than 1,000 feet over flat terrain for any instrument approach application.

10.1.4 Cloud Types. The observer may, at the discretion of the operator, report the type of clouds (e.g., cumulus, stratus, etc.) constituting a ceiling as well as the presence of towering cumulus clouds in the area. The observer should provide the cardinal heading(s) from the airport toward the towering cumulus clouds and any observed direction of movement of those clouds. This may require the use of a compass.

10.2 **Determining Visibility.** The observer should also estimate visibility at the airport in the direction from which an arriving aircraft will approach, if known. In other words, if an aircraft will be landing on Runway 36, the observer should assess visibility to the south of the airport and on the airport.

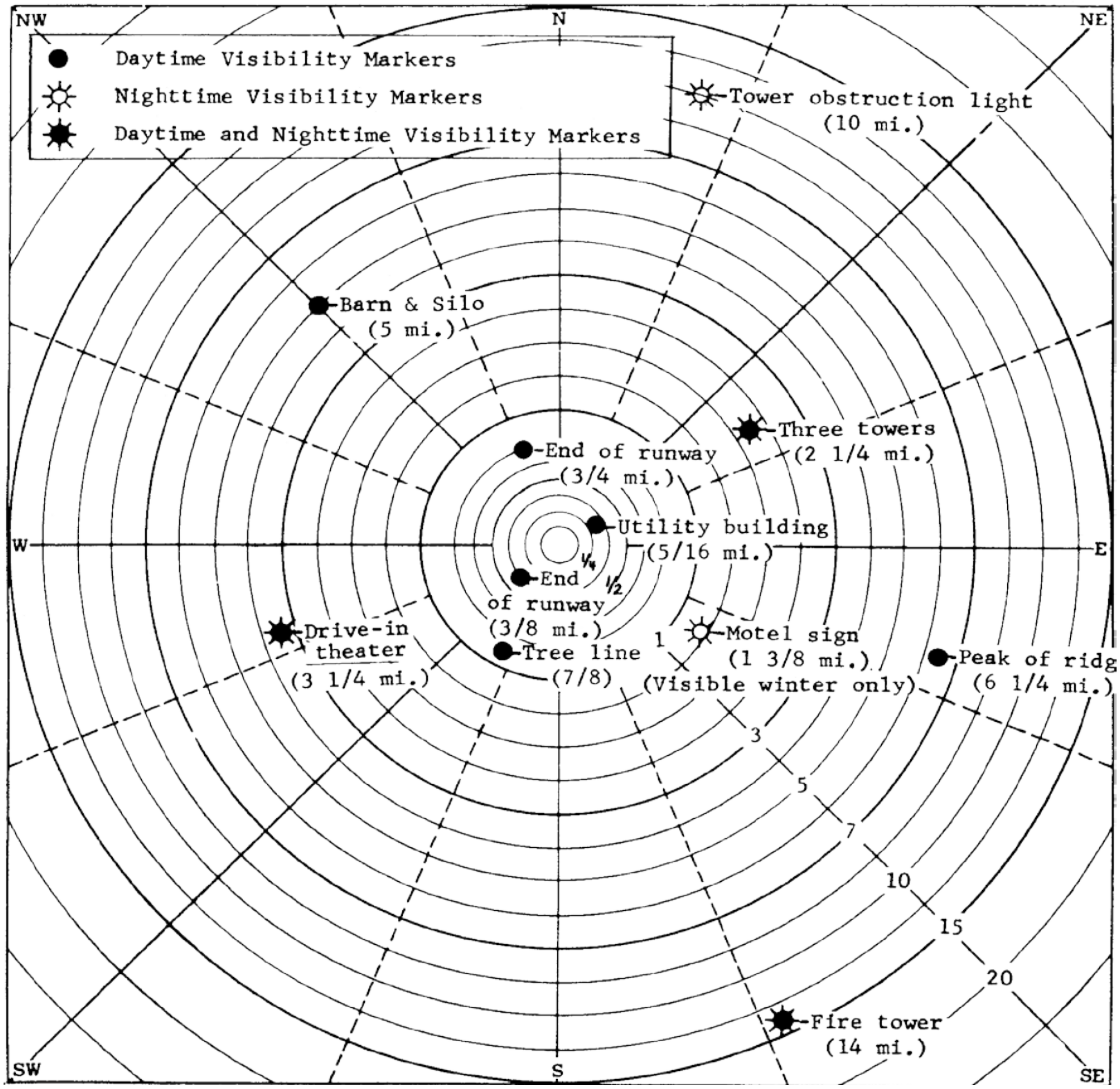
10.2.1 Surface Visibility. Observers can estimate surface visibility in a variety of ways. The most common estimating technique is based on measured distances between the observation location and known objects, such as the peak of a ridgeline, towers, tree lines, buildings, etc. Operators may choose to erect markers such as painted plywood panels that are easily visible at known distances corresponding to IAP visibility minimums. Bear in mind, however, that the objective of observing visibility is to determine that visibility meets or exceeds the minimum visibility that the relevant instrument approach requires; the observation does not necessarily need to be reported in actual distances.

10.2.2 Visibility Chart. As an aid for determining visibility around the airport, operators can develop a visibility chart. This chart should be posted near and centered at the point from which one observes visibility. This chart should list or otherwise indicate the location of all visibility markers, their distance from the station, and whether they are daytime or nighttime markers. It is also very important that the operator maintain this type of visibility chart.

10.2.2.1 Figure 1, Example VFR Visibility Chart, shows an example of a visual flight rules (VFR) visibility chart. An IFR chart may have only a few markers, at or slightly beyond the minimum visibility required for each IAP as viewed from the center observation point on the airport, or from the end of the runway in use beyond the approach end of the runway served by the approach.

10.2.2.2 When estimating IAP visibility minimums, do so from a common point on the airport or very close to the approach end of the runway in use. Bear in mind that the observer is estimating whether visibility meets or exceeds IAP minimum visibility, which is generally less than 2 miles; therefore, visibility targets should be sufficiently large so that an observer can see them at that distance in typical low lighting.

Figure 1. Example VFR Visibility Chart



10.2.2.3 Another visual aid would be a set of photos that depict known landmarks or locations of panels corresponding to the minimum visibility, a point beyond, and a point closer to the observer.

10.3 Determining Wind Speed and Direction. At airports without an automated wind speed and direction device such as an anemometer, estimates of wind direction and speed may be based upon the response of a calibrated windsock to wind or the appearance of wind effects on water, smoke, or vegetation (refer to the Beaufort Wind Scale). An observer may estimate wind direction based upon the required windsock, wind tee, or tetrahedron as available at the airport.

10.3.1 Windsocks. A limp windsock indicates calm air. A windsock that is fully extended alerts you of significantly windy conditions. A windsock should move freely about its vertical shaft and indicate the true wind direction within 5 degrees (plus or minus) when subjected to wind of 3 knots or more. A fully extended windsock should indicate surface wind of at least 15 knots. Therefore, a windsock that partially extends and fully extends, in an alternate manner, indicates gusting conditions with gusts up to or exceeding 15 knots. Windsocks that meet these specifications are available from a number of vendors.

10.3.2 Appearance of Wind Effects On Land.

Wind (mph)	Appearance of Wind Effects On Land
< 1	Calm, smoke rises vertically
1 – 3	Smoke drift indicates wind direction, wind vanes are still
4 – 5	Wind felt on face, leaves rustle, wind vanes begin to move
6 – 9	Leaves and small twigs constantly moving, light flags extended
10 – 14	Dust, leaves, and loose paper lifted, small tree branches move
15 – 18	Small trees in leaf begin to sway
19 – 23	Larger tree branches moving, whistling in wires
24 – 29	Whole trees moving, resistance felt walking against wind
30 – 35	Twigs breaking off trees, generally impedes progress
36 – 41	Slight structural damage occurs, slate blows off roofs

Note: In the absence of being able to provide a magnetic direction from which the wind is coming, observers should advise the pilot of which runway the wind favors and an estimation of the wind speed.

10.4 Other Significant Weather Characteristics.

10.4.1 Precipitation. Precipitation in any form poses a potential threat to safety of flight. The observer should warn the pilot via their observation report of any precipitation, such as snow, snow pellets, ice pellets, hail, mist, drizzle, or rain, along with the intensity of the precipitation. The observer should also warn the pilot of any form of precipitation that indicates freezing of liquid water on exposed surfaces or aloft in the lower atmosphere (i.e., freezing mist, drizzle, rain, or ice pellets) occurring on or near the airport. Methods of determining precipitation intensity may be found in the AMS Glossary of Meteorology under the term “rain.”

10.4.2 Altimeter Settings/Barometric Pressure. If no local altimeter setting source for the destination airport is available, the pilot may use the current altimeter setting that the facility designated on the approach chart for the destination airport provides.

10.4.3 Thunderstorms. The observer should also provide reports of the presence of any thunderstorm within 5 miles of the airport to the pilot along with any observed direction of movement of the storm, if possible. One can determine the approximate distance to the storm by counting the number of seconds between the flash of lightning and the sound of thunder. Divide the number of seconds by 5 to arrive at the approximate distance of the storm in miles.

11 USE OF WEATHER CAMERAS. An operator can use weather camera images to determine visibility and, when adequate references are available, the height above the airport of the bases of clouds. Operators should position weather cameras where there is a clear view of the approach end of the airport and ceiling and visibility landmarks. Cameras can be hard-mounted, mounted on a rotator, or hand-held, providing the individual holding the camera always aims the camera in a known and consistent manner. Weather camera image interpretation methods should be based upon photographic comparison standards. The operator should provide the observer interpreting FAA weather camera images or images from the operator's own camera with master images of key landmarks and features that must be visible to assess ceiling and visibility, and should provide the interpreter with sufficient resolution and visual references to estimate whether the instrument approach weather minimums are met or exceeded. Operators should exercise caution when utilizing weather camera images, as wind direction and speed and approaching adverse weather may not be observable or accurately assessed.

12 COMMUNICATIONS. The pilot should receive communications regarding weather observations either directly or through an operations controller or other company facility that will relay the appropriate information via radio, satellite phone, or other reliable means. The noncertified observer or the photo interpreter should estimate this information based on observations made or images captured within 30 minutes prior to departure and again within 30 minutes prior to the scheduled arrival of the flight at the destination, or when the weather is observed to change from at or above IAP minimums to below IAP minimums, or the opposite case.

13 TRAINING REQUIREMENTS.

13.1 Training and Testing. Before submitting a request for authorization to use noncertified local weather observations at airports without a destination METAR, operators should develop an appropriate training program and ensure that personnel who will be making the weather observations are appropriately trained on the topics outlined in paragraphs 10 and 11 above.

13.2 Training Topics. The FAA expects noncertified weather observation techniques may vary from destination to destination, depending upon the availability of natural terrain and landmarks.

13.2.1 Operators should base training on the accepted documented method for each location and should include repeatable and consistent methods of estimating:

- Whether cloud base height is at or above/below IAP minimums and cloud types;
- Whether visibility is at or above/below IAP minimums;
- Wind speed and direction;
- Types and intensities of precipitation; and
- Distance to thunderstorms.

13.2.2 The operator should provide training to weather observers about the following, consistent with the observer's responsibilities:

- Use of radio communication equipment and uniform noncertified weather reporting phraseology;
- Care and routine preventative maintenance and calibration verification (as appropriate) of any instruments, equipment, or photos, maps, or charts used;
- Requesting replenishment of supplies or replacement equipment, charts, maps, or comparison standard photos; and
- Circumstances under which the observer may not be able to provide accurate noncertified weather observations based upon missing, broken, or uncalibrated tools, instruments, or other equipment and comparison standards.

13.3 **Recurrent Training.** Operators should conduct recurrent training annually and emphasize those areas where pilots observe significant differences between reported weather and weather conditions actually experienced on each approach. As part of the procedures for en route and destination weather evaluation and for the purpose of continued refinement of noncertified weather reports, the operator should record and analyze differences between noncertified weather estimates provided by the noncertified weather observer and weather observed by the pilot.

14 **DOCUMENTATION OF PROCEDURES.** Operators using these procedures for en route and destination weather evaluation should document the procedures and incorporate those documented procedures into the GOM or other similar manual or resource the operator maintains so that pilots and noncertified weather reporting personnel use consistent methods for both requesting and providing weather information. Those not required to have a GOM should ensure that personnel who will provide noncertified weather information are trained in the appropriate subject areas and provide their observers and interpreters with appropriate references as needed to ensure consistency in estimates from time to time and from observer to observer.

15 AC FEEDBACK FORM. For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.

Robert C. Carty
Deputy Executive Director, Flight Standards Service

Advisory Circular Feedback Form

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the Air Transportation Division (AFS-200) at 9-AWA-AVS-AFS-200-Air-Transportation-Division@faa.gov or the Flight Standards Directives Management Officer at 9-AWA-AFB-120-Directives@faa.gov.

Subject: AC 135-45, Use of Noncertified Weather Observations in Noncontiguous States

Date: _____________________

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph ____________ on page _______.

☐ Recommend paragraph _____________ on page __________ be changed as follows:

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☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

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☐ Other comments:

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☐ I would like to discuss the above. Please contact me.

Submitted by: ________________________________ Date: ______________________