

Factual Report – Attachment 4

Correspondence with the National Weather Service.

METEOROLOGY

WPR19FA084

*Submitted by: Mike Richards
NTSB, AS-30*

Richards Michael

----- Forwarded message -----

From: **Curt Janota - NOAA Federal** [REDACTED]
Date: Fri, Apr 12, 2019 at 4:35 PM
Subject: Re: CRITICAL NTSB REQUEST: AOMC Trouble Ticket/Log Files for KELY from January 1 to March 15, 2019
To: Lora Wilson - NOAA Federal [REDACTED], Curt Janota <[REDACTED]>
Cc: Susan M Murphy - NOAA Federal [REDACTED], Patrick O'Reilly - NOAA Federal [REDACTED]
[REDACTED]

My replies are below...

Curt

On Fri, Apr 12, 2019 at 3:30 PM Lora Wilson - NOAA Federal <[REDACTED]> wrote:

Hi again Curt!

So, the information you provided was exactly what NTSB needed to start connecting things. Unfortunately, this case is looking to be very convoluted and every answer we get leads to more questions. So, below are a couple more request with regards to the daily emails to the WFOs and Regions that you mentioned as well as some followup questions on the trouble tickets, specifically ticket #901210056. **None of this has to be completed today!** You can definitely work on it next week as operational shifts allow. Also, it may actually be easier to do some of it in a call with the NTSB meteorologist. If you feel comfortable with that, just let me know and I can get it set up. But it's entirely up to you.

So first request is related to the daily emails - **they would like to have any emails related to the KELY ASOS between 20 Jan 2019 – 16 Mar 2019, to WFOs or other entities, automated or not.** If emails can be extracted into a folder (such as Google Drive or zip file) that can work. If it's easier to send them individually we'll go that route. Whatever is easiest for you is what we will work with! Just let me know your preference. And **if there are any other types of records on communication or action regarding the KELY ASOS during this timeframe from AOMC, NTSB needs it.**

I will work on this.

Second, questions from them:

- *Can we confirm all times in the tickets (.pdf) are UTC? **Yes, all times are UTC***
- *It appears tickets (in general) are opened because AOMC dialed in to an ASOS and found something. What prompts AOMC to dial in to an ASOS? Is it random? Or are there specific notifications or indications? Particularly for ticket #s: 901210056, 902200337, 903020257 and 903050158.*

All observations are received into the NWS Telecommunications Gateway (NWSTG) and are routed around the world. As the observations go through the system, a routine looks for a \$ at the end of the METAR. If it has a \$, a copy of the METAR is put into a file. Every 5 minutes (approx), that file is moved to an ftp folder. A routine runs every 4 minutes looking to see if a new file has been placed on the ftp server. If so, then each METAR in the file is parsed. When the script finds a bit of missing data from the METAR, it looks to see if there is already a ticket open for that site for that

sensor. If so, it skips it and continues to parse the METAR. When it finds a new issue, it opens a trouble ticket in EM7. The queue is set to "AOMC_unacknowledged". The AOMC controllers review all of the tickets within the "AOMC_unacknowledged" queue. If needed, they log onto the site, review the logs, and see if they can fix the issue remotely (there are a limited number of conditions that they are allowed to fix remotely). If the issue requires a WFO tech to fix it, the queue is changed to "AOMC_WFO". If it is a long line comms issue, it is placed in the "AOMC_FAA" queue. Depending upon the severity of the issue, the AOMC controller will call the WFO to report the issue. So, the AOMC only dials into the site when the script automatically opens a ticket.

For 901210056, the script used the following METAR...

KELY 210553Z AUTO 16014KT 10SM CLR 03/M02 A2973 RMK AO2 SLP041 T00281022 10056 20017 \$
It couldn't find any missing sensor data, so it open the ticket as "OTHER". The AOMC controller dialed into the site and found that the site had experienced a "warm start" which is the equivalent to rebooting a computer.

For 902200337, the script used the following METAR...

KELY 202053Z AUTO 05003KT BKN039 OVC045 M03/M11 A2959 RMK AO2 SLP068 60000 T10331111 58020 \$
It determined that visibility was missing so it opened a Priority 1 ticket for VIS.

For 903020257, the script used the following METAR...

KELY 022246Z AUTO 00000KT - SN FEW004 OVC024 M01/M01 A2982 RMK AO2 P0002 T10061011 \$
It determined that visibility was missing so it opened a Priority 1 ticket for VIS.

For 903050158, the script used the following METAR...

KELY 051253Z AUTO 22009KT BKN043 02/M01 A3007 RMK AO2 SLP170 T00171011 \$
It determined that visibility was missing so it opened a Priority 1 ticket for VIS.

- *For ticket # 901210056...*
 - *What is "CL31"? The ceilometer (determines cloud height)*
 - *What position/where does "OBS" refer to in general? OBS is the manual observer at the airport*
 - *On 2019-1-22 at 15:49:59 it says the ticket was closed. It was cleared remotely by "SJL" at 1532Z. What does this mean? Did someone (perhaps SJL) call the AOMC to inform that the problem has been fixed, and therefore AOMC closed the ticket? What does "cleared remotely" mean? And what item was "cleared"?*

SJL is the WFO Technician (Steven Leedy). At 01/22/19 1532Z Steven sent an email to AOMC saying that he remotely cleared the alerts. By remotely, it means that the WFO Electronics Technician (EI Tech or ET) dialed into the site and cleared the alert flags. This is usually done when the EI Tech sees from the logs that it's probably not a hardware failure that requires an on site visit. They may have rebooted the system. They may have noticed that readings looked correct now and attributed it to some brief issue (like maybe a bird landed on the visibility sensor, (s)he saw a power spike in the logs, or some other issue that was brief in nature. etc). In this case, SJL did not specify what (s)he determined to be the nature of the issue, just that the flags were removed. In most cases, the EI Tech will reset the flag, wait for an observation to be taken, and verify that the flag did not return. From what info was provided by the EI Tech, there is no way for the AOMC to know if this was done or not - the WFOs have a set of standard operating procedures that the EI Tech follows.

- *Aside from working with the local WFOs, who does the AOMC advise/alert on ASOS issues, either within NWS or external? How are those communications made and when?*

The AOMC really only interacts with the WFO. If the issue is a long line comm issue (how the METAR is sent from the ASOS site), the AOMC still calls the WFO who in turn coordinates with the FAA for repair. This was not the case for any of the tickets mentioned in this email. An automated report is also sent to the Western Region at 1255Z (4:55 a.m. PDT)

and 1955Z (11:55 a.m. PDT) that simply lists the current open ticket without any details apart from the ticket number, when the ticket was opened, the WFO responsible, and the summary of the ticket.

- *Was there any notification to any NWS (aside from the WFO) or external entity on the KELY ASOS between 20 Jan 2019 – 16 Mar 2019? If so, can you provide records of these communications, or if those don't exist, describe what happened?*

The only contact would have been with the WFO and the summary emails to the Western Region.

I'm fairly certain CL31 is the ceilometer, but I'll let you answer that just in case I'm wrong in this situation.

Thank you so much for your help with this! It is very appreciated! If you have any questions, please let me know!

Thanks,
Lora

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Curt Janota
IT Specialist
NWS/NCEP/NCO
Operational Monitoring Branch


Richards Michael

From: Lora Wilson - NOAA Federal <[REDACTED]>
Sent: Wednesday, May 1, 2019 16:27
To: Richards Michael [REDACTED]; Little Thomas [REDACTED]
Subject: Info from WFO LKN

Mike, Tom,

Some information that I just got passed over to me from Steve:

There was a question asking if we had visited the KELLY ASOS prior to January 21. After reviewing the EMRS maintenance log technicians were on site the following dates:

12/03/2019 Replaced Visibility cross arm assembly
12/07/2018 Removed and replaced Visibility transmitter
12/12/2018 Inspected the ASOS tilt-over towers in order to identify corrosion on the pivot pin. I.A.W.
ASOS Maint Note 109.

Let me know if you have any questions!

Lora

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Program Manager,
NWS Forensic Services.
Aviation Training and QMS

NWS Analyze, Forecast and Support Office/AFS24
Aviation and Space Weather Services Branch
Office Phone [REDACTED]

Forensic science has been called the art of observation governed by the rules of science - Stuart James

Richards Michael

----- Forwarded message -----

From: **Steven Leedy - NOAA Federal** <[REDACTED]>

Date: Wed, May 15, 2019 at 2:35 PM

Subject: Additional Questions for NTSB Investigation

To: Lora Wilson - NOAA Federal <[REDACTED]>

Cc: James Beavers <[REDACTED]>, Joseph Roberts <[REDACTED]>

Lora,

Please find below the responses to the requested questions. I have referenced the AOMC ticket EM7 program and the System log from the KELY site as well as verification of travel from our station time-sheets. Please let me know if you have any further question, Thank you.

1. From January 2019 through April 2019, could you list all parts you replaced on the Ely NV visibility sensor (example: receiver, transmitter, 5 volt power supply, etc...)?

27 February 2019 S100-2MT5A2A3 OPTICAL TRANSMITTER

27 February 2019 S100-2MT5A2A4 DETECTOR, OPTICAL

14 March 2019 S100-2MT5A1A1 CONTROLLER

2. From January 2019 through April 2019, was there a failure flag "F" on the visibility sensor maintenance page? If yes, what was the date(s)?

05 March 2019 AOMC ticket 903020257 AOMC dialed into the site and found 1 Sensor Status failure, 1 Vis Quality failure, 1 Photo Quality failure on Visibility #1.

19 April 2019 AOMC ticket 904190294 1. Open Ticket, AOMC remotely dialed into the site and found that on DCP#1 that the IFW sensor has an multiple failures

flags on
Response (1) and Power Status AOMC also found multiple errors flags on Data Quality (1), Heater Voltage (1),
Array
Resistance (1) and Incoming Supply Volt (1)

Sensor
Heater

2. AOMC also found that the DCP#1 had multiple error flags on the Visibility #1 sensor for Vis Quality, Sensor Response and Power Status.

3. AOMC also found that DCP #1 has an error flag on the DCP#1/UPS for ON AC Line.

3. From January 2019 through April 2019, was there a condition "C" on the visibility maintenance page? If yes, what was the date(s)?

02 March 2019 AOMC ticket 903020257 AOMC dialed into the site and found multiple errors on VIS#1.

05 March 2019 AOMC ticket 903020257 @1237Z received an email from NSB (Dereje Yadeta) stating: Alert received during maintenance window from 03/05/2019 3:29 - 03/05/2019 3:40am. Site has been up and stable since. This ticket is ok to close....(JAG)

4. From January 2019 through April 2019 during remote dial-in to the site, did the ESA or ETs performed a remote power cycle of the visibility sensor? If yes, what was the date(s)?

05 March 2019 SJL (ESA) logged on as technician from OID#5 No record to show power cycle was performed. My standard practice for Failure flags would be to power cycle and test the sensor and if all passes the sensor would be considered to be good.

19 April 2019 JEB (ET) logged on as technician from OID#5 (traveled to the KELY ASOS)

19 April 2019 JEB logged on as technician from OID#1 (confirmed on site via station time-sheet)

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Steven J. Leedy, USCG, (Ret.)

Electronic System Analyst
National Weather Service

██████████
Elko, NV 89801
██████████

Richards Michael

----- Forwarded message -----

From: **Chet Schmitt - NOAA Federal** <[REDACTED]>
Date: Mon, May 13, 2019 at 2:00 PM
Subject: Re: ASOS Questions for NTSB Investigation
To: Lora Wilson - NOAA Federal <[REDACTED]>
Cc: Kelvin Xu <[REDACTED]>, James Heil - NOAA Federal <[REDACTED]>, Thomas Day - NOAA Federal <[REDACTED]>, Mark Miller - NOAA Federal <[REDACTED]>

Hi Lora,

There is a mis-labeling of one of the data files: ELY_OMO.txt. ELY_OMO.txt does not contain one-minute observation data (OMO), it contains 1-minute sensor data. The difference between the two is subtle but significant: OMO are fully processed observations ASOS produces once per minute, meaning that the temperatures/dewpoints are 5-minute averages and the present weather is output from the rather complex, multi-part present weather algorithm. The 1-minute data, which is contained in ELY_OMO.txt, is raw sensor data (in the case of present weather) and minimally processed data (in the case of temp/dew...the temp/dew listed are 1-minute averages of 10-second readings). I have offered answers to the questions raised below:

Can we confirm this means the ELY ASOS was calculating "heavy snow" for that one minute report (and the ones following)?

The S+ at 0146Z is the present weather sensor reading at that minute, not what ASOS is reporting. ASOS does not report present weather readings, but uses the most recent 10 readings (among other data) to determine the presence and type of precipitation occurring and uses the last 5 present weather readings to determine the intensity. For snow, the intensity is adjusted based on the visibility (since snow intensity is visibility based). In this case, the most recent 5 readings were S, S, S, S+, S+. In this case, ASOS would have moderate snow based on sensor output. However, ASOS checks this intensity against the visibility and adjusts it if necessary to comply with the FMH-1 reporting standards for snow intensity. Looking at the visibility sensor data (from the so-called "page one" data, attached), an extinction co-efficient of 0.050, a photometer reading of N (night) and the presence of snow in the present weather field, ASOS would have reported a visibility of 9SM. (recall that ASOS visibility is the 10-minute harmonic mean of 1-minute visibility values...in this case, all 10 minutes worth of visibility data was the same). Thus, ASOS would have set the snow intensity to light (moderate snow by definition must reduce visibility to below 3/4SM and heavy snow must reduce visibility to below 1/4SM).

Therefore, **ASOS would have reported light snow (-SN) at 146Z on 2/16.**

If this is correct, why does the OMO data during that and the following times report heavy snow, when the five minute data and METARs/SPECIs are only reporting light snow during the period (other data also attached)?

The data in the ELY_OMO.txt is sensor data, not one-minute observations. One/five-minute data, METARs and SPECI data are processed observational data. Again, ASOS uses the most recent 10 present weather sensor readings to determine the presence and type of precipitation, then uses the last 5 readings to determine the intensity. For snow, the intensity is adjusted based on the visibility pursuant to the standards specified in the FMH-1.

Would a listener to ELY on either VHF or telephone during these times be receiving the same (partial) OMO data as reflected in the "page two" data attached? Or would they be receiving other information, and if so, what would that be?

The page two data is used, in conjunction with other data, to produce the elements of the observations. The page two data itself is never broadcast or disseminated.

The ASOS voice broadcast (both telephone and VHF) can be set to either broadcast last METAR/SPECI or last one-minute observation. I dialed into KELY today (5/13/2019), and it is set to last one-minute observation.

Below is the ELY SPECI criteria as provided by the ESA at the Elko WFO. What does "user's visibility" refer to? How are SPECI criteria at a particular ASOS site chosen? What are the factors in determining? Does FAA order 7900.5 factor in (i.e., approach minimums) and are monitored for changes in the approaches? Does it matter if the ASOS is augmented by an observer or not?

In addition to the SPECI criteria specified in FMH-1 (3SM, 2SM and 1SM), ASOS allows additional values to generate SPECIs based on local operational needs. These are the user's visibility. At KELY, ASOS will generate SPECIs when the visibility drops to/below or rises to/above 1/2SM and 1 1/2SM. It does not matter if the visibility change is automated or due to editing/augmentation.

Pending answer to the OMO questions above, if visibility and/or sky condition are reporting erroneously in the hourlies, 5-min and/or OMO data, could that be a factor in automated SPECIs not being issued when they should be, or automated SPECIs being issued when they shouldn't be (considering actual conditions on field)?

Yes, erroneous observational elements can and do affect the issuance of automated SPECIs. The generation of automated SPECIs is particularly sensitive to the visibility and sky condition reports.

Hope this helps. If you have any other questions, please let me know.

Chet

Richards Michael

----- Forwarded message -----

From: **Steven Leedy - NOAA Federal** <[REDACTED]>

Date: Fri, May 3, 2019 at 11:28 AM

Subject: LKN KELY ASOS Special criteria

To: Lora Wilson - NOAA Federal <[REDACTED]>

Lora,

Please find below the special criteria settings for the KELY ASOS. Please let me know if you have any questions.

ELY AIRPORT (YELLAND FIELD)

CRITERIA FOR SPECIAL ALERTS

SKY CONDITION:

CEILING AT OR BELOW	3000	1500	1000	500	FEET
USER'S CEILING AT OR BELOW	0	0	0	0	0

LAYERS BELOW	1000	FEET
USER'S LAYERS BELOW	0	0

VISIBILITY:	3	2	1	MILES
USER'S VISIBILITY	1/2	1	1/2	

RVR:	FEET
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Steven J. Leedy, USCG, (Ret.)

Electronic System Analyst

National Weather Service

[REDACTED]
Elko, NV 89801
[REDACTED]

Richards Michael

From: Chet Schmitt - NOAA Federal <[REDACTED]>
Sent: Thursday, November 7, 2019 21:41
To: Richards Michael <[REDACTED]>
Cc: Lora J. Wilson - NWS Federal <[REDACTED]>
Subject: Re: ASOS Questions for NTSB Investigation - ELY

Hi Mike,

No problem...we are always happy to support NTSB in any way possible. Below, please find the answers to the questions you had raised.

Q1 - Regarding your comments about snowfall intensity reporting below, I have attached both "page one" and "page two" sensor-level ELY ASOS data for the time period 1640-1730 PST on 15 February 2019. Based on your comments I believe that this ASOS would have reported light snow (-SN) for each minute where an "S" is present in the "page two" data but not anywhere else. Would this be correct?

A1: Almost correct....ASOS uses the most recent 10 minutes of present weather sensor data to determine the precipitation type. If two or more minutes of the data over the past 10 minutes are reporting snow, then the precip type will be snow (ASOS needs the present weather sensor to report precipitation for at least 2 out of the last 10 minutes before precipitation will be reported by ASOS). ASOS uses the past 5 minutes of present weather sensor data to determine the precipitation intensity using what is known as the "high three common" method (explanation of this method can be found below). For snow, ASOS will adjust the precipitation based on the visibility if needed pursuant to the reporting standards specified in FMH-1 (ASOS will adjust +SN to SN if the visibility is between 1/4 and 3/4SM, +SN to -SN if the visibility is greater than or equal to 3/4SM, and adjust SN to -SN if the visibility is greater than or equal to 3/4SM).

So, if the intensity did NOT need to be adjusted based on visibility, ASOS would have reported -SN from 1702 LST thru 1711 LST and again from 1714 LST thru 1720 LST. From 1721 to 1730, ASOS would have reported SN.

However, since ASOS was reporting a visibility of 9SM, ASOS would have reported -SN from 1702 LST thru 1711 LST and again from 1714 LST thru 1730 LST

Q2 - Is there anything whatsoever we can infer/determine about what **should** have been reported (what real conditions were) either in visibility or precipitation type/intensity, which may not have been reported in OMO during this period due to visibility measurement issues? I am guessing this is impossible but worth the ask....

Your guess is correct. Since there is no way to verify which sensor (visibility or present weather) was erroneous or if either sensor was erroneous with the information available at the time of observation, there would be no way to determine what should have been reported.

Q3 - Related to the question just above, I am trying to determine if a SPECI should have been triggered based on "real" visibility conditions but wasn't (3SM, 2SM, 1SM, 1 1/2SM, 1/2SM being the criteria for ELY). Impossible too?

There is no way to know with the information available at the time of observation since there is no way to know if/when the visibility had indeed crossed those SPECI thresholds.

If there are any other questions, please let me know.

Chet

"high three common" method explained

Common intensity is defined as follows:

HEAVY precipitation includes common intensities of: HEAVY, MODERATE, LIGHT

MODERATE precipitation includes common intensities of: MODERATE, LIGHT

LIGHT precipitation includes common intensity of: LIGHT

ASOS uses the highest intensity common to at least three minutes of data. So, if the past five minutes of precipitation data are S- S+ S S S-, the highest three common intensities are moderate (the S+ and two Ss include moderate, the highest intensity common to at least three minutes of data). If the past five minutes of precipitation data are S+ S+ S+ S S-, the highest three common intensities are heavy. If the past five minutes of precipitation data are S- S+ S S- S-, the highest three common intensities are light. If there are not three common intensities, then the precipitation intensity will be considered "light".

Richards Michael

From: Mark Miller - NOAA Federal [REDACTED]
Date: Wed, Oct 9, 2019 at 4:04 PM
Subject: RE: NTSB Investigation - ASOS Spare Parts List History and Requirement Questions
To: Lora Wilson - NOAA Federal <[REDACTED]> Thomas Day - NOAA Federal [REDACTED]
Tommy Thompson Sr. - NOAA Federal [REDACTED] Chet Schmitt - NOAA Federal
<[REDACTED]>, Joseph Devost - NOAA Federal [REDACTED]

Lora,

Per NWS-PD 30-22, dated 18 November 2009:

The National Weather Service (NWS) must install, configure, maintain, and modify systems and equipment to function in a safe and effective manner. Comprehensive instructions and information in Technical Orders (TO) help achieve this goal.

TOs are official orders issued in the name of the Director (or designee), Office of Operational Systems (OPS) {now Office of Observations for ASOS}, and by order of the Assistant Administrator (AA) for Weather Services. Compliance with NWS TOs is mandatory, except as explained in TO documentation. This directive establishes the TO system.

The NWS will not field systems (hardware or software) to be operated and maintained without TOs procured and verified. TOs for specific systems and commodities take precedence over general TOs.

Terms

Technical Order (TO): Official orders issued in the name of the Director (or designee), Office of Operational Systems and by order of the Assistant Administrator for Weather Services (AA). These documents include systems and equipment manuals (handbooks), maintenance and modification notes, system administrative notes, software notes, contractor interface notes, system information notes, software patch instructions, and technical information packages.

NWS follows NWS Policy. The following is the pedigree of ASOS Maintenance Note 18, a Technical Order that provides ASOS Maintenance Policy with regard to Spare Parts Kits.

- Engineering Handbook 11, volume2 established the Automated Surface Observing system (ASOS) Spares Kit in ASOS Maintenance Note 18 on 12 May 1995.

- December 4, 1995, ASOS Errata Sheet 1 provided page replacement and page addition for ASOS Maintenance Note 18.
- March 1999, Errata Sheet 2 is missing but is referenced in Errata Sheet 3.
- February 4, 2000, ASOS Errata Sheet 3 references Errata Sheet 2 with instructions to replace Errata Sheet 2 with Errata Sheet 3. It is reasonable to assume the Mini Spares Kit was established in ASOS Errata Sheet 2. The Mini Spares Kit contained 26 items in March of 1999. In December of 1999, 42 additional items were added for a total of 93 items on the Mini Spares Kit List.
- August 27, 2008, ASOS Maintenance Note 18, Revision A is released superseding the original ASOS Maintenance Note of 1995.

Defining Errata: as a list of errors and their corrections inserted, usually on a separate page or slip of paper, in a book or other publication. We can infer the ASOS Maintenance Note 18 Errata sheets were corrections to the original Maintenance Note 18 issued establishing the Spare Parts Kit part number listing. ASOS Maintenance Note 18 Revision A replaces ASOS Maintenance Note 18 and all erratum associated with it. ASOS Maintenance Note 18 Revision A is under review and will be revised concurrent with the ASOS ACU/DCP/SCA upgrade project.

If you have any further questions, POC for this response is my PM for ASOS, Mr. Ken Boutin.

v/r

Mark

Mark B. Miller

Director, Surface & Upper Air Division

Office of Observations

NOAA National Weather Service

[REDACTED]

[REDACTED]

[REDACTED]

Cell: [REDACTED]

[REDACTED]

From: Lora J. Wilson - NWS Federal [REDACTED]
Sent: Tuesday, October 1, 2019 1:14 PM
To: Thomas Day - NOAA Federal <[REDACTED]>; Mark Miller - NOAA Federal [REDACTED]
Tommy Thompson Sr. - NOAA Federal [REDACTED] Chet Schmitt - NOAA Federal [REDACTED]
<[REDACTED]> Joseph Devost - NOAA Federal <[REDACTED]>
Subject: NTSB Investigation - ASOS Spare Parts List History and Requirement Questions

Good afternoon,

As part of an ongoing NTSB investigation into a fatal aviation accident, we are working to try and run down information on the ASOS spare parts list(s) and need some additional clarification. During conversations with various ASOS experts, we have become aware of the ASOS Maintenance Note 18, Revision A that was signed by Mark Paese back in 2008. It is our understanding that this document lists all the spare parts a WFO is required to have on-station (attached).

However, during multiple conversations, a "mini" list has been mentioned (attached) and it appears that some offices may be using this list along with additional "anecdotal" information (e.g., number of TAF sites, airport service level, etc) in order to justify keeping a smaller number of spare parts on hand. This "mini" list has a date of 2000 which indicates to me that it has been superseded by the 2008 maintenance note. However, it appears that some are still going off the "mini" list.

- Does anyone know the history of this "mini" list so that we can understand context?
- Does the 2008 maintenance note supersede the "mini" list as I'm assuming it does?
- Are the parts listed in the 2008 maintenance note truly REQUIRED or is it a suggested list and WFOs can make their own determination on what to keep on-station based on local knowledge and history?

Thanks for any assistance you can provide so that we can better understand what these lists were designed for and how they are expected to be used.

Lora

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Lora J. Wilson

Program Manager,

NWS Forensic Services

and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24

Aviation and Space Weather Services Branch

Office Phone: [REDACTED]

Forensic science has been called the art of observation governed by the rules of science - Stuart James

Richards Michael

From: Steven Leedy - NOAA Federal <[REDACTED]>
Date: Fri, Oct 18, 2019 at 3:02 PM
Subject: Re: Few More Questions from ELY Aircraft Accident for NTSB Investigation
To: Lora J. Wilson - NWS Federal <[REDACTED]>
Cc: Gregory Barnhart <[REDACTED]>

Lora,

We had some spare parts available here at the WFO when I got here and I assumed that was our allotted spare parts. The process with ordering spare parts replacements and non-spare parts replacements was through the return parts program (order a part from NRC send a defective part back to them for repair and place back in to their stock). It could have been the mini parts kit we got originally but I can not confirm that any ware. We are going to inventory our parts against the Note 18A list and request the needed parts through our Regional office for initial issue rather than repair/return.

On Fri, Oct 18, 2019 at 10:21 AM Lora J. Wilson - NWS Federal <[REDACTED]> wrote:

Great! This is good to know. So if you weren't aware of this maint note, was there any type of WRH requirement or standard that y'all were using there to stock spare parts? Or was it just based on historical experience between you and the ETs?

Thanks,
Lora

On Fri, Oct 18, 2019 at 11:57 AM Steven Leedy - NOAA Federal <[REDACTED]> wrote:

Lora,

I was made aware of this note last September when another WFO was looking for a spare parts list. I do not recall receiving this Maintenance Note in 2008. Looking at the note there is no direction as to purchasing the needed parts or who is responsible for supplying the needed parts. I will look into this further and find out what transpired during that time period. I was not aware of this Maintenance note though until September 2019.

On Thu, Oct 17, 2019 at 2:26 PM Lora J. Wilson - NWS Federal <[REDACTED]> wrote:

Hi Steve!

I have a couple more questions for you as part of the NTSB investigation into that fatal aircraft accident that occurred back in February. During the course of the investigation, we learned about the ASOS Maintenance Note 18, Revision A (attached) that was signed by Mark Paese back in 2008 that outlines ASOS spare parts required to be on-station.

- Is your office aware of this maintenance note and the requirement to maintain all these spare parts?
- If so, is there any reason that your office might deviate from it (e.g., regional requirements that differ from national requirements, the old mini-spare parts list, etc)?

From previous conversations during the investigation, it was indicated that y'all had to order the parts for the ELY ASOS which indicates y'all didn't have them on-station at the time. So, we're just trying to understand why so we don't make any assumptions.

Let me know if you have any questions!

Thanks,
Lora

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Lora J. Wilson

Program Manager,
NWS Forensic Services
and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24
Aviation and Space Weather Services Branch
Office Phone: [REDACTED]

Forensic science has been called the art of observation governed by the rules of science - Stuart James

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Steven J. Leedy, USCG, (Ret.)

Electronic System Analyst
National Weather Service
[REDACTED]

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Steven J. Leedy, USCG, (Ret.)

Electronic System Analyst
National Weather Service
[REDACTED]

Richards Michael

From: Tommy Thompson Sr. - NOAA Federal <[REDACTED]>
Sent: Tuesday, July 16, 2019 12:41 PM
To: Lora Wilson - NOAA Federal <[REDACTED]>; Richards Michael <[REDACTED]>; Arthur Patrick <[REDACTED]>
Subject: Fwd: [REQUEST] TT# 902060013 Data Report

Team,

Per your request, please review the content within this email threat.

Let me know if you need anything else.

Respectfully,

Tommy Thompson, Sr.

CISSP, CAP, CISA, CISM, CRISC, FITSP M/A, ITILv3
AOMC Lead
IT Security Program Manager
Surface and Upper Air Division
Office of Observation
National Weather Service
[REDACTED] Office,
[REDACTED] Cell

----- Forwarded message -----

From: Aomc Aomc - NOAA Service Account <[REDACTED]>
Date: Tue, Jul 16, 2019 at 1:12 PM
Subject: Re: [REQUEST] TT# 902060013 Data Report
To: Tommy Thompson Sr. - NOAA Federal <[REDACTED]>

Hello Tommy,

Brandon here, I found the TT you referenced and below is a copy/paste of the info and notes on that ticket:

Ticket Properties

Ticket Description ASOS KELLY - VIS - WFO: LKN
Ticket State [[Default] V]
Status [[Resolved] V]
Severity [[AOMC - Priority 1 (Service Level A, B, C)] V]
Category [[--] V]
Source [[--] V]
Queue[[AOMC_WFO] V]
Assigned User [[dblack] V]
TOC Ticket
Carrier Ticket
NCIRT Ticket
Other Ticket
Tier II Called[]
NOC Tier II Group [[none] V]

Notes & Attachments

#1) Date [2019-02-06 00:44:13] | User [dblack] | Address [REDACTED]

Site Identifier: KELY ;Location: Ely, NV ;AOMC/RMM ID: KELY
Class: C1 Small ;SvcLvl: D ;Agency: FAA ;Region: WRH ;Office: WFO LKN (Elko, NV) ;OCC:
AFOS PIL/WMO Header: LKNMTRELY ;LongLineComms: ZDC ;ALDARS Site: NO
Equipment: VIS1 ;Type: C
Point of Contact: Steven Leedy [REDACTED]
Maintenance Type: Corrective
Ticket Type: Maintenance

----- Filled in upon resolution -----
Action Taken: ____ ;HOMAL: ____ ;Tech's ID: ____
Resolution Date: ____ ;(MM/DD/YY) Resolution Time: ____ ;(HHMMZ)
Serial Number: #####

edited via automated script

#2) Date [2019-02-06 00:44:13] | User [dblack] | Address [REDACTED]

opened ticket. NEMC (RC) reporting VIS and WIND are unreliable. WFO (DP) contacted.

#3) Date [2019-02-25 21:49:26] | User [gerald.floyd] | Address [REDACTED]

Updated ticket. Tech (SJL) unable to visit site due to high WINDS. They will attempt later this week.

#4) Date [2019-02-27 22:10:39] | User [dblack] | Address [REDACTED]

WFO: LKN , SJL 2153Z, Technicians visited the site and repaired the visibility sensor

Richards Michael

----- Forwarded message -----

From: Kenneth Boutin - NOAA Federal [REDACTED]
Date: Tue, Nov 19, 2019 at 3:55 PM
Subject: RE: NTSB Request: Question Regarding Outage Determinations
To: Lora J. Wilson - NWS Federal <[REDACTED]>

Hello Lora,

Question 1. Very simply we follow NWS Instruction 30-2111 for maintenance. The AOMC opens a ticket based on information from either an operator, technician or the system itself and then personnel follow the instruction. The instruction categorizes and prioritizes the maintenance response depending on the sensor that fails and/or the service level of the aerodrome. An outage doesn't necessarily mean that the system isn't at least partially operational; for example if the wind sensor goes down, that has no effect on the temperature, dew point, altimeter etc. and the METAR will still be generated but the wind data will be missing.

Question 2. No it would not be an outage. Local operations personnel in the vicinity of the ASOS would probably be the only ones to notice this "appears to not be representative of current conditions" issue you mention. They would also have to have training and experience to make this determination as well i.e. operations personnel, weather observers and ATC.

Yes report processing can be turned off, I am looking into what operational occasions this would be done. The SYSLOG audits each and every system activity so you can apply forensics analysis to the syslog to determine this as well.

More to follow.

Very Respectfully,

Ken Boutin

Program Manager

Automated Surface Observing System

National Oceanic & Atmospheric Administration
National Weather Service
Office of Observations

Surface and Upper Air Division

[REDACTED]

[REDACTED]

Cell [REDACTED]

From: Lora J. Wilson - NWS Federal [REDACTED]
Sent: Tuesday, November 19, 2019 1:35 PM
To: Kenneth Boutin - NOAA Affiliate [REDACTED]
Subject: NTSB Request: Question Regarding Outage Determinations

Hi Ken,

I have a couple more questions for you that we need some clarification on from the investigation into the ELY fatal aviation accident. So, two questions are:

1. What is the definition of an ASOS outage?
2. Additionally, if given a situation where office staff observes that an ASOS appears to not be representative of current conditions however there is no maintenance equipment failure/flag noted in the systems, is this considered an outage? Also note, the ASOS is located 3-4 hours away, so a simple glance out the window is not possible.

We understand that report processing can be turned off. We looking for definitions that might precede this action.

Thanks,

Lora

--

Lora J. Wilson, MPAL, MPharm,

Program Manager,

NWS Forensic Services

and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24

Aviation and Space Weather Services Branch

Office Phone: [REDACTED]

Forensic science has been called the art of observation governed by the rules of science - Stuart James

Richards Michael

----- Forwarded message -----

From: **Kenneth Boutin - NOAA Federal** <[REDACTED]>
Date: Wed, Nov 20, 2019 at 9:18 AM
Subject: FW: FW: NTSB Request: Question Regarding Outage Determinations
To: Lora J. Wilson - NWS Federal [REDACTED]

Hello Lora,

Here are some additional references that may assist in your investigation.

Ken

Ref: NATIONAL WEATHER SERVICE INSTRUCTION 30-2101, December 14, 2009, Operations Division, Systems Maintenance, NWSPD 30-21, SYSTEMS MAINTENANCE MANAGEMENT:

Section

3.8 Maintenance Reporting

Maintenance reporting is accomplished through the Engineering Management Reporting System (EMRS). EMRS is the primary source for reliability and maintainability data for NWS systems and equipment. All field offices will use EMRS to document maintenance activities following NWS Instruction 30-2104, Maintenance Data Documentation guidance.

Section

3.9 Outage Reporting

All field offices will report outages following NWSI 30-2112, Reporting Systems, Equipment, and Communication Outages.

Note: This is the Unscheduled Outage Reporting System (USOS) not EMRS

Section

4 Maintenance Data Reporting Requirements. The EMRS Data Entry System is the primary field level maintenance data collection and workflow management tool used by the NWS. Use the EMRS Data Entry System to:

Bullet

3. Report equipment outages, maintenance actions, activations, deactivations and engineering modifications on all equipment designated by the Director of the Office of Operational Systems. See Appendix C for a listing of designated equipment and facilities.

Note: ASOS Outage not specifically defined in EHB-4. However, here Outage is used as a generally accepted engineering terminology to reference the highest level of equipment failure (complete system or equipment failure) as we list Outage, Maintenance Actions (Corrective, Preventive & Directed), activations, deactivations and engineering modifications.

Ref : ENGINEERING HANDBOOK 4 SECTION 6.0, EMRS Maintenance Note 5 EHB-4, A-1, ATTACHMENT A – Procedures for Documenting NWR Maintenance Events, 5/23/2018

Appendix

A.1 Introduction

Paragraph 5

When forecast products are not being broadcast, this is considered to be an NWR transmitter "outage". The NWR transmitter is "Not Operational" as there is a loss of all primary products and the equipment/system cannot perform its primary function.

Note: ASOS Outage not specifically defined in this Maintenance Note. However, here Outage is used as a generally accepted engineering terminology to reference the highest level of system or equipment failure (complete system failure) as there is a loss of all primary products and the equipment/system cannot perform its primary function.

Note: In general EMRS provides consistent guidance across all programs unless specifically requested by the systems/equipment program manager. No such request was provided for ASOS. The term Outage is used in EMRS as the generally accepted engineering terminology to reference the highest level of system or equipment failure (complete system failure). There is a loss of all primary products and the equipment/system cannot perform its primary function..

Ref: NATIONAL WEATHER SERVICE INSTRUCTION 30-2112, SEPTEMBER 19, 2014, Maintenance, Logistics, and Facilities, Systems/Equipment Maintenance, NWSPD 30-21, REPORTING SYSTEMS, EQUIPMENT, AND COMMUNICATIONS OUTAGES:

NWSI 30-2112 September 19, 2014, APPENDIX B - System Outages to be Reported in Daily Reports:

7. Failure of ASOS (includes any DoD or FAA system used by the office for generating watches and warnings). (Failure includes network outages on system outages that precludes dissemination of data remotely and/or locally via Ground-to-Air [GTA] or Operator Interface Device [OID] terminals).

From: Lora J. Wilson - NWS Federal <[REDACTED]>
Sent: Tuesday, November 19, 2019 1:35 PM
To: Kenneth Boutin - NOAA Affiliate <[REDACTED]>
Subject: NTSB Request: Question Regarding Outage Determinations

Hi Ken,

I have a couple more questions for you that we need some clarification on from the investigation into the ELY fatal aviation accident. So, two questions are:

1. What is the definition of an ASOS outage?
2. Additionally, if given a situation where office staff observes that an ASOS appears to not be representative of current conditions however there is no maintenance equipment failure/flag noted in the systems, is this considered an outage? Also note, the ASOS is located 3-4 hours away, so a simple glance out the window is not possible.

We understand that report processing can be turned off. We looking for definitions that might precede this action.

Thanks,

Lora

--

Lora J. Wilson, MPAL, MPharm,

Program Manager,

NWS Forensic Services

and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24

Aviation and Space Weather Services Branch

Office Phone: [REDACTED]

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Richards Michael

----- Forwarded message -----

From: **Sean Wink - NOAA Federal** <[REDACTED]>
Date: Wed, Nov 20, 2019 at 2:52 PM
Subject: Re: NTSB Request: WR Documentation Related to ASOS Maintenance Note 18A
To: Lora J. Wilson - NWS Federal <[REDACTED]>
Cc: Joe Lachacz - NOAA Federal <[REDACTED]>

Hi Lora,

We did some checking, but unfortunately we do not have anything more. Unfortunately the Maint. Note was just that, a note, not requiring each office to validate and sign off on it.

Sorry.

Sean

On Tue, Nov 19, 2019 at 9:55 AM Lora J. Wilson - NWS Federal <[REDACTED]> wrote:

Hi Sean,

As part of the investigation into the fatal aircraft accident that occurred near ELY back in February 2019, we were made aware of ASOS Maintenance Note 18, Revision A that went into effect in 2008 (attached). This is the list of spare parts required to be on-hand at all WFOs for ASOS maintenance.

Does WR have any regional-level technical orders or other documentation related to Maint Note 18A?

Thanks,
Lora

--
Lora J. Wilson, MPAL, MPharm,
Program Manager,
NWS Forensic Services
and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24
Aviation and Space Weather Services Branch
Office Phone: [REDACTED]

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--

Sean Wink
Chief, Systems & Facilities Division
NOAA/National Weather Service
Western Region Headquarters


Richards Michael

----- Forwarded message -----

From: Sean Wink - NOAA Federal <[REDACTED]>
Date: Fri, Nov 22, 2019 at 2:22 PM
Subject: Re: NTSB Request: WR Documentation Related to ASOS Maintenance Note 18A
To: Lora J. Wilson - NWS Federal <[REDACTED]>
Cc: Joe Lachacz - NOAA Federal <[REDACTED]>

Hi Lora,

Nothing additional from the WR level and we concur with Ken's statements.

Thanks
Sean

On Wed, Nov 20, 2019 at 1:07 PM Lora J. Wilson - NWS Federal <[REDACTED]> wrote:

Perfect...thank you for that response. I do have one more set of questions. I sent the below questions to HQ personnel yesterday. Ken's (ASOS PM) responses are below each question (in blue font). Similar to the spare parts list, *are there any regional definitions/instructions that further strengthen what Ken provided?*

1. What is the definition of an ASOS outage?
 1. Very simply we follow NWS Instruction 30-2111 for maintenance. The AOMC opens a ticket based on information from either an operator, technician or the system itself and then personnel follow the instruction. The instruction categorizes and prioritizes the maintenance response depending on the sensor that fails and/or the service level of the aerodrome. An outage doesn't necessarily mean that the system isn't at least partially operational; for example if the wind sensor goes down, that has no effect on the temperature, dew point, altimeter etc. and the METAR will still be generated but the wind data will be missing.
2. Additionally, if given a situation where office staff observes that an ASOS appears to not be representative of current conditions however there is no maintenance equipment failure/flag noted in the systems, is this considered an outage? Also note, the ASOS is located 3-4 hours away, so a simple glance out the window is not possible.
 1. No it would not be an outage. Local operations personnel in the vicinity of the ASOS would probably be the only ones to notice this "appears to not be representative of current conditions" issue you mention. They would also have to have training and experience to make this determination as well i.e. operations personnel, weather observers and ATC.

As I mentioned to HQ/Ken, we know that report processing can be turned off. We are looking for definitions that might precede that action.

Thanks!
Lora

--

Lora J. Wilson, MPAL, MPharm,
Program Manager,
NWS Forensic Services
and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24
Aviation and Space Weather Services Branch
Office Phone: [REDACTED]

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On Wed, Nov 20, 2019 at 2:52 PM Sean Wink - NOAA Federal <[REDACTED]> wrote:

Hi Lora,

We did some checking, but unfortunately we do not have anything more. Unfortunately the Maint. Note was just that, a note, not requiring each office to validate and sign off on it.

Sorry.

Sean

On Tue, Nov 19, 2019 at 9:55 AM Lora J. Wilson - NWS Federal <[REDACTED]> wrote:

Hi Sean,

As part of the investigation into the fatal aircraft accident that occurred near ELY back in February 2019, we were made aware of ASOS Maintenance Note 18, Revision A that went into effect in 2008 (attached). This is the list of spare parts required to be on-hand at all WFOs for ASOS maintenance.

Does WR have any regional-level technical orders or other documentation related to Maint Note 18A?

Thanks,
Lora

--

Lora J. Wilson, MPAL, MPharm,
Program Manager,
NWS Forensic Services
and Aviation Training

NWS Analyze, Forecast and Support Office/AFS24
Aviation and Space Weather Services Branch
Office Phone: [REDACTED]

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Sean Wink
Chief, Systems & Facilities Division
NOAA/National Weather Service
Western Region Headquarters


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Sean Wink
Chief, Systems & Facilities Division
NOAA/National Weather Service
Western Region Headquarters
