

FACILITY INSPECTION REPORT

Facility No:	K6-1145, K6-1145A		Fiscal Year:	2012
Facility Name:	Multi-Function Facility, Electrical Substation		Inspection Date:	12/11
Location:	Kennedy Space Center (KSC) VAB Area		Facility Owner:	NASA
RPI CRV:	\$3,439,185 and 58,442 as of 2010	Original Construction Date:	1985	
ISC Maintained Systems/Codes:	AC/FG/LU(ELV), AC(EHV), AI(MEC), FA/SC/SY(PHY), HV(HVC), PR/SR(STR), SS/WP(WWS)		FCA Type:	Refresh
Inspector(s):	Justin Gilman, Shannon Gordon			

A. Facility Mission/Description:

Facility K6-1145 is a 15,953 square-foot facility that was constructed in 1985 as a pre-cast concrete structure with a built-up gravel roof. The majority of this facility is occupied by Lackmann Culinary Services and is currently used to house the Cafeteria for the North end of KSC. This building also contains a KSC Federal Credit Union branch as well as a decommissioned Medical Facility. See Figures 1 and 2.

Facility K6-1145A is a 192 square-foot facility that was constructed on a concrete foundation with pre-cast concrete walls and a corrugated metal roof system. The facility houses equipment that is responsible for supplying hot water to K6-1145 as well as a 300 Kilo Volt Amp transformer. See Figure 3.

Figure 1. K6-1145 General View



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Figure 2. K6-1145 Side View



Figure 3. K6-1145A Rear View



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B. Facility Manager Interview:

Neil Raver for Bill Lauer, Facility Manager (Cafeteria), Lackmann Culinary Service

This cafeteria area is approximately 12,000 sq. ft. and overall is in good condition with no major issues. There are no leaks and the temperature control is good. There are minor areas inside the dining area where paint is required due to the removal of wall hung items. Occasionally the ice/soda machine drains will back up and need to be cleaned. The loading dock area behind the facility will sometimes flood during heavy rains. No major improvements are required or being requested by the cafeteria at this time.

Doug Husted, Decommissioned Medical Facility Manager, IHA

The medical dispensary area is approximately 2,624 sq. ft. This area was decommissioned after the end of the Shuttle program. Funding for this site was provided by Shuttle. The site is currently used for some miscellaneous storage. HVAC remains operational and at a comfortable temperature despite the area not having any inhabitants. At the time of FCA site inspection there was a sink in the drug screening room that was leaking and had completely saturated the carpet within the room. The Duty Office was contacted.

Tami Sheppard, Credit Union Manager, KSCFCU

The credit union area is approximately 1,318 sq. ft. and is in good condition. During colder months the temperature is below the employees comfort level. There is also a sewage smell during these months. During the site visit, the FCA team found the source of the sewer odor. This is addressed in WWS system section.

C. Planned Facility/System Major Projects:

Table 1. Projects		
Work Order Number	FY	Description
10370930	2012	PREP/PAINT EXTERIOR OF FACILITY, K6-1145
E1006461	2012	REPLACE DAMAGED AWNING CANVAS, SOUTH SIDE MFF CAFETERIA, K6 1145
E1275825	2012	Mechanical Upgrades for various facilities FY11 (PCN: 98889) (Design only)

D. Administrative Deficiency Recommendations:

a Real Property:

Table 2. Real Property Recommendations	
Construction Field	Recommendations
K6-1145 - Exterior	Change from concrete block to Pre-Cast Concrete (K6-1145 & K6-1145A)

b OMEU: No deficiencies exist.

c Maximo: No deficiencies exist.



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E. Asbestos Containing Material (ACM) Analysis:

A review of the AMIS (Asbestos Management Information System) database located at <http://amis.ksc.nasa.gov> indicates that the facility was assessed and there was no ACM identified within the facility. No further action is required.

F. Indoor Air Quality (IAQ) Analysis:

The KSC Federal Credit Union employee's complained of a sewer like odor within their work area. In February 2010, the Medical Environmental Services Contract investigated a complaint of the "sewer" like odor and determined that a small break/storage room that used to be a restroom could be the source of the odor (Report# T201002-0669). ISC plumbing shop investigated and determined that was not the source.

During the site visit, the FCA team found a sewer vent cap that was not properly sealed on the south side of the facility, adjacent to the credit union. Strong odors were noticeable. The ISC SME was notified and E1321234 Work Order was submitted. See WWS for more information on this deficiency.

G. Warranties and Service Agreements Analysis: No warranties or service agreements exist.

H. Facility/Systems Condition Assessment:

STR/SR/B2

Condition Code: STR K6-1145 (4-Good) K6-1145A (4-Good)

STW K6-1145 (3-Fair)

1. Research:

a General System Description:

K6-1145 – The facility has a concrete foundation and concrete pre-cast walls. Glass windows run the length of the East and South sides. (See Figures 1 & 2). The building has two sets of exterior storefront doors as well as two functioning power storefront doors. The south side of the facility exterior is partially covered, and there is a court yard that is not covered due to a removed awning. The rear of the facility consists of a loading dock area for the cafeteria and a drop off location for the medical facility.

K6-1145A – Half of the facility has a concrete foundation and concrete pre-cast walls. The west side is open at the south side and houses a transformer. The east side is enclosed and houses the water heaters and for K6-1145.

b Previous Facility/System Assessment Recommendations:

K6-1145/K6-1145A - A Facility Condition Assessment (FCA) was conducted in 2002 with no recommendations for the STR/SR sub-system.

c Interviews - Known Problems or Issues:

Doug Czerwinski, ISC, STR/SR/B2 Systems Maintenance Engineer

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There are no known structural deficiencies that have not been addressed by submittal of a Work Order. The cafeteria carpet was replaced in the last year. The exterior awning needs to be replaced.

d Existing Support Requests:

E1006461- Replace damaged awning canvas, south side MFF cafeteria, K6-1145

10370930- PREP/PAINT EXTERIOR OF FACILITY, K6-1145

e Maintenance Trend Analysis:

The maintenance program for this system is reactive. There are no recommended changes to the current maintenance plan at this time.

2. Site Inspection, Conclusions and Recommendations:

The exterior concrete and windows are in good condition. The exterior paint is in fair condition. The interior floor coverings and walls are in good condition. There are personnel doors at the rear of the facility that are experiencing some corrosion at the frames. There is also a storm drain in the loading dock area which is clogged and causing flooding. Work orders were submitted by the SME to correct these. See figures 4 and 5.

Figure 4.



Figure 5.



FCA Team initiated submission of a WON to clean out the storm drain.

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The following recommendations were identified for the STR/SR subsystem:

- Replace the outdoor awning. (E1006461,existing)
- Repair rear kitchen personnel door frames. (10569074,existing)
- Clean out storm drain at rear of facility. (E1316988,added as a result of FCA)

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

K6-1145/K6-1145A - The existing maintenance program for the structural system is reactive. This type of program is suitable for this facility which has no structural components that requires preventive maintenance. No recommended changes to the current maintenance plan exist at this time.

b Predictive Technologies

No predictive technologies are used in the current reactive maintenance program.

STR/RO

Condition Code: STR K6-1145 (4-Good) K6-1145A (4-Good)

1. Research:

a General System Description:

K6-1145 – The facility has a built-up gravel roof that was replaced in 2002.

K6-1145A - The facility has a corrugated metal roof that is original.

b Previous Facility/System Assessment Recommendations:

There are no previous known deficiencies with the roofing system.

c Interviews - Known Problems or Issues:

John Smith, ISC, STR/RO Systems Maintenance Engineer

K6-1145/K6-1145A – There are no known deficiencies with either roof system.

d Existing Support Requests:

N/A

e Maintenance Trend Analysis:

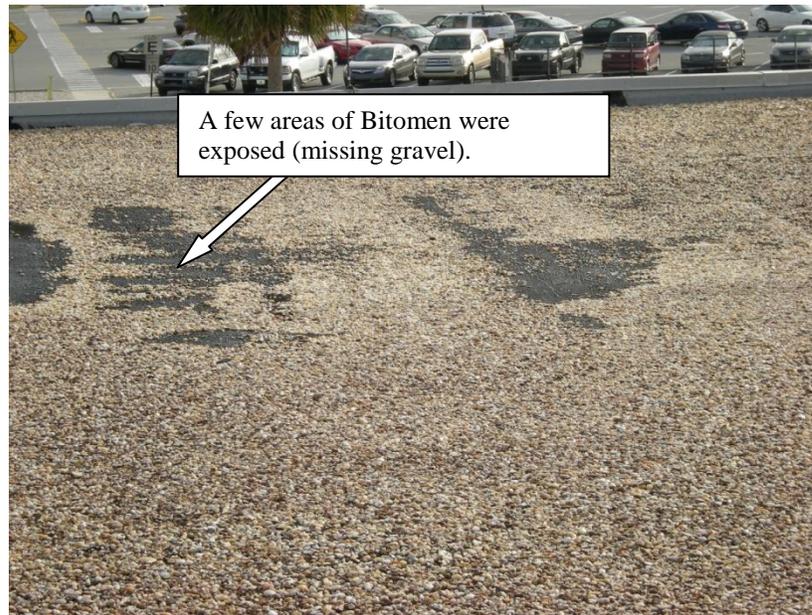
Based on the analysis of the Maximo work orders submitted for these facilities and personnel interviews, no maintenance trends were identified.

2. Site Inspection, Conclusions and Recommendations:

K6-1145-K6-1145A - Access to the roof top was available. The roof showed no signs of deterioration or fatigue. There were a couple of areas where the gravel was thin and this is being addressed by the SME. See Figure 6.

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Figure 6.



The following recommendations were identified for the STR/RO subsystem:

- Add gravel to thin areas. (E1316709, added as a result of FCA)

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

Preventive maintenance is being performed on the built-up gravel roof on a semi-annual basis per job plan BSR009A. There are no recommended changes to the current maintenance plan at this time.

b Predictive Technologies

No predictive technologies are used in the current preventative maintenance program.

EHV/AC

Condition Code: (4–Good)

1. Research:

a General System Description:

The high voltage EHV system at K6-1145 consists of a 300KVA pad mounted transformer (USS-834) feeding low voltage from K6-1145A to K6-1145.

b Previous Facility/System Assessment Recommendations:

The previous FCA identified a WON to replace the 500KVA transformer with a new 300KVA unit. This was completed under WON 00117428.

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c Interviews – Known Problems or Issues:

Son Ho, ISC, EHV/AC System Maintenance Engineer (SME)

The current maintenance program is reactive.

d Existing Support Requests:

There are no open SR's for the EHV/AC subsystem.

e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, no maintenance trends were identified.

2. Site Inspection, Conclusions and Recommendations:

The following deficiencies were identified for the EHV/AC subsystem:

- Surface corrosion exists on an interior transformer enclosure. No remedial action is required and no recommendations exist at this time.

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

Preventive maintenance is being performed on the 300 KVA transformer on a tri-yearly basis per Job Plan PLTF11A3. There are no recommended changes to the current maintenance plan at this time.

b Predictive Technologies

Maintenance is preventive. Repairs are reactive. No predictive technologies are used.

ELV/AC

Condition Code: (4-Good)

1. Research:

a General System Description:

The electric low voltage system consists of six transformers, nine Low Voltage panels located in equipment rooms throughout the facility, lighting, and supply power to the cafeteria equipment.

b Previous Facility/System Assessment Recommendations:

A FCA was performed by Nelson Engineering Company in 2002. Table 5 contains the status of the previous FCA recommendations.

Table 5. Previous FCA Recommendations.		
2002 FCA Deficiencies and Recommendations	Status	Comments
The electric system in wet areas is not sealed.	Complete	Inspection showed water tight boxes are in working order.

c Interviews - Known Problems or Issues:

Jerome Blake, ISC, ELV/AC System Maintenance Engineer (SME)

Maintenance is reactive. PM's are not performed on the low voltage subsystem with the exception of emergency lights.

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d Existing Support Requests:

E1303204-Install elect eye for lights at front entrance and loading dock, K6-1145 due to personnel injury. (Inprg)

e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, no maintenance trends were identified.

2. Site Inspection, Conclusions and Recommendations:

The following deficiencies were identified for the ELV/AC subsystem:

- No deficiencies were noted on this inspection.

The following recommendations were identified for the ELV/AC subsystem:

- No recommendations were made for LV during this inspection.

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

The existing maintenance program for the ELV/AC subsystem is reactive with exception of the emergency lights which is preventive. The current maintenance program is appropriate, per ISC, ELV/AC SME Jerome Blake.

b Predictive Technologies:

Maintenance is reactive and preventive. No predictive technologies are used.

ELV/FG/LU

Condition Code: (4-Good)

1. Research:

a General System Description:

K6-1145

The ELV/FG/LU subsystem consists of air terminals, main roof and down conductors connected to a ground rod/counterpoise system.

The grounding subsystem is not visible.

b Previous Facility/System Assessment Recommendations:

A FCA was performed by Nelson Engineering Company in 2002. There were no recommendations made for this system on the prior FCA.

c Interviews - Known Problems or Issues:

Jerome Blake, ISC, ELV/FG/LU System Maintenance Engineer

There are no known problems or issues with the FG/LU system.

d Existing Support Requests:

There are no known Support Requests for the FG/LU system.

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e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, no maintenance trends were identified.

2. Site Inspection, Conclusions and Recommendations:

The following deficiencies were identified for the ELV/FG/LU subsystem:

- No deficiencies were noted.

The following recommendations were identified for the ELV/FG/LU subsystem:

- No recommendations.

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

Preventive maintenance is being performed on the LPS on a 5 year basis per job plan I67010A5. There are no recommended changes to the current maintenance plan at this time.

b Predictive Technologies:

Maintenance is preventive. No predictive technologies are used.

PSY/FA/SY/SC

Condition Code: FA (4–Good), SY (5-Excellent), SC (4-Good)

1. Research:

a General System Description:

This system is comprised of a newly installed wet pipe fire suppression system, a wet chemical suppression system located in the kitchen, and a Fire Alarm Panel.

b Previous Facility/System Assessment Recommendations:

A FCA was performed by Nelson Engineering Company in 2002. There were no recommendations made as a result of this FCA.

c Interviews – Known Problems or Issues:

Bill Bray, ISC, Fire Alarm System Maintenance Engineer

MFF has recently been fully sprinkled. PM's are currently suspended awaiting turnover of the modified system. The system passed 100% Final Inspection on 3/1/11.

d Existing Support Requests and WONs:

10189670- CONFIGURE SMOKE DETECTOR, MFF CAFETERIA, K6-1145 (This WON may no longer be valid with the recent installation of the wet pipe fire suppression system. FCA team to contact Fire Inspector and validate.)

e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, no maintenance trends are evident.

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2. Site Inspection, Conclusions and Recommendations:

The wet pipe sprinkler system is new and in excellent condition. The fire alarm panel, which is also new, is located in the lobby area and is in excellent condition. The wet chemical suppression systems are located in the kitchen hoods and are in good condition.

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

PM's are currently suspended awaiting turnover of the modified system.

b Predictive Technologies

Maintenance is reactive. No predictive technologies are used.

HVC/HV/RW

Condition Code: (4-Good)

1. Research:

a General System Description:

The heating, ventilation and air conditioning (HV) subsystem consists of four 30 ton chilled water air handlers. Two are located in the north equipment room (Rm. 1070), one in the medical facility (Rm. 1018a), and the fourth is located above the ceiling in the lobby area. The HV Subsystem also consists of three roof top exhaust fans required to ventilate the kitchen cooking area.

The refrigeration subsystem (RW) consists of three walk-in coolers, three deli coolers, one pan/salad cooler, and two ice machines.

b Previous Facility/System Assessment Recommendations:

A FCA was performed by Nelson Engineering Company in 2002. There were no recommendations made for this system on the prior FCA.

c Interviews - Known Problems or Issues: The Credit Union manager noted that in the past, the temperature was below comfort level in the past. The SME was notified and is reviewing the complaint. It is the SME's belief that this was resolved last winter season.

d Existing Support Requests and WON's:

E1269035 - EVALUATE, CHANGE MFF WALK-IN COOLER/FREEZER KCCS ALARM SET UP, K6-1145

e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, no maintenance trends were identified for the HV sub-system, but there were trends associated with the RW sub-system.

2. Site Inspection, Conclusions and Recommendations:

The HV sub-system is in Good condition. All air handlers, exhaust fans, and their controls are operating normally with few issues. This equipment was replaced during the last FCA in 2002.

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The RW sub-system is in fair condition. The coolers are fairly old and are starting to have maintenance issues and failures as a result of their age and condition.

The following HVC deficiency and recommendation was identified:

- Replace the missing filter on one of the roof-top exhaust fans. (E1317615, added as a result of FCA site assessment) see Figure 7.
- Replace fallen air handler access panel in north mechanical room. (E1317638, added as a result of FCA site assessment)
- The air handler in the medical facility appears to be operating as if the area was staffed at full occupancy. Because the area is unoccupied, the FCA Team will review with SME and Energy engineers to determine if the loads can be adjusted to reduce energy usage.

Figure 7.



3. Energy Usage and Savings Recommendation:

- a AHU's 3 & 4 serve the credit union and medical clinic (respectively) and are constant volume bypass systems. A review of the cooling and heating sequences of operation reveals simultaneous cooling and heating of the supply airstream. At a minimum the chilled water coil LAT should be reset to 65° F upon activation of the first stage of electric heat. On a continued fall in space temperature the valve for the chilled water coil shall be closed as the VAV bypass is modulated to full open for full heating airflow to the space and a second stage of electric heat is activated. Conservatively, 5-20% energy savings can be realized when limiting simultaneous cooling and heating during times of high dehumidification only.

4. Maintenance Program Analysis:

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a Existing Preventive Maintenance Program

Preventive maintenance is being performed on the four air handlers every 4 months under Job Plan HVAC20M4. There is no longer a maintenance plan in place for the roof-top exhaust fans. Preventive maintenance is being performed on the ice machines quarterly under job plan HVFI04Q. Preventative maintenance is being performed on the freezers and coolers yearly under Job Plan HVAC25A.

b Predictive Technologies

Maintenance is preventive. No predictive technologies are used.

SPE/FP

Condition Code: (3–Fair)

1. Research:

a General System Description:

This system is comprised of the equipment required to maintain and operate the functions of the cafeteria. This equipment includes ranges, hoods, fryers, steam kettles, mixers, dish machines, and conveyors.

b Previous Facility/System Assessment Recommendations:

A FCA was performed by Nelson Engineering Company in 2002. This system was not identified under the last FCA.

c Interviews – Known Problems or Issues:

Based on the FCA inspection findings, no SME interview is required. An interview was performed with the facility manager. Due to the age of the majority of the kitchen equipment, he experiences frequent failures which require Trouble Calls to correct.

d Existing Support Requests and WONs:

E1318368- D/O K6-1145 CAFE: TROUBLESHOOT INOPERATIVE TOASTER

E1211639- D/O K6-1145, CAFE: DISHWASHER NOT HOLDING TEMP

E1294410- D/O K6-1145, CAFE: REPLACE SPRAYER AT 3-COMPARTMENT SINK

E1308876- D/O K6-1145: LOCATE & REPAIR TEMP SENSOR ON FREEZERS

E1122385- D/O K6-1145 CAFE: T/S POWER FOR NEW COOLER IN DINING AREA

E1318765- D/O K6-1145: WORK STOPPAGE - DISH MACHINE WILL START, THEN STOP - TROUBLESHOOT

e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, maintenance and failure trends are evident.

2. Site Inspection, Conclusions and Recommendations:

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The kitchen equipment is beyond 20 years old and is experiencing frequent failures. During the FCA site visit, the dish machine was inoperative and being repaired during a service time for the cafeteria.

3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

Preventive maintenance is being performed on the various pieces of kitchen equipment under Job Plan: BSM156SA, BSM156SA, BSM052A, BSM022SA, BSM022SA, BSM033SA, BSM153SA, BSM032SA, and BSM017W.

Preventive maintenance schedules vary depending on the usage of the equipment.

b Predictive Technologies

No predictive technologies exist or are recommended for the existing maintenance program.

WWS (SS, WP)

Condition Code: SS (3-Fair), WP (4-Good)

1. Research:

a General System Description:

The WWS system consists of water supply and sewage piping, restroom fixtures, sinks, toilets, four backflow preventers, and three hot water heaters located in K6-1145a.

The building's potable water is supplied from a 4" inch service line on the north side of the facility. All wastewater leaves the building via 2 sewer lines, one on the west side, and one on the southwest side.

b Previous Facility/System Assessment Recommendations:

A FCA was performed by Nelson Engineering Company in 2002. There were no recommendations made for this system on the prior FCA.

c Interviews - Known Problems or Issues:

John (Russ) Carson, ISC, WWS System Maintenance Engineer

Overall, the WWS system is functioning acceptably and supports the mission of the facility. The WWS system is in fair condition with no major deficiencies existing at this time. There are occasional drain backups that are resolved typically under trouble calls. It is thought that there was an improper drain line routing during construction which leads to the occasional backups.

d Existing Support Requests:

E1140061- D/O K6-1145 Rm 1201: Cut & cap pipes protruding from wall

E1314925- D/O K6-1145, Rm 1209: Water leaking from sink foot pedal - carpet soaked

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e Maintenance Trend Analysis:

Based on the analysis of the Maximo work orders submitted for this facility and personnel interviews, a maintenance trend has been identified for the WWS system. The trend is related to the buildings waste water drain system.

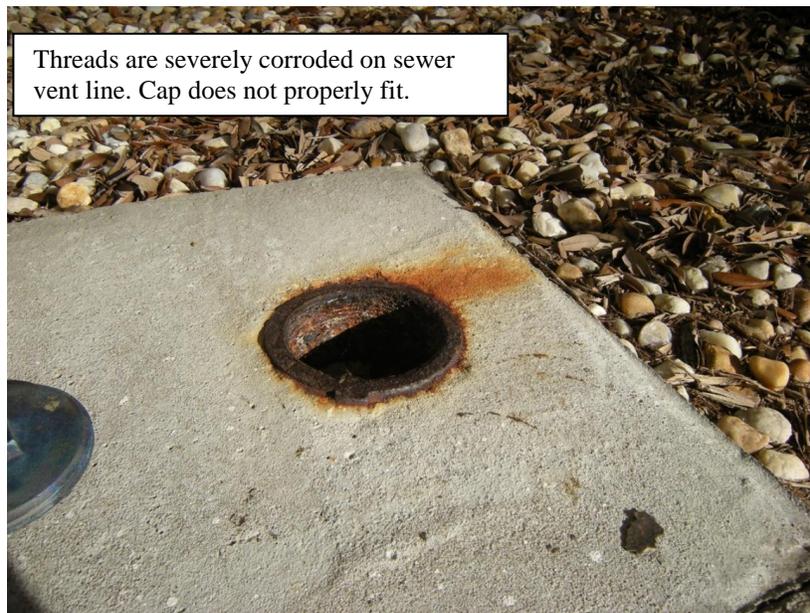
2. Site Inspection, Conclusions and Recommendations:

Unless noted otherwise, the WWS system is in overall fair condition and functions properly. No major functional deficiencies were identified with the supply and wastewater piping, restroom fixtures, sinks or water heater. The water pressure is sufficient.

The following WWS deficiency and recommendation was identified:

- Adjacent to the Credit Union, a sewage cap was noted as not being secured properly. The cap had been replaced, but the threaded fitting was still rusted and beyond repair. The SME was notified and action is being taken. See Figure 8.
 - This is possibly the source to the odor complaint given during the interview of the Credit Union Manager.
 - (E1321234-D/O K6-1145 SW CORNER: Install temporary plug in clean-out, added as a result of FCA)
 - (ESR Submitted: ESR0000949-Replace Broken Clean-Out, added as a result of FCA)

Figure 8.



3. Maintenance Program Analysis:

a Existing Preventive Maintenance Program

The existing maintenance program for the WWS system is ok and preventive. The maintenance program for the supply and wastewater piping, restroom

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fixtures, sinks and water heater is reactive. The maintenance program for the backflow preventers is preventive.

The following WWS maintenance program deficiency was identified:

With the above exceptions, no changes are recommended at this time and the current maintenance program is appropriate, per ISC, WWS SME Russ Carson.

b Predictive Technologies

No predictive technologies exist or are recommended for the current WWS maintenance programs.

I. Other Observations:

- None