

Five-Year Surveillance Report for the 105-C, 105-D, 105-H, 105-F and 105-N/109-N Safe Storage Enclosures

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-09RL14728



**P.O. Box 650
Richland, Washington 99352**

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D. G. Ranade
Mission Support Alliance

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**P.O. Box 650
Richland, Washington 99352**

APPROVED
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Date

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**Five-Year Surveillance Report for the 105-C, 105-D, 105-H, 105-F and
105-N/109-N Safe Storage Enclosures**



EXECUTIVE SUMMARY

From September 2014 to April 2015, Mission Support Alliance, LLC, conducted surveillance activities at the 105-C, 105-D, 105-F, 105-H, and 105-N/109-N safe storage enclosures (SSE). This document provides an overview of that activity and includes findings and recommendations based on the surveillance experience. The SSEs, also known as cocooned reactors, were completed between 1998 (105-C) and 2011 (105-N) and were designed to ensure that the reactor core would be maintained in a safe, environmentally secure, and cost-effective manner until final closure could be accomplished (for up to 75 years). The following surveillance and maintenance plans (one for each SSE) require a 5-year surveillance or inspection of the SSEs and allow for a change in inspection frequency based on the surveillance results.

- DOE/RL-98-44, *Surveillance and Maintenance Plan for the 105-C Reactor Safe Storage Enclosure*, Rev. 1¹
- DOE/RL-2003-45, *Surveillance and Maintenance Plan for the 105-F Reactor Safe Storage Enclosure*, Rev. 0²
- DOE/RL-2004-59, *Surveillance and Maintenance Plan for the 105-D Reactor Safe Storage Enclosure*, Rev. 0³
- DOE/RL-2005-67, *Surveillance and Maintenance Plan for the 105-H Reactor Safe Storage Enclosure*, Rev. 0⁴
- DOE/RL-2011-106, *Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure*, Rev 0.⁵

In 2013, three *Hanford Federal Facility Agreement and Consent Order*⁶ (Tri-Party Agreement) change notices were prepared to line up the inspection schedules so they would occur in a single fiscal year, 2015. This was done to increase safety and efficiency of the surveillance process. The 5-year surveillance of the 105-F SSE was conducted in October 2014. This served as a test case for the overall SSE surveillance project; lessons learned from the 105-F surveillance were incorporated into the surveillance activities for the remaining four SSEs. Surveillances at 105-C, 105-D, 105-H, and 105-N/109-N were conducted in April 2015.

¹DOE/RL-98-44, 2012, *Surveillance and Maintenance Plan for the 105-C Reactor Safe Storage Enclosure*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

²DOE/RL-2003-45, 2003, *Surveillance and Maintenance Plan for the 105-F Reactor Safe Storage Enclosure*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

³DOE/RL-2004-59, 2004, *Surveillance and Maintenance Plan for the 105-D Reactor Safe Storage Enclosure*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

⁴DOE/RL-2005-67, 2005, *Surveillance and Maintenance Plan for the 105-H Reactor Safe Storage Enclosure*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

⁵DOE/RL-2011-106, 2011, *Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure*, Rev 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

⁶Ecology, EPA, and DOE 1989, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

The surveillance process involves up-front planning and mobilization of support resources followed by interior air/radiological sampling. All air sampling results were within the expected limits. An initial safety team consisting of Industrial Hygiene, Industrial Safety, and Radiological Control professionals and biologists, entered each SSE to observe current conditions and establish any additional safety controls for the inspection teams. After the initial safety team completed their inspection, the radiological, structural, and instrumentation (temperature and flooding sensors) teams performed the required surveillances.

The surveillances found that all of the SSEs are structurally sound. The radiological and safety conditions within the SSEs had not changed since the last surveillance. Temperature sensors located inside the SSE indicate that the inside temperatures reflect the outside temperature. The flood sensors located in the lower levels of the SSEs have never alarmed, indicating no water intrusion. The floors were completely dry. Limited biological intrusions, including bats (alive and dead), insects, and spiders, were observed. Access for the intrusions appear as small gaps or openings in the outer metal siding. Additionally, a few housekeeping items were observed that do not affect the integrity of the structures. These items include, but are not limited to, oil stains, personnel protective equipment waste left by previous contractors, and exterior soil grading issues.

Routine maintenance and housekeeping items are being addressed by Long-Term Stewardship Program personnel with more complex tasks being planned for fiscal years 2016 – 2017.

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TERMS

ALARA	as low as reasonably achievable
BFA	beryllium facility assessment
CBDPP	<i>Hanford Site Chronic Beryllium Disease Prevention Program</i>
CFR	<i>Code of Federal Regulations</i>
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FY	fiscal year
IH	industrial hygienist
MSA	Mission Support Alliance, LLC
PSRP	Public Safety and Resources Protection
RCT	radiological control technician
RL	U.S. Department of Energy, Richland Operations Office
S&M	surveillance and maintenance
SSE	safe storage enclosure
TPA-CN	Tri-Party Agreement change notice
Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>

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1.0 INTRODUCTION

This report describes 5-year surveillance activities conducted at the 105-C, 105-D, 105-F, 105-H, and 105-N safe storage enclosures (SSE) in fiscal year (FY) 2015. In 2013, Washington Closure Hanford conducted surveillance at the 105-DR SSE, so it was not included in the FY 2015 surveillance activity.

The surveillances are required by the surveillance and maintenance (S&M) plans for the 105-C, 105-D, 105-F, 105-H, and 105-N SSEs:

- DOE/RL-98-44, *Surveillance and Maintenance Plan for the 105-C Reactor Safe Storage Enclosure*, Rev. 1.
- DOE/RL-2003-45, *Surveillance and Maintenance Plan for the 105-F Reactor Safe Storage Enclosure*, Rev. 0.
- DOE/RL-2004-59, *Surveillance and Maintenance Plan for the 105-D Reactor Safe Storage Enclosure*, Rev. 0.
- DOE/RL-2005-67, *Surveillance and Maintenance Plan for the 105-H Reactor Safe Storage Enclosure*, Rev. 0.
- DOE/RL-2011-106, *Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure*, Rev 0.

Mission Support Alliance, LLC (MSA), prepared Work Packages 2M-64026/C and 2M-73151/C to complete the activities.

From 1998 through 2012, the Interim Safe Storage Project work at the 105-C, 105-D, 105-F, 105-H, and 105-N/109-N Reactor buildings was completed with the installation and sealing of the SSEs. The design intent of this project was to ensure that the reactors would be maintained in a safe, environmentally secure, and cost-effective manner until final closure could be accomplished through decommissioning. All reactors listed in this report except 105N/109N are to be cocooned up until 2068 at the latest. No final decision has been made on the end state of 105N/109N. In the interim, ongoing S&M activities (external areas every year; internal areas every 5 years) are conducted that meet the following objectives:

- Verify safety and radiological conditions around and inside the SSE
- Verify the structural integrity of the SSE and identify potential hazards
- Verify functionality of thermal and flood-level sensors in the SSE
- Verify the condition of the weather protection system (e.g., sealants, roofing, siding, and flashing).

Surveillance of the 105-F SSE was conducted in October 2014. Lessons learned from the 105-F SSE surveillance were incorporated into the planning and execution at the remaining four SSEs. Table 1 identifies the approximate dates of the surveillance tasks.

Table 1. Approximate Dates of 5-Year Surveillance Tasks.

Task	105-F	105-H	105-D	105-C	105-N/109-N
Open doors	10/9/2014	3/26/2015	3/26/2015	3/27/2015	3/26/2015
Safety inspection	10/13/2014	4/6/2015	4/9/2015	4/16/2015	4/14/2015
Instrumentation check	10/13/2014	4/6/2015	4/9/2015	4/16/2015	4/14/2015
Radiological survey	10/13/2014	4/6/2015	4/9/2015	4/16/2015	4/21/2015
Structural assessment	10/14/2014	4/7/2015	4/13/2015	4/20/2015	4/21/2015
Close doors	10/23/2014	4/8/2015	4/15/2015	4/20/2015	4/22/2015

In 2013, the U.S. Department of Energy, (DOE), Richland Operations Office (RL), worked with the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) –the signatory agencies of the *Hanford Federal Facility Agreement and Consent Order* (Tri Party Agreement) (Ecology et al. 1989) – to align the inspection schedule for the cocooned SSEs into a single FY (2015). This was done to increase efficiency and safety performance and reduce overall costs. Table 2 shows the original inspection schedule based on the SSE completion dates and the revised schedule based on discussions with the Tri-Party agencies and appropriate Tri-Party Agreement change notices (TPA-CN # 571, 572 and 573). A separate TPA-CN will be required for 105-DR to align it with the next inspection period.

2.0 THE SURVEILLANCE PROCESS

The surveillance process consisted of pre-surveillance activities and the surveillance activities. These activities are described in this section.

2.1 THE PRE-SURVEILLANCE ACTIVITIES

Before beginning the surveillance activities, several prerequisite activities had to be conducted. These are discussed in the following paragraphs.

The S&M activity of the SSEs has been categorized as below than Hazard Category 3. The hazard category classification is based on off-site and on-site consequences. Category 1 has the highest consequences. A change management form for each SSE was completed as required by the applicable programs and procedures.

Scientists from MSA's Public Safety and Resources Protection (PSRP) organization conducted ecological and cultural survey around the SSEs. The protection and preservation of cultural resources at the Hanford Site is governed by number of federal laws including *National Historic Preservation Act of 1966*, Sections 106, and 110, Title 36 *Code of Federal Regulations (CFR)*, Part 800, "Protection of Historic Properties," and the *Archaeological Resources Protection Act of 1979*. No impacts to cultural resources were anticipated from the S&M activities. More information about the ecological and cultural survey is in Appendix A.

A beryllium facility assessment (BFA) was conducted by an MSA industrial hygienist. DOE-0342, *Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP)*, Section 6.6.1, "Facility Characterization Process," requires an initial assessment of all facilities to determine the beryllium status of the facility. During the assessment, if an area of concern is identified, characterization sampling must be conducted to clear the building. If characterization sampling is not conducted (as in the case of the SSEs), the areas of concern remain beryllium suspect areas, and the building is a beryllium controlled facility (DOE-0342-002, *Hanford Site Assessment & Characterization/Verification of Buildings Procedure*, Section 4.2).

A BFA was conducted in the vestibule, a small exterior room that provides access to the interior of the SSE through a door that is welded shut between surveillance periods. The vestibule was assessed because of the planned intrusive activities, such as grinding the door weld. The assessment included collecting dust samples in the vestibule. The dust samples were negative for beryllium. The vestibule was cleared for S&M activities. The BFAs were not conducted inside the SSEs because no intrusive activities are planned. Environmental screening, which is required to ensure compliance with the environmental laws, was also completed for the surveillance activities. More information on BFA for SSEs is in appendices B through F.

The change management forms, BFA reports, ecological and cultural assessment reports, and environmental screening forms are included in the work packages associated with the surveillance activities.

2.2 THE SURVEILLANCE ACTIVITIES

All the SSEs have a vestibule leading to the main interior door. The exterior doors leading to the vestibule are locked and access to the keys is controlled by the MSA facility manager for each SSE. The doors leading to the SSE interior are welded shut between surveillances.

The initial step in the surveillance activity involved assessing the area around the interior door for safe working conditions. A team of safety professionals and craft workers took interim measures, such as setting up the work area, setting barriers and isolating potential hazards, energizing the electrical panel for lighting, and conducted external radiological surveys. The safety team checked the vestibules and the open areas for radiological contamination, biological hazards, and safety issues.

The interior doors were opened by grinding off the welded plate that secured each interior door, as shown in Figure 1. The air inside the SSE was sampled by placing large-volume air samplers in the threshold of the SSE to ensure safe radiological conditions. The SSEs were then allowed to “breathe” for several days using natural ventilation to reduce the potential for radon buildup. No forced-air ventilation was required, consistent with previous surveillances. The outer door of the vestibule was kept locked during this period.

The safety team members were allowed inside the SSE when the air was deemed safe by an industrial hygienist (IH) and radiological control technicians (RCT). The safety team shown in Figure 2, which consisted of a RCT, an industrial safety professional, an IH, and a biologist, entered the building to verify that the lights were on and that the surveillance routes were safe for the surveillance teams. The surveillance routes are addressed in Section 2.2.1. The safety team surveys are described in Section 2.2. The surveillance teams, which consisted of a RCT, an instrument technician, and structural engineers entered the SSEs to conduct the surveillance. A brief description of the results of the surveillance team's safety inspections, structural assessment, and radiological assessment are presented in Section 2.4 and described in detail in Appendices A through E. Annual inspection checklists from 2011 through 2014, completed by Washington Closure Hanford, are included in Appendix G. The temperature and flood level sensor surveys are described in Section 2.3.3.



Figure 1. The Carpenter Grinding the Welded Plate.



Figure 2. The Safety Team Ready to Enter the SSE.

2.2.1 Surveillance Routes

The S&M plan for each SSE identified the surveillance routes on each level within each SSE. The surveillance routes were field modified depending on the current radiological and safety conditions established by the initial safety team to maintain radiological exposure as low as reasonably achievable (ALARA). The modified surveillances routes will be documented in a

MSA surveillance and maintenance plan which is will be prepared prior to the next entry and inspection. When prepared, this plan will combine the surveillance and maintenance plans for all six SSEs (including 105-DR) into one document and will replace the existing surveillance and maintenance plans for the SSEs.

2.3 SAFETY TEAM

The surveys conducted by the safety team are described in this section.

2.3.1 Radiological Safety

The RCTs surveyed the routes for radiological contamination. No contamination was found along the routes. The routes were radiologically released for walking. The surveys are presented in Appendices A through E.

2.3.2 Physical Hazards

This section addresses physical safety hazards associated with stairs, areas with a potential for falls, barriers, and posting.

2.3.2.1 Stairs

The stairs were found to be generally in good condition. The potential hazards associated with the stairs (e. g., spalling and slight rocking back and forth) were clearly marked with orange paint. The MSA industrial safety personnel inspected these stairs before allowing access. The industrial safety professional also identified other safety hazards, such as tripping hazards, head bangers (low ductwork or bracing) and sharp and protruding equipment in the surveillance path. The identified hazards were addressed in the safety pre-briefings which were held each morning before surveillance activities began and documented in the work package for future entries.

2.3.2.2 Fall Protection

Locations where fall protection was needed were clearly identified by previous contractors. The surveillance routes were designed to stay away from these areas. During the inspection process, no fall protection for the inspection teams was required.

2.3.2.3 Barriers and Postings

Barriers and postings such as those shown in Figure 3 are used to prevent unwarranted access to hazardous areas within the facility and to inform personnel of potentially hazardous conditions that exist in the SSE.



Figure 3. Barrier and Posting at 105-D SSE.

2.3.3 Industrial Hygiene

The IH conducted general area direct-reading instrument monitoring of the surveillance routes before additional personnel entered to complete surveillance activities. The monitoring was for carbon monoxide, flammable gas, oxygen, and volatile organic compounds.

2.3.4 Biological Hazards

Biologists surveyed the routes for dead or live animals, such as snakes, spiders, or other biological hazards. Bat guano was present in the 105-C, 105-D, 105-F, and 105-H SSEs. Fecal droppings from other animals also were present. The live bats observed in the SSEs were not on the routes. The routes were cleared for walking. The biological surveys are addressed in Appendix F.

2.4 SURVEILLANCE TEAMS

The surveys conducted by the surveillance teams are briefly discussed in this section. Appendices A through E provide detailed information.

2.4.1 Radiological Survey

Radiological surveys of internal and external conditions were conducted at each SSE in accordance with applicable program and procedures. Figure 4 shows an internal radiological survey being conducted. The survey data and results are provided in Appendices A through E. The radiological survey results for each SSE are consistent with the results from previous surveys. No unexpected radiological conditions were encountered. Radiologic postings observed in the SSEs are appropriate for the conditions observed. Exterior radiological surveys

will continue to be performed annually, in accordance with applicable program and procedures or its successor document. During the surveillance activity, remediation activities by other contractors were going on very close to SSEs 105-H, 105-D, and 105-N/109-N. It was not possible to safely conduct the external radiological surveys at these SSEs. Annual exterior radiological surveys will continue to be completed at each SSE.



Figure 4. Radiological Survey at 105-F SSE.

2.4.2 Structural Survey

Polestar Technical Services of Richland, Washington, conducted the structural assessment. The structural assessment included observing the SSE exterior and interior (such as foundations, walls, roof, steel decking, handrails, penetrations, covers – anything else that might be considered “structural”) to identify areas of potential structural deterioration and any obvious hazards that might compromise the integrity of the SSE structures or allow the release of potentially hazardous substances. Documentation of the structural survey for each SSE is provided in Appendices A through E.

2.4.2.1 Exterior Structure

During exterior inspections of the SSEs, Polestar Technical Services personnel did not identify any conditions requiring immediate corrective action. The steel structures are in very good condition and the original concrete portions are in fair to good condition. They noted several gaps in the steel siding that provide bats and birds access to the inside of the 105-C, 105-D, 105-F, and 105-H SSEs. These gaps or openings do not affect the structural integrity of the SSEs. However, they do provide access for biological intrusion and will be evaluated for future maintenance/housekeeping actions.

2.4.2.2 Interior Structure

Interior inspections revealed that, with few exceptions, the original concrete structures are aging very well and appear structurally sound. The newer steel SSE also shows very little if any structural deterioration. The gaps or openings in the seams of the steel siding are obvious from the inside and reveal themselves as “light leaks.”

Vertical cracks in the original concrete wall near and inside the vestibule were noted in the 105-F and 105-D SSEs. A crack monitor, shown in Figure 5, was installed in each of these SSEs to monitor any potential displacement along the cracks with time. It is interesting to note that similar cracks were observed in the 105-B Reactor building, which has construction very similar to the 105-F and 105-D SSEs. Bat guano and/or spider webs were present in all the SSEs. Live and dead bats were observed in some SSEs and evaluated by the IH for health and safety purposes. The inside conditions were dry in all of the SSEs and little or no evidence of water intrusion was noted. No evidence of groundwater intrusion was noted in any of the basement floors.



Figure 5. Crack Monitor Installed at 105-F.

2.4.3 Thermal and Flood-Level Sensor Survey

Temperature and flood level sensors are present at each SSE. These sensors are monitored monthly. The results of the temperature and flood-level surveys are shown in Figures 6 and 7, respectively. The temperature and flood level monitoring systems were automated by MSA Long-Term Stewardship personnel in 2014. During the surveillance, instrument technicians visually inspected the temperature sensors and float switches for the flood sensors and manually manipulated the float switches to simulate an alarm condition. A data analyst with a laptop computer at the SSE ran the remote reactor sensor monitoring application.

The temperature and flood-level sensors were operating within the acceptable ranges. A problem was observed with one backup temperature sensor reading in the 105-D SSE. It is not known whether the backup sensor is malfunctioning or the switch is malfunctioning. Data collected

since 2009 are presented in Figure 6. These data show that monthly maximum and minimum temperatures inside the SSE structures track with average outside temperatures. Additionally, none of the SSEs show evidence of surface water or groundwater flooding (alarm conditions) (Figure 7). Continued monthly monitoring of these systems may not provide any additional value.

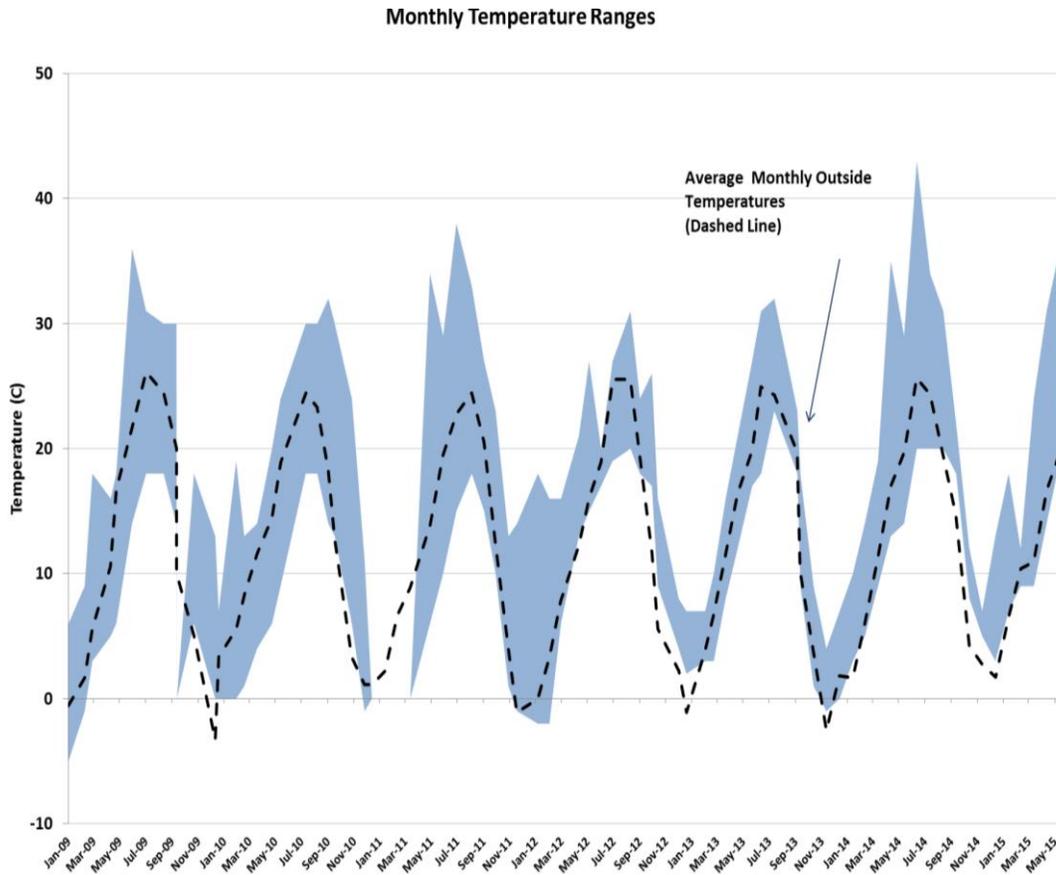


Figure 6. Monthly Temperature Readings and Average outside Temperature.

3.0 WASTE MANAGEMENT

The surveillance activities generated minimal amounts of personnel protective equipment considered waste after the SSE entries. The waste was classified as potential low-level radioactive waste because the waste was generated inside a contamination area. The waste generated at each SSE was managed by following MSC-PRO-EIS-0204, *Reactor Facility Waste Management Instruction*.

Four bags of potential low-level radioactive waste were found inside 105-H SSE and one bag was found inside 105-D SSE. The bags were presumably left behind by the previous surveillance contractor. The contents of the bags will be characterized then disposed of as required by MSC-PRO-EIS-0204. The characterization and disposal activity will occur in FY 2016 with other maintenance/housekeeping activities.

Two dry transformers were observed in 105-C SSE. A work package will be prepared to remove the transformers. The removal work will be completed in FY 2016.

The low-level radioactive waste generated during the SSE entries by MSA was collected in plastic bags and stored in drums. After the surveillance routines were completed, the drums were moved to 105-N SSE. The drums will be shipped from 105-N SSE to the Environmental Restoration Disposal Facility (ERDF) under the appropriate waste management procedures. The required paperwork for the shipment to ERDF has been completed.

Oil stains from mechanical equipment (trolley cranes or winches) were observed in the 105-C and 105-D SSEs. A small amount of oil pooled in a drip pan was also observed in the 105-C SSE. The oil stains and the pooled oil will be evaluated for further action, if any, during the maintenance/housekeeping work planned in FY 2016.

4.0 CONCLUSION AND RECOMMENDATIONS

The SSE structures are aging well with only minor nonstructural or “housekeeping” issues noted. No changes to radiological conditions from previous inspections were noted during the surveillances. Structural and radiological findings (Appendices B through F) provide evidence that the SSE structures are functioning as designed and are protective of the public and environment. However, the surveillance identified several housekeeping actions for consideration. Some of the identified actions have been completed. Other the actions are underway or are being planned for completion in FY 2016/2017. The recommended actions are addressed in the following subsections.

4.1 ADMINISTRATIVE ACTIONS

1. Based on the performance of the SSEs, consider working with the Tri-Party agencies to extend the 5-year inspection period to 10 years (next inspection period 2025). The S&M plans developed for each SSE allows for this type of adjustment and the finding of no significant deterioration in any of the SSEs support this recommendation.

Actions Taken/Actions Proposed

Following TPA-CNs to change the surveillance frequency to 10 years are being considered.

TPA-CN-0711 (105-C)

TPA-CN-0712 (105-D)

TPA-CN-0713 (105-H)

TPA-CN-0714 (105-N/109-N)

TPA-CN-0715 (105-F)

TPA-CN-0716 (105-DR)

2. Work with the Tri-Party agencies to align the 105-DR SSE into the next proposed SSE assessment period (2025).

Actions Taken /Actions Proposed

TPA-CN-0716 is being considered to align the 105-DR SSE into the next proposed assessment (2025) alignment with other SSEs.

3. Revise the individual S&M plans for each SSE into a single document. The revision should take into account the current conditions and routes available to survey.

Actions Taken/Actions Proposed

DOE/RL-2016-21, *Surveillance and Maintenance Plan for 105-C, 105-D, 105-DR, 105-F, 105-H, and 105-N/109-N Safe Storage Enclosures* is being written and will be completed prior to the next inspection period. .

4. Work with the Tri-Party agencies to discontinue the temperature and flood-level sensor monitoring. The data set to date clearly demonstrates that no upset conditions

(temperature or flooding) have been identified and the likelihood of future upset conditions is negligible.

Actions Taken /Actions Proposed

Following TPA-CNs which will eliminate periodic monitoring are being considered.

TPA-CN-0711 (105-C)

TPA-CN-0712 (105-D)

TPA-CN-0713 (105-H)

TPA-CN-0714 (105-N/109-N)

TPA-CN-0715 (105-F)

TPA-CN-0716 (105-DR).

4.2 105-C SAFE STORAGE ENCLOSURE

1. Confined space at level 0 ft

This confined space is a hole in the floor leading to a tunnel at -17 ft (Appendix B, Figures 1 and 2). The space is identified as “NON-PERMIT REQUIRED CONFINED SPACE.”

Actions Taken/Actions Proposed

The space was not entered. The proposed action is that if entering the space during future inspections becomes necessary, the safety personnel will evaluate the space for appropriate confined space classification as dictated by the current procedure for confined space entry.

2. There is evidence of very slow water in-leakage at a pourback/roof structure junction at grade level; the leak is so slow as to only form white deposits, as shown in Figure 8.

Action Taken/Action Proposed

The proposed action is to seal the outside area (Figure 8) where the in-leak may be occurring.



Figure 8. The Area to be Sealed at the 105-C SSE.

3. An open J-box in the vestibule for the new SSE incoming power line was identified.

Action Taken/Action Proposed

A cover has been installed on the J-box. The issue is closed.

4. The interior and exterior of a steel door on the rear face exhibits a good deal of corrosion on the outside at its base and some dampness and corrosion on the inside at this location.

Actions Taken/Actions Proposed

The area around the door was regraded to keep the water away. This item will be observed during the annual exterior inspections.

5. Several locations were observed where light from the outside could be seen through a gap in the siding. While not a structural issue, these locations could provide opportunities for biological intrusions.

Actions Taken /Actions Proposed

A project to screen off the gaps in the siding has been initiated. This activity is planned to be completed in FY 2016.

6. A number of locations show dense swallow nesting at concrete interior corners and under ledges – not an issue presently, but continued buildup of feces around the building and on installed steel caps on the exterior rear face may present personnel or corrosion concerns in the future.

Actions Taken/Actions Proposed

Continue to monitor the swallow nests.

7. Hydraulic fluid is present in the equipment pan and on the floor (Appendix B, Photos 3601 and 3605).

Actions Taken/Actions Proposed

The unknown liquid and the hydraulic fluid are confined to the area of contamination. No evidence of fresh hydraulic oil drips was found on the floor. These items will be monitored during future S&M activities.

8. Two dry transformers observed at 45 ft 2¼ in. (Appendix B, Photos 3628 and 3629)

Actions Taken/Actions Proposed

BHI-01231, *105-C Reactor Interim Safe Storage Project Final Report*, did not address the transformers. A work package to remove the two transformers is being prepared in FY 2016.

9. Multiple live bats and a single dead bat were observed. Bat guano was seen in multiple locations and on multiple levels along the survey routes.

Actions Taken/Actions Proposed

Four bat houses were installed on the 105-C SSE in September 2015.

4.3 105-D SAFE STORAGE ENCLOSURE

1. A vertical crack in entrance vestibule to the SSE (Appendix C, photo 3561) extends from just above the floor (0-ft level) to the ceiling of the vestibule. Specific portions of the crack are large enough that pieces (about 1 in. by 1 in.) of concrete have fallen out of the wall.

Actions Taken/Actions Proposed

A crack monitor was installed on the crack inside the vestibule (Appendix C, Photo 3561). This monitor was labeled Crack Monitor D-1. A second crack monitor, labeled D-2, was installed on this same crack on the inside of the facility (on the opposite side of the wall from the vestibule) (Appendix C, Photo 3669). The crack monitors in the vestibule will be observed annually and the interior crack monitor will be observed during future interior inspections.

2. A winch is leaking oil/grease in the front face room (Appendix C, Photo 3542). The winch is located along the north wall of room 40+ ft above the front face floor. Oil/grease spots observed on the floor of the front face room appeared to be new. Another winch located above the 80-ft elevation also is leaking oil/grease.

Actions Taken/Actions Proposed

Monitor during future S&M activities.

3. Metal floor sheeting on the 13-ft level was lifting up in one location. Sheeting can be a tripping hazard.

Actions Taken /Actions Proposed

The metal floor sheeting will be evaluated by Safety personnel during the next S&M activities.

4. Concrete spalling was observed at the underside of the staircase located on the 42-ft 5-in. level (Appendix C, Photo 3535).

Actions Taken /Actions Proposed

The spalling does not appear to be an imminent hazard, however, it will be monitored during future S&M activities.

5. The concrete spanned walkway on the west side of the 56-ft 4-in. level had several hairline cracks running perpendicular to the walkway (Appendix C, Photo 3525).

Actions Taken/Actions Proposed

The cracks do not appear to be an imminent hazard, however, it will be monitored during the next interior S&M activities.

6. At several locations at the 56-ft 4-in. elevation, light from the outside could be seen through the gap in siding (Appendix C, Photos 3519 through 3522).

Actions Taken/Actions Proposed

A project to screen off the gaps in the siding has been initiated. The project is scheduled to be completed in FY 2016.

7. Swallow nests were noted at various locations on the exterior of the facility.

Actions Taken/Actions Proposed

Continue to monitor the swallow nests.

8. One bag of potential low-level radioactive waste was found inside 105-D SSE, presumably from the previous inspection contractor.

Actions Taken /Actions Proposed

The waste will be characterized and removed as specified in applicable procedure.

4.4 105-F SSE

1. Small cracks were observed at the 0-ft level in the base SSE concrete wall starting at each infill at an approximately 45-degree angle (Appendix D, Figure 1).

Actions Taken/Actions Proposed

Two crack monitors were installed. They will be monitored during the future S&M activities.

2. At several locations, light from the outside could be seen through a gap in the siding.

Actions Taken/Actions Proposed

A project to screen off the gaps in the siding has been initiated. The project is scheduled to be completed in FY 2016.

4.5 105-H SSE

1. At several locations, light from the outside could be seen through gaps in the siding.

Actions Taken /Actions Proposed

A project to screen off the gaps in the siding has been initiated.

2. A metal plate is affixed to the west wall on the front face with bolts (Appendix E, Figure A-2). The concern is that the bolts can be removed to gain unauthorized access inside the SSE.

Actions Taken /Actions Proposed

A project to tac-weld the bolts has been completed.

3. Four bags of potential low-level radioactive waste were found inside 105-H SSE, presumably left by the previous inspection contractor.

Actions Taken /Actions Proposed

The waste will be characterized and disposed of as specified in applicable programs and procedure.

4. Multiple live bats and a single dead bat were observed. Bat guano was seen in multiple locations and on multiple levels along the survey routes.

Actions Taken/Actions Proposed

Four bat houses were installed on 105-H SSE in September 2015.

4.6 105-N/109-N SAFE STORAGE ENCLOSURE

1. At several locations, light from the outside could be seen through gaps in the siding.

Actions Taken/Actions Proposed

A project to screen off the gaps in the siding has been initiated. This project is scheduled to be completed by FY 2016.

2. Faint air flow out of the Zone 1 door into Room 172 was noted (Appendix F, Photo 3737).

Actions Taken/Actions Proposed

The actions required to evaluate this condition and possibly better seal the doors will be reviewed in FY 2016.

3. Swallow nesting was observed at concrete/siding junction and in some cases directly on the steel sliding.

Actions Taken/Actions Proposed

A project to remove the swallow nests from 105-N/109-N has been initiated and will be completed in FY 2016.

4. Possible water intrusion/corrosion from outside caused by contact with backfill at the door (Appendix F, Photo 3683).

Actions Taken/Actions Proposed

The area was regraded away from the door. Monitor during the next S&M activities.

5. Ceiling corrosion was noted at 60-ft level (Appendix F, Photos 4, 5, 6, & 7, Addendum 1)

Actions Taken/Actions Proposed

The floor area under the ceiling was covered with a clean sheet of plastic (Figure 9). Monitor the plastic sheet for accumulation of rust falling from the ceiling to evaluate potential corrosion rates.



Figure 9. Plastic Sheeting on Floor under Corrosion Area in 105-N (60-foot level).

5.0 REFERENCES

36 CFR 800, "Protection of Historic Properties," *Code of Federal Regulations*, as amended.

Archaeological Resources Protection Act of 1979, 16 USC § §470aa – 470mm, et seq., as amended.

DOE-0342, 2014, *Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP)*, Rev. 2A, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-0342-002, 2015, *Hanford Site Assessment & Characterization/Verification of Buildings Procedure*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-98-44, 2012, *Surveillance and Maintenance Plan for the 105-C Reactor Safe Storage Enclosure*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2003-45, 2003, *Surveillance and Maintenance Plan for the 105-F Reactor Safe Storage Enclosure*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2004-59, 2004, *Surveillance and Maintenance Plan for the 105-D Reactor Safe Storage Enclosure*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-67, 2005, *Surveillance and Maintenance Plan for the 105-H Reactor Safe Storage Enclosure*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2011-106, 2011, *Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure*, Rev 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE 1989, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

National Historic Preservation Act of 1966, 16 USC §470 et seq., as amended.

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APPENDIX A
S&M ACTIVITIES REPORTS COMMON TO 105-C, 105-D, 105-F, 105-H, AND
105-N/109-N SAFE STORAGE ENCLOSURES

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APPENDIX A
S&M ACTIVITIES REPORTS COMMON TO 105-C, 105-D, 105-F, 105-H, AND
105-N/109-N SAFE STORAGE ENCLOSURES

This appendix includes ecological resource surveys for 105-C, 105-D, 105-F 105-H, and 105-N/109-N safe storage enclosures. The temperature and flood level data for June and July 2015 are provided as Table A-1 to illustrate the data routinely collected. The 5-year data for the temperature and flood levels are summarized in Figures 6 and 7 in Section 2.4.3 of the main document.

Table A-1. Temperature and Flood Level Data For June and July 2015.

Reading Date	SSE	Power	Float 1	Float 2	Float 3	Temp 1	Temp 2	Temp 3	Voltage	Error Message
07/15/2015 12:00 PM	100-C	On	Normal	Normal	N/A	26.0°C (78.8°F)	30.5°C (86.9°F)	N/A	22.999	None
07/15/2015 12:00 PM	100-D	On	Normal	Normal	N/A	26.7°C (80.1°F)	35.0°C (95.0°F)	N/A	24.162	None
07/15/2015 12:00 PM	100-DR	On	Normal	Normal	N/A	26.7°C (80.1°F)	38.8°C (101.8°F)	N/A	24.262	None
07/15/2015 12:00 PM	100-F	On	Normal	Normal	N/A	26.0°C (78.8°F)	36.0°C (96.8°F)	N/A	23.763	None
07/15/2015 12:00 PM	100-H	On	Normal	Normal	N/A	25.0°C (77.0°F)	36.9°C (98.4°F)	N/A	24.162	None
07/15/2015 12:00 PM	100-N (1)	On	Normal	Normal	Normal	23.9°C (75.0°F)	31.4°C (88.5°F)	N/A	23.410	None
07/15/2015 12:00 PM	100-N (2)	Off	N/A	N/A	N/A	N/A	N/A	N/A	23.490	None
06/15/2015 12:00 PM	100-C	On	Normal	Normal	N/A	21.2°C (70.2°F)	26.0°C (78.8°F)	N/A	22.999	None
06/15/2015 12:00 PM	100-D	On	Normal	Normal	N/A	22.2°C (72.0°F)	33.3°C (91.9°F)	N/A	24.162	None
06/15/2015 12:00 PM	100-DR	On	Normal	Normal	N/A	21.2°C (70.2°F)	34.3°C (93.7°F)	N/A	24.262	None
06/15/2015 12:00 PM	100-F	On	Normal	Normal	N/A	21.2°C (70.2°F)	36.0°C (96.8°F)	N/A	23.763	None
06/15/2015 12:00 PM	100-H	On	Normal	Normal	N/A	19.3°C (66.7°F)	34.3°C (93.7°F)	N/A	24.096	None
06/15/2015 12:00 PM	100-N (1)	On	Normal	Normal	Normal	20.1°C (68.2°F)	29.5°C (85.1°F)	N/A	23.520	None
06/15/2015 12:00 PM	100-N (2)	Off	N/A	N/A	N/A	N/A	N/A	N/A	23.240	None

Mission Support Alliance
Post Office Box 650
Richland, Washington 99352



MSA-1502040

May 11, 2015

Rick Moren
Mission Support Alliance
P. O. Box 650
Richland, WA 99352

Dear Mr. Moren:

SURVEY REPORT FOR ECOLOGICAL RESOURCES SURVEY TO COMPLY WITH STIPULATIONS PROVIDED BY REVIEW ECR-2015-106, 105C, 105D, 105H and 105N REACTOR ENTRY TO PERFORM 5 YEAR SURVEILLANCE AND MAINTENANCE IN THE BUILDINGS

Reference: MSA Service Catalog Request#KSR000000158249, P. Gonzalez, MSA, dated November 20, 2014.

MSA Correspondence MSA-1500064, P. Gonzalez, MSA, dated January 12, 2015

PROJECT DESCRIPTION

The Interim Safe Storage (ISS) Project prepared the 105C, 105D, 105H and 105N Reactor for long-term safe storage until the reactor block can be removed at the end of the storage period. In accordance with the long-term safe storage, surveillance and maintenance activities are performed every five years "to ensure that the safe storage enclosure (SSE) at the Hanford Site's C, D, H and N Reactors are maintained in a safe, environmentally secure, and cost-effective manner until subsequent closure during the final disposition phase of decommissioning" (DOE/RL 2003). An ecological resources review was performed prior to five year entry. The review ECR-2015-106 provided the project with stipulations that would support the protection of resources. ECR-2014-124, for entry into 105F performed in 2014, provided additional stipulations for entry requirements including:

"As part of the surveillance and maintenance activities to be conducted in the 105F Reactor building, a biologist from MSA's Ecological Monitoring and Compliance organization shall participate in a walkdown inside the building to look for any signs that bats have been or are currently present within the building. Project personnel must contract the author of this section at least 7 days prior to the scheduled entry to ensure a biologist is available."

To be consistent with compliance with stipulations from ECR-2014-124 for entry into all reactor entries, biologists from MSA's Ecological Monitoring and Compliance organization participated in walk through inside the buildings to look for signs that bats or other wildlife have been or are currently present within the building. This letter report provides background on the primary resource of interest, details of survey, and recommendations from findings.

General Bat Information for the Hanford Site (Lindsey et al. 2013)

Nine species of bats have been documented on the Hanford Site by the Nature Conservancy (TNC) in surveys performed in 1997 and 1998 (Soll et al. 1999) and by Mission Support Alliance (MSA) in surveys performed 2012 (Lindsey et al. 2012) (Table 1).

Table 1. Bat species previously encountered on the Hanford Site by Nature Conservancy and Mission Support Alliance

Common Name	Scientific Name	TNC Acoustic	TNC Captured	MSA Acoustic 2012
pallid bat	<i>Antrozous pallidus</i>	X	X	X
big brown bat	<i>Eptesicus fuscus</i>	X		X
silver-haired bat	<i>Lasionycteris noctivagans</i>	X	X	X
hoary bat	<i>Lasiurus cinereus</i>	X		X
California myotis	<i>Myotis californicus</i>		X	X
western small-footed myotis	<i>Myotis ciliolabrum</i>		X	X
little brown myotis	<i>Myotis lucifigus</i>		X	X
Yuma myotis	<i>Myotis yumanensis</i>		X	X
canyon bat	<i>Parastrellus hesperus</i>	X		X

Of the species documented on the Hanford Site, pallid bats, western small-footed myotis, and canyon bats are listed as Washington Department of Fish and Wildlife (WDFW) State Monitor Species (WDFW 2014). In addition, roosting concentrations of big-brown bats, pallid bats, and all roosts for bats in the genus *Myotis* are considered Priority Habitats by the WDFW (WDFW 2013). Roosting congregations can be maternity colonies, winter roosts, or night roosts. Males typically day-roost alone or in small groups, and do not have the same strict roosting habitat requirements as maternity colonies. Maternity colonies are specialized locations where groups of female bats roost together to give birth and raise their young. Individuals show strong fidelity to these roosting locations, and the same roosts are used year-after-year. These locations are selected for proximity to food and water resources, as well as appropriate temperature, humidity, and light conditions. The bats congregate to share body heat in order to conserve energy. These maternity locations are vital to successful reproduction. Night roosts are located close to feeding areas and are used by bats for resting and digestion between feeding bouts. Bats are known to habitually use night roosts from night-to-night and from year to year (Ormsbee et al. 2007). Although some species that occur on the Hanford Site are migratory (silver-haired bat, hoary bat), most bats remain in the region during the winter. Due to cold temperatures and lack of available food (insects), bats must hibernate in winter roosts to survive. Winter roosts are selected for cold and constant temperatures so bats can down-regulate their body temperature, slowing their metabolism and conserving energy, to survive through the winter. Bats select all communal roost types for very specific conditions that may not be otherwise available in the same areas. Identification and protection of roosting locations is becoming increasingly important with the outbreak of the fungal infection referred to as White Nose Syndrome (WNS). White nose syndrome is affecting bats in the eastern United States and Canada, and is rapidly expanding westward. Bats save energy during the winter by reducing their body temperature and entering a state of hibernation called torpor. They break these torpor bouts by warming their

body temperature back up at regular intervals through the winter; these events are termed “arousals”. Bats are thought to use these arousals for depuration, defecation, grooming, breeding, and possibly drinking. Although these arousals represent a relatively small portion of the time the bats spend winter roosting, a large amount (up to 80%) of their energy stores for the season are burned during arousals (Thomas et. al. 1990). Bats are thought to increase the number of arousals due to WNS, likely for additional grooming. Although other factors may be contributing, the excessive arousals cause bats to exhaust their energy stores prior to the end of the winter, resulting in starvation. This disease spreads quickly through roosting colonies and causes fatality rates up to 100% at infected winter roosts (more information available at whitenosesyndrome.org). Because of the collapse of these bat colonies and the potential expansion of this disease westward, it is extremely important to identify and characterize roosts to provide a baseline in case the disease reaches this area. Bat researchers must follow strict WNS Protocols established by the U.S. Fish and Wildlife Service (FWS) and other agencies when working with bats (WNS 2012).

Bats are sensitive to disturbance, especially while pregnant and lactating. Early identification of roost areas can help avoid impacts to these sensitive species. DOE-RL has shown a commitment to protecting bats on the Hanford Site, providing protection for known roost sites and mitigating for unavoidable impacts to other roosting locations. Washington Closure Hanford, a contractor to DOE-RL, has identified maternity colonies of Yuma myotis and pallid bats in abandoned buildings in the 100-F and 100-D Areas of the Hanford Site and protected these important maternity colonies, which are some of the largest in the State of Washington (West et al. 2011, Table 2).

Table 2. Bat Roosts Known on the Hanford Site Prior to 2013

Description	Primary Roost Type	Primary Species Present
105-F Reactor Bat Boxes	Maternity	Pallid Bats
105-H Reactor Bat Boxes	Unknown	Unknown
183-D Facility	Maternity	Pallid Bats
183-F Clearwell	Maternity	Yuma myotis
190-D Pipe Tunnel Entrance	Maternity	Yuma myotis
190-DR Pipe Tunnel Entrance	Maternity	Yuma myotis
Cornelius Pump House	Unknown	Pallid Bats
Hanford Townsite School	Unknown	Unknown

Walkdown Survey Summary of the 105C, D, H, N Reactor SSE

Mission Support Alliance (MSA) Environmental Compliance biologists Justin Wilde and Jamizon Grzyb performed an exterior and interior walkdown survey of 105D, H and N reactors. Justin Wilde was only biologist who performed survey of 105C reactor.

105H

Higher than expected quantities of guano throughout reactor. Located a minimum of 2 live bats using the reactor on inspection routes, presumed to be little brown myotis (*Myotis lucifugus*). Noticed multiple entry points for bats and potentially smaller birds. No bat mitigation was noticed outside of reactor via bat boxes or other items. Joe Wiley, RCT,

R. Moren
 May 11, 2015
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noted bat on ground in poor condition in reactor face room on April 8, 2015. PSRP staff biologists advised J. Wiley not to make contact with the bat but to contact Integrated Biological Control (IBC) for handling of potentially ill bats. IBC staff collected bat and deemed it to be healthy but entrapped in cobwebs from reactor, confirmed little brown myotis, placed on exterior of building. The bat later vacated the building area.

105D

Guano was present, but in limited amounts, similar to the 2014 105F entry. No live bats were noted during the survey of the inspection routes. Many bat mitigation measures are present surrounding 105D, including structures built for bat occupancy and availability to clear well tunnels and clear well itself. There was an increased present of bird droppings, likely Rock Pigeon (*Columba livia*) and also other rodent droppings both of some mouse species and large droppings likely from a Norway rat (*Rattus norvegicus*) with potential being from a bushy-tailed woodrat (*Neotoma cinerea*) but unlikely due to shape.

105N

Limited presence of wildlife sign was seen during survey. A small amount of guano was located in limited locations. Very little ecological resource concern on survey.

105C

105C had high amount of ecological activity inside. Multiple live bats, and a single dead bat were located along survey routes. Up near the “top hat” location of the reactor at least 2 bats were seen flying around the open space. Guano was seen in multiple locations and on multiple levels of the survey route. There was sign of bird waste in locations along the survey route as well. On the exterior of the reactor there were 2 large nests. A nest on the north side of the reactor was believed to be occupied by a Common Raven (*Corvus corax*). The southern nest was occupied by a Red-tailed Hawk (*Buteo jamaicensis*) pair with birds present on the nest. Activities on the southern side of the reactor disturbed the birds and pushed parents off the nest. Project was advised to stay indoors when possible and limit time birds were forced from the nest to 30 minutes for every 4 hours.

Recommendations

The presence of bat guano in many locations does provide evidence that bats are using the interior of reactors SSE, at minimum in warmer months. Therefore, exclusion activities including the repair of any openings or crevices that wildlife may enter through can be performed during the winter months without risk to bats. Should work be performed in the warmer months, March through September, additional restrictions will apply. If the project plans on performing work during a time of higher bat activity levels, additional surveys will be required to reduce impacts to the resources. Additionally, nesting birds at that time may also induce extra controls and limitations to comply with the Migratory Bird Treaty Act.

105C and 105H lacked bat mitigation measures, such as bat boxes, on the exterior of the buildings. It is highly recommended that bat boxes be added to the exterior of those buildings to provide alternative roosting locations for species in the area. Should any repairs to the building cause exclusion of bat populations than these mitigation actions shall be in place 2-3 weeks before repairs begin. Other Hanford reactors have used the Coveside Sunshine’s bat house, large size. These area usually painted dark brown and affixed to the

R. Moren
May 11, 2015
Page 5

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building reactor wall. Please contact PSRP biologists for directions on installation of bat boxes for highest probability of success.

All questions in regards to the contents of this letter should be directed to J. W. Wilde at 376-2473.

HNF-59342, Rev. 0

Mission Support Alliance
Post Office Box 650
Richland, Washington 99352



MSA-1502040

ATTACHMENT 1

PHOTOS TAKEN OF ECOLOGICAL RESOURCES DURING SURVEY OF 105 C, D, H,
AND N

Consisting of 2 pages,
Including this cover page



Figure 1. Accumulation of Bat Guano on floors during reactor entry



Figure 2. Bats located inside the 100C reactor

Mission Support Alliance
Post Office Box 650
Richland, Washington 99352



MSA-1404536

October 21, 2014

Rick Moren
Mission Support Alliance
P. O. Box 650
Richland, WA 99352

Dear Mr. Moren:

SURVEY REPORT FOR ECOLOGICAL RESOURCES SURVEY TO COMPLY WITH STIPULATIONS PROVIDED BY REVIEW ECR-2014-124, 105F REACTOR ENTRY TO PERFORM 5 YEAR SURVEILLANCE AND MAINTENANCE IN THE 105-F BUILDING

Reference: MSA Service Catalog Request#KSR000000138624, P. Gonzalez, MSA, dated July 31, 2014.

MSA Service Catalog Request# KSR000000143483, P. Gonzalez, MSA, dated September 8, 2014.

MSA Correspondence MSA-1403384, P. Gonzalez, MSA, dated September 24, 2014

PROJECT DESCRIPTION

The 105-F Interim Safe Storage (ISS) Project prepared the 105-F Reactor for long-term safe storage (up to 75 years) until the reactor block can be removed at the end of the storage period (Ison 2003). In accordance with the long-term safe storage, surveillance and maintenance activities are performed every five years “to ensure that the safe storage enclosure (SSE) at the Hanford Site’s 105-F Reactor is maintained in a safe, environmentally secure, and cost-effective manner until subsequent closure during the final disposition phase of decommissioning” (DOE/RL 2003). An ecological resources review was performed prior to five year entry. The review ECR-2014-124 provided the project with stipulations that would support the protection of resources, including:

“As part of the surveillance and maintenance activities to be conducted in the 105F Reactor building, a biologist from MSA’s Ecological Monitoring and Compliance organization shall participate in a walkdown inside the building to look for any signs that bats have been or are currently present within the building. Project personnel must contract the author of this section at least 7 days prior to the scheduled entry to ensure a biologist is available.”

In compliance with stipulations from ECR-2014-124 for entry into 105-F SSE biologists from MSA’s Ecological Monitoring and Compliance organization participated in a walk through inside the building to look for signs that bats or other wildlife have been or are currently present within the building. This letter report provides background on the primary resource of interest, details of survey, and recommendations from findings.

General Bat Information for the Hanford Site (Lindsey et al. 2013)

Nine species of bats have been documented on the Hanford Site by the Nature Conservancy (TNC) in surveys performed in 1997 and 1998 (Soll et al. 1999) and by Mission Support Alliance (MSA) in surveys performed 2012 (Lindsey et al. 2012) (Table 1).

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silver-haired bat	<i>Lasionycteris noctivagans</i>	X	X	X
hoary bat	<i>Lasiurus cinereus</i>	X		X
California myotis	<i>Myotis californicus</i>		X	X
western small-footed myotis	<i>Myotis ciliolabrum</i>		X	X
little brown myotis	<i>Myotis lucifigus</i>		X	X
Yuma myotis	<i>Myotis yumanensis</i>		X	X
canyon bat	<i>Parastrellus hesperus</i>	X		X

Of the species documented on the Hanford Site, pallid bats, western small-footed myotis, and canyon bats are listed as Washington Department of Fish and Wildlife (WDFW) State Monitor Species (WDFW 2014). In addition, roosting concentrations of big-brown bats, pallid bats, and all roosts for bats in the genus *Myotis* are considered Priority Habitats by the WDFW (WDFW 2013). Roosting congregations can be maternity colonies, winter roosts, or night roosts. Males typically day-roost alone or in small groups, and do not have the same strict roosting habitat requirements as maternity colonies. Maternity colonies are specialized locations where groups of female bats roost together to give birth and raise their young. Individuals show strong fidelity to these roosting locations, and the same roosts are used year-after-year. These locations are selected for proximity to food and water resources, as well as appropriate temperature, humidity, and light conditions. The bats congregate to share body heat in order to conserve energy. These maternity locations are vital to successful reproduction. Night roosts are located close to feeding areas and are used by bats for resting and digestion between feeding bouts. Bats are known to habitually use night roosts from night-to-night and from year to year (Ormsbee et al. 2007). Although some species that occur on the Hanford Site are migratory (silver-haired bat, hoary bat), most bats remain in the region during the winter. Due to cold temperatures and lack of available food (insects), bats must hibernate in winter roosts to survive. Winter roosts are selected for cold and constant temperatures so bats can down-regulate their body temperature, slowing their metabolism and conserving energy, to survive through the winter. Bats select all communal roost types for very specific conditions that may not be otherwise available in the same areas. Identification and protection of roosting locations is becoming increasingly important with the outbreak of the fungal infection referred to as White Nose Syndrome (WNS). White nose syndrome is affecting bats in the eastern United States and Canada, and is rapidly expanding westward. Bats save energy during the winter by reducing their body temperature and entering a state of hibernation called torpor. They break these torpor bouts by warming their

body temperature back up at regular intervals through the winter; these events are termed “arousals”. Bats are thought to use these arousals for depuration, defecation, grooming, breeding, and possibly drinking. Although these arousals represent a relatively small portion of the time the bats spend winter roosting, a large amount (up to 80%) of their energy stores for the season are burned during arousals (Thomas et. al. 1990). Bats are thought to increase the number of arousals due to WNS, likely for additional grooming. Although other factors may be contributing, the excessive arousals cause bats to exhaust their energy stores prior to the end of the winter, resulting in starvation. This disease spreads quickly through roosting colonies and causes fatality rates up to 100% at infected winter roosts (more information available at whitenosesyndrome.org). Because of the collapse of these bat colonies and the potential expansion of this disease westward, it is extremely important to identify and characterize roosts to provide a baseline in case the disease reaches this area. Bat researchers must follow strict WNS Protocols established by the U.S. Fish and Wildlife Service (FWS) and other agencies when working with bats (WNS 2012).

Bats are sensitive to disturbance, especially while pregnant and lactating. Early identification of roost areas can help avoid impacts to these sensitive species. DOE-RL has shown a commitment to protecting bats on the Hanford Site, providing protection for known roost sites and mitigating for unavoidable impacts to other roosting locations. Washington Closure Hanford, a contractor to DOE-RL, has identified maternity colonies of Yuma myotis and pallid bats in abandoned buildings in the 100-F and 100-D Areas of the Hanford Site and protected these important maternity colonies, which are some of the largest in the State of Washington (West et al. 2011, Table 2).

Table 2. Bat Roosts Known on the Hanford Site Prior to 2013

Description	Primary Roost Type	Primary Species Present
105-F Reactor Bat Boxes	Maternity	Pallid Bats
105-H Reactor Bat Boxes	Unknown	Unknown
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190-D Pipe Tunnel Entrance	Maternity	Yuma myotis
190-DR Pipe Tunnel Entrance	Maternity	Yuma myotis
Cornelius Pump House	Unknown	Pallid Bats
Hanford Townsite School	Unknown	Unknown

Bat in the 105-F Reactor SSE Area (West et al. 2011)

Roosting bats were observed inside the 100-F Reactor building during the initial phases of the ISS project beginning in FY2000. In spring 2003, a maternity colony of pallid bats was observed in the upper reaches of the reactor building and *Myotis sp.* were also seen. During the installation of the new roof on the 100-F Reactor in August 2003, mitigation efforts were initiated to remove the bats from the building unharmed and provide alternate roosting habitat. A slotted door with exclusion netting was used to allow bats to get out of the building but did not allow them to get back in. Commercially-made bat roosts were installed on the outside walls of the reactor building and on one utility pole 50 m northeast of the reactor. Five bat boxes designed for pallid bats and two designed for *Myotis* bats were placed

on the outside of the reactor. One bat box designed for pallid bats was positioned on the utility pole.

Follow-up surveys in September 2003 showed pallid bats were using the boxes on the reactor but not the box on the utility pole. Very few *Myotis* bats were using the boxes designed for them. During spring 2004, pallid bats were observed using all of the boxes on the reactor designed for them but not the one on the utility pole. *Myotis sp.* continued to use the boxes for them but not as a maternity colony. In subsequent years (2005-2010), pallid bats continue to use the boxes designed for them on the outside of the reactor as a maternity colony. On September 25, 2008, Nine pallid bats and one Yuma myotis were captured in mist nets at the 105-F Reactor. All of the pallid bats captured were female and some appeared to have given birth that year providing further evidence that the boxes were being used as a maternity colony.

Bat monitoring was performed at the 105-F Reactor on August 31, 2009. During mist netting, one of the captured pallid bats was light tagged (a small glo-stick used to identify the bat in flight) and was observed entering the eve of the 105-F Reactor roof.

October 14, 2014 Walkdown Survey of the 105-F Reactor SSE

Mission Support Alliance (MSA) Environmental Compliance biologists Justin Wilde and John Nugent performed an exterior and interior walkdown survey of 105-F Reactor SSE on October 14, 2014. During the exterior survey, three large stick nests were located on the outside of the reactor building. One of these nests was observed earlier in the year (during the 2014 nesting season) as an active Common Raven (*Corvus corax*) nest. The exterior survey documented accumulations of bat guano below multiple bat boxes affixed to the exterior wall of 105-F Reactor building. No obvious building entrances for bats or other wildlife were noted from the exterior of the building.

The 105-F interior survey was initiated at 0927 hours and lasted until approximately 1015 hours. The survey started by entering the basement of the 105-F Reactor building. Scattered accumulations of bat guano were noted. No bats were observed in the basement area.

The survey continued by climbing to various levels within the 105-F Reactor SSE. Stairways and landings with light fixtures often had bat guano accumulations below the light fixtures indicating potential day or night roost locations (Figure 1). Old lamp fixtures, void of bulbs, appear to provide roosting structure for the bats (Figure 2). No bats were observed.

Several other wildlife observations were made. The first observation was a medium-sized woven cup nest discovered on a shelf structure. The nest appeared to be that of an American Robin (*Turdus migratorius*) based on size and shape, although other species are possible. The nest had feces pushed to the edges and down the sides, a sign that an adult bird was cleaning the nest and that the nest may have been successful at producing young. A determination of how recently the nest may have been active was not possible. The second observation was the skeleton of a bird found behind a screen in an air duct. The air duct was out of reach but, judging by the size and shape of the skeleton, the bird was most likely a European Starling (*Sturnus vulgaris*) or an American Robin. Another observation made was that daylight was entering the building in multiple locations, providing potential avenues for wildlife to enter the building. No large guano accumulations or urine staining indicative of

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October 21, 2014
Page 5

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major roosting congregations of bats were noted during the internal survey. No live bats were seen during the internal survey of the 105-F Reactor SSE. Staff exited the structure without issue.

Recommendations

The survey on October 14, 2014 did not detect any winter bat roost locations. The presence of bat guano in many locations does provide evidence that bats are using the interior of 105-F Reactor SSE in warmer months. Therefore, exclusion activities including the repair of any openings or crevices that wildlife may enter through can be performed during the winter months without risk to bats. Should work be performed in the warmer months, March through September, additional restrictions will apply. If the project plans on performing work during a time of higher bat activity levels, additional surveys will be required to reduce impacts to the resources. Additionally, nesting birds at that time may also induce extra controls and limitations to comply with the Migratory Bird Treaty Act.

All questions in regards to the contents of this letter should be directed to J. W. Wilde at 376-2473.

Sincerely,



April L. Johnson, Manager
Ecological Monitoring and Compliance

Attachments 2

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A. L. Johnson, MSA
J. J. Nugent, MSA
J. A. Pottmeyer, MSA
D. G. Ranade, MSA
J. W. Wilde, MSA
J. L. Yount, MSA

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REFERENCES USED IN DEVELOPMENT OF 105-F SURVEY REPORT

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References

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PHOTOS OF OCTOBER 14, 2014 SURVEY INDICATING BAT ACTIVITY WITHIN
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Figure 1. Accumulation of Bat Guano below a Light Fixture in the 105-F Reactor SSE

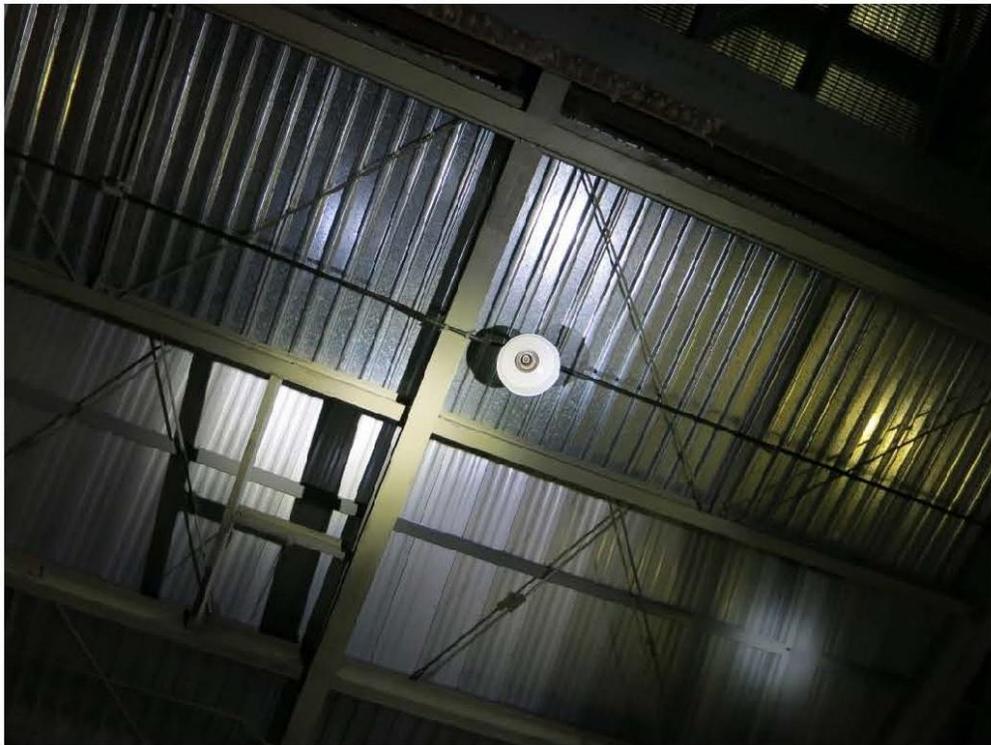


Figure 2. Light Fixture in the 105-F Reactor SSE, a Probable Bat Roost Structure

Mission Support Alliance
Post Office Box 650
Richland, Washington 99352



MSA-1404536

October 21, 2014

Rick Moren
Mission Support Alliance
P. O. Box 650
Richland, WA 99352

Dear Mr. Moren:

SURVEY REPORT FOR ECOLOGICAL RESOURCES SURVEY TO COMPLY WITH STIPULATIONS PROVIDED BY REVIEW ECR-2014-124, 105F REACTOR ENTRY TO PERFORM 5 YEAR SURVEILLANCE AND MAINTENANCE IN THE 105-F BUILDING

Reference: MSA Service Catalog Request#KSR000000138624, P. Gonzalez, MSA, dated July 31, 2014.
MSA Service Catalog Request# KSR000000143483, P. Gonzalez, MSA, dated September 8, 2014.
MSA Correspondence MSA-1403384, P. Gonzalez, MSA, dated September 24, 2014

PROJECT DESCRIPTION

The 105-F Interim Safe Storage (ISS) Project prepared the 105-F Reactor for long-term safe storage (up to 75 years) until the reactor block can be removed at the end of the storage period (Ison 2003). In accordance with the long-term safe storage, surveillance and maintenance activities are performed every five years "to ensure that the safe storage enclosure (SSE) at the Hanford Site's 105-F Reactor is maintained in a safe, environmentally secure, and cost-effective manner until subsequent closure during the final disposition phase of decommissioning" (DOE/RL 2003). An ecological resources review was performed prior to five year entry. The review ECR-2014-124 provided the project with stipulations that would support the protection of resources, including:

"As part of the surveillance and maintenance activities to be conducted in the 105F Reactor building, a biologist from MSA's Ecological Monitoring and Compliance organization shall participate in a walkdown inside the building to look for any signs that bats have been or are currently present within the building. Project personnel must contract the author of this section at least 7 days prior to the scheduled entry to ensure a biologist is available."

In compliance with stipulations from ECR-2014-124 for entry into 105-F SSE biologists from MSA's Ecological Monitoring and Compliance organization participated in a walk through inside the building to look for signs that bats or other wildlife have been or are currently present within the building. This letter report provides background on the primary resource of interest, details of survey, and recommendations from findings.

General Bat Information for the Hanford Site (Lindsey et al. 2013)

Nine species of bats have been documented on the Hanford Site by the Nature Conservancy (TNC) in surveys performed in 1997 and 1998 (Soll et al. 1999) and by Mission Support Alliance (MSA) in surveys performed 2012 (Lindsey et al. 2012) (Table 1).

Table 1. Bat species previously encountered on the Hanford Site by Nature Conservancy and Mission Support Alliance

Common Name	Scientific Name	TNC Acoustic	TNC Captured	MSA Acoustic 2012
pallid bat	<i>Antrozous pallidus</i>	X	X	X
big brown bat	<i>Eptesicus fuscus</i>	X		X
silver-haired bat	<i>Lasiorycteris noctivagans</i>	X	X	X
hoary bat	<i>Lasiurus cinereus</i>	X		X
California myotis	<i>Myotis californicus</i>		X	X
western small-footed myotis	<i>Myotis ciliolabrum</i>		X	X
little brown myotis	<i>Myotis lucifigus</i>		X	X
Yuma myotis	<i>Myotis yumanensis</i>		X	X
canyon bat	<i>Parastrellus hesperus</i>	X		X

Of the species documented on the Hanford Site, pallid bats, western small-footed myotis, and canyon bats are listed as Washington Department of Fish and Wildlife (WDFW) State Monitor Species (WDFW 2014). In addition, roosting concentrations of big-brown bats, pallid bats, and all roosts for bats in the genus *Myotis* are considered Priority Habitats by the WDFW (WDFW 2013). Roosting congregations can be maternity colonies, winter roosts, or night roosts. Males typically day-roost alone or in small groups, and do not have the same strict roosting habitat requirements as maternity colonies. Maternity colonies are specialized locations where groups of female bats roost together to give birth and raise their young. Individuals show strong fidelity to these roosting locations, and the same roosts are used year-after-year. These locations are selected for proximity to food and water resources, as well as appropriate temperature, humidity, and light conditions. The bats congregate to share body heat in order to conserve energy. These maternity locations are vital to successful reproduction. Night roosts are located close to feeding areas and are used by bats for resting and digestion between feeding bouts. Bats are known to habitually use night roosts from night-to-night and from year to year (Ormsbee et al. 2007). Although some species that occur on the Hanford Site are migratory (silver-haired bat, hoary bat), most bats remain in the region during the winter. Due to cold temperatures and lack of available food (insects), bats must hibernate in winter roosts to survive. Winter roosts are selected for cold and constant temperatures so bats can down-regulate their body temperature, slowing their metabolism and conserving energy, to survive through the winter. Bats select all communal roost types for very specific conditions that may not be otherwise available in the same areas. Identification and protection of roosting locations is becoming increasingly important with the outbreak of the fungal infection referred to as White Nose Syndrome (WNS). White nose syndrome is affecting bats in the eastern United States and Canada, and is rapidly expanding westward. Bats save energy during the winter by reducing their body temperature and entering a state of hibernation called torpor. They break these torpor bouts by warming their

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Bats are sensitive to disturbance, especially while pregnant and lactating. Early identification of roost areas can help avoid impacts to these sensitive species. DOE-RL has shown a commitment to protecting bats on the Hanford Site, providing protection for known roost sites and mitigating for unavoidable impacts to other roosting locations. Washington Closure Hanford, a contractor to DOE-RL, has identified maternity colonies of Yuma myotis and pallid bats in abandoned buildings in the 100-F and 100-D Areas of the Hanford Site and protected these important maternity colonies, which are some of the largest in the State of Washington (West et al. 2011, Table 2).

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Description	Primary Roost Type	Primary Species Present
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Bat in the 105-F Reactor SSE Area (West et al. 2011)

Roosting bats were observed inside the 100-F Reactor building during the initial phases of the ISS project beginning in FY2000. In spring 2003, a maternity colony of pallid bats was observed in the upper reaches of the reactor building and *Myotis sp.* were also seen. During the installation of the new roof on the 100-F Reactor in August 2003, mitigation efforts were initiated to remove the bats from the building unharmed and provide alternate roosting habitat. A slotted door with exclusion netting was used to allow bats to get out of the building but did not allow them to get back in. Commercially-made bat roosts were installed on the outside walls of the reactor building and on one utility pole 50 m northeast of the reactor. Five bat boxes designed for pallid bats and two designed for *Myotis* bats were placed

R. Moren
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October 14, 2014 Walkdown Survey of the 105-F Reactor SSE

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The survey continued by climbing to various levels within the 105-F Reactor SSE. Stairways and landings with light fixtures often had bat guano accumulations below the light fixtures indicating potential day or night roost locations (Figure 1). Old lamp fixtures, void of bulbs, appear to provide roosting structure for the bats (Figure 2). No bats were observed.

Several other wildlife observations were made. The first observation was a medium-sized woven cup nest discovered on a shelf structure. The nest appeared to be that of an American Robin (*Turdus migratorius*) based on size and shape, although other species are possible. The nest had feces pushed to the edges and down the sides, a sign that an adult bird was cleaning the nest and that the nest may have been successful at producing young. A determination of how recently the nest may have been active was not possible. The second observation was the skeleton of a bird found behind a screen in an air duct. The air duct was out of reach but, judging by the size and shape of the skeleton, the bird was most likely a European Starling (*Sturnus vulgaris*) or an American Robin. Another observation made was that daylight was entering the building in multiple locations, providing potential avenues for wildlife to enter the building. No large guano accumulations or urine staining indicative of

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Recommendations

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All questions in regards to the contents of this letter should be directed to J. W. Wilde at 376-2473.

Sincerely,



April L. Johnson, Manager
Ecological Monitoring and Compliance

Attachments 2

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J. J. Nugent, MSA
J. A. Pottmeyer, MSA
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ATTACHMENT 2

October 21, 2014

PHOTOS OF OCTOBER 14, 2014 SURVEY INDICATING BAT ACTIVITY WITHIN
THE 105-F REACTOR

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Figure 1. Accumulation of Bat Guano below a Light Fixture in the 105-F Reactor SSE

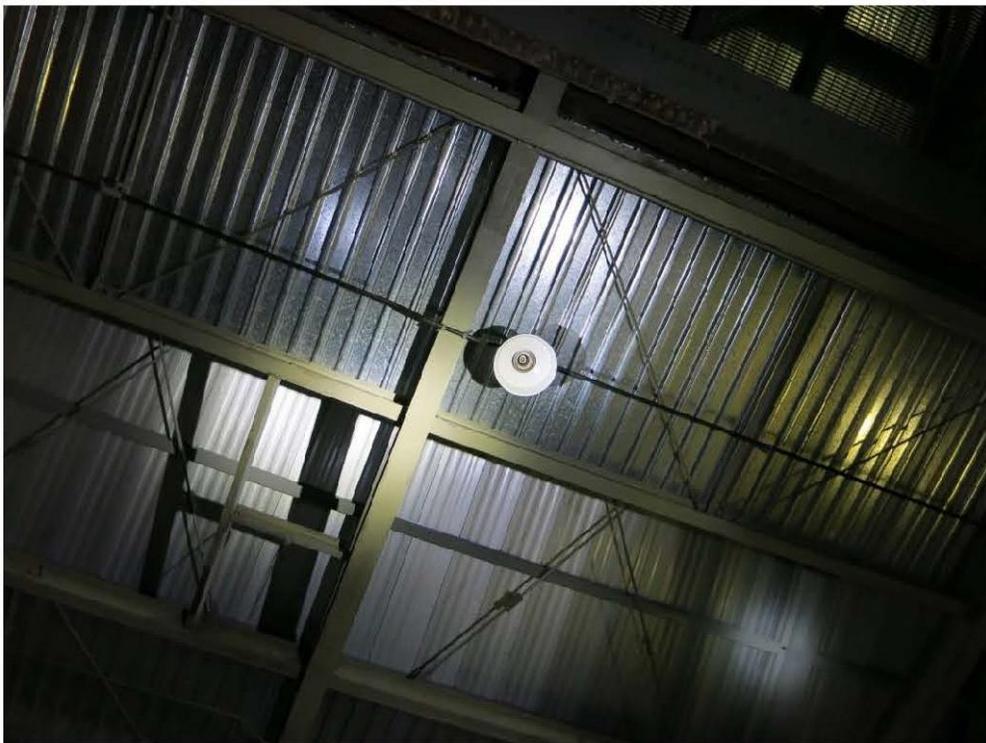


Figure 2. Light Fixture in the 105-F Reactor SSE, a Probable Bat Roost Structure

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APPENDIX B
S&M ACTIVITIES REPORTS FOR 105-C SSE ASSESSMENT

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APPENDIX B
S&M ACTIVITIES REPORTS FOR 105-C SSE ASSESSMENT

This appendix presents reports associated with the surveillance and maintenance activities. The appendix is arranged so that each activity is listed separately, followed by the applicable documents.

The activities inside the 105-C SSE were mostly conducted along the structural routes identified in DOE/RL-98-44, *Surveillance and Maintenance Plan for the 105-C Reactor Safe Storage Enclosure*, Rev. 1. These surveillance routes also are included in Work Package 2M-73252/C.

External Radiological Survey

Radiological control technicians performed external surveys along the outside walls.

COPY

MSA RADIOLOGICAL SURVEY REPORT

Job Description
 Baseline Survey of fixed contamination areas (PCA-C-0001 & PCA-C-0002) at C-Reactor East & North walls, C-Reactor & recently transferred from WCH to MSA.

Purposes of Survey
 Job Coverage
 Verification
 Work/Job Control Pkg./ISAs
 Required Task #
 RAM Shipment #
 Material Release Released to:
 Sample Counter Number:
 Contamination Incident
 Skin Clothing Spill
 Alarm Response CAM ARM APM
 Exposure Incident HRA/VHRA Work
 RPR No.
 Other
 Air sample taken - see attached log
 Emergency Response - see attached forms

Item(s) #
 Static Survey
 • Number of static measurements
 • Distance from the item (inches)
 • Count time (seconds)
 • Percentage of the item surveyed
 No observable/audible counts above background (i.e., <D)
 Large area wipe (LAW)
 • Count time (seconds)
 • Survey speed (inches/second)
 • Distance from the LAW (inches)
 • Percentage of item wiped
 • Area wiped for each LAW
 No observable/audible counts above background (i.e., <D/LAW), or Observed activity above background (i.e., >D/LAW)

Item(s) #
 Scanning Survey
 • Survey speed (in./sec)
 • Distance from the item (inches)
 • Percentage of the item surveyed
 No observable/audible counts above background (i.e., <D)

Map/Sketch
 N/A

Map Legend
 Smear LAW * Contact Reading
 Air Sample Neutron
 --- (designation inside) --- Radiological Area Boundary
 Dose Rates in mrem/h unless otherwise noted

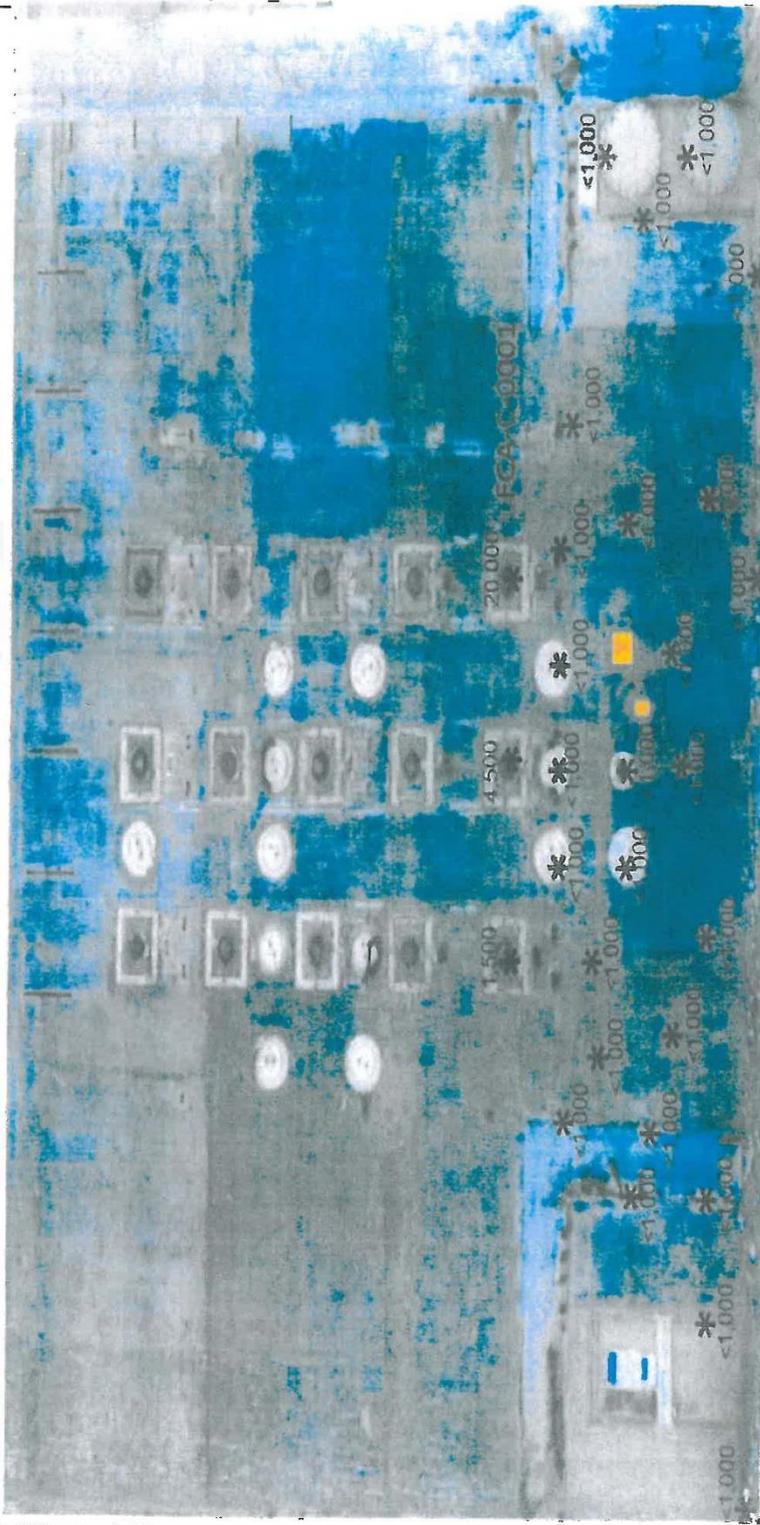
Check appropriate boxes above

Instrument	RO-3B	GM Model	PAM	GM	rodium2360	RCT Name(s) (Print)	Joe Wiley/Archie Parker
Serial No.	12883-0442	Probe	ACBC1-0239	Probe	SC128-0946	Signature(s)	<i>Joe Wiley</i>
Efficiency	N/A	Probe	DZERC-0807	Probe	DZERC-1075	Supervisor or Designate (Print)	Archie Parker
		Probe	444	Probe	10%	Signature	<i>Archie Parker</i>
		Probe	444	Probe	10%	Page 1 of 5	Survey Report No. N-14-0469
		Probe	444	Probe	10%	Payroll #	80302/73619
		Probe	444	Probe	10%	Date	09/08/2014
		Probe	444	Probe	10%	Payroll #	57377
		Probe	444	Probe	10%	Date	9/8/14

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION EXEMPTION 6

Name/Org: *Chet Deaswell* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



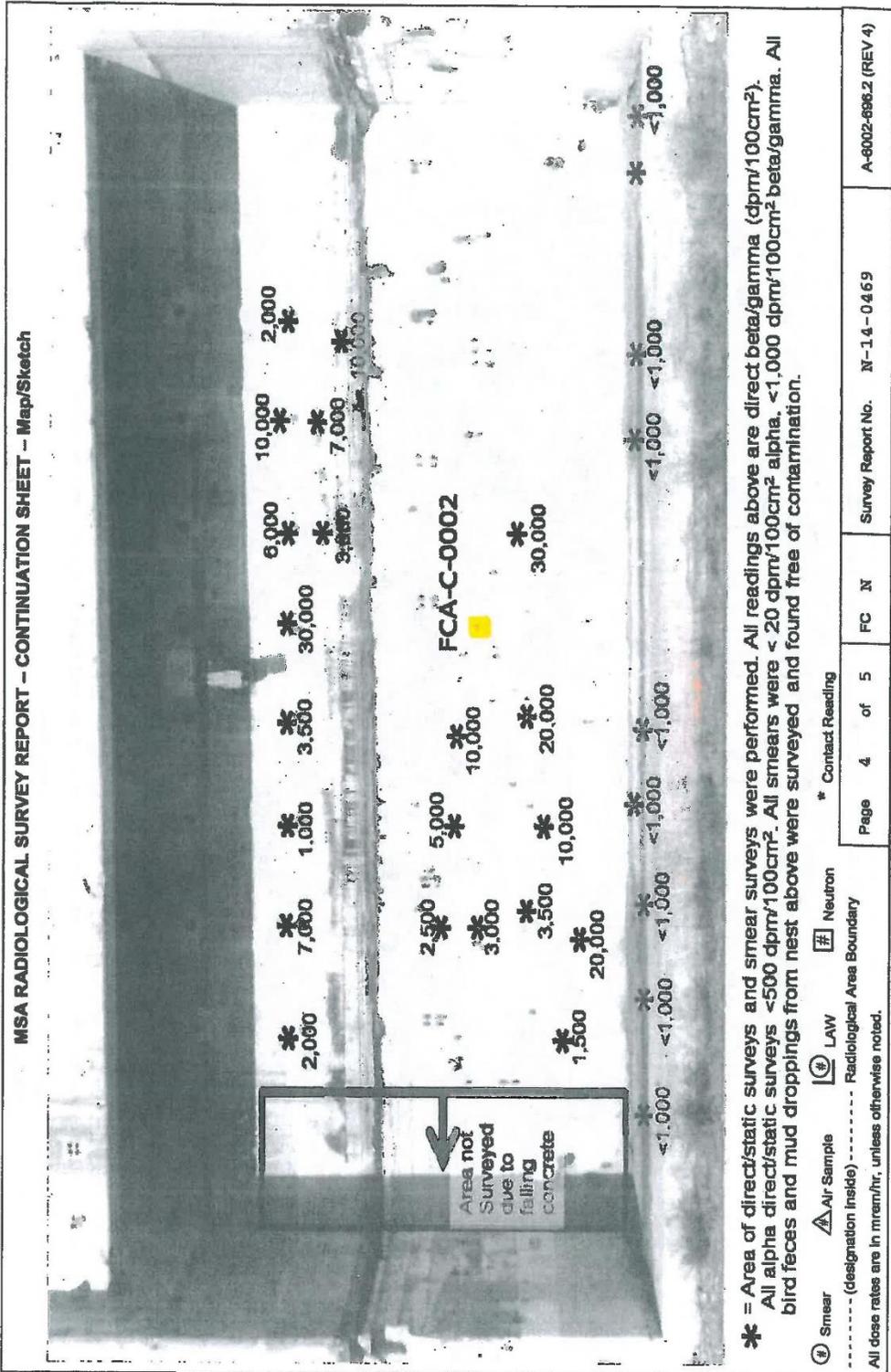
* = Area of direct/static surveys and smear surveys were performed. All readings above are direct beta/gamma (dpm/100cm²). All alpha direct/static surveys <500 dpm/100cm². All smears were < 20 dpm/100cm² alpha, <1,000 dpm/100cm² beta/gamma. All bird feces and mud droppings from nest above were surveyed and found free of contamination.

<p> <input type="checkbox"/> Smear <input type="checkbox"/> Air Sample (designation inside) </p>	<p> <input type="checkbox"/> LAW (designation inside) </p>	<p> <input type="checkbox"/> Neutron (designation inside) </p>	<p> <input type="checkbox"/> Radiological Area Boundary (designation inside) </p>	<p>* Contact Reading</p>	<p>Page 3 of 5</p>	<p>FC N</p>	<p>Survey Report No. N-1.4-0.469</p>	<p>A-8002-686.2 (REV 4)</p>
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DOES NOT CONTAIN EXEMPTION 6

OFFICIAL USE ONLY INFORMATION

Name/Org: *c. h. t. brasswell / SPS* Date: *10-7-15*

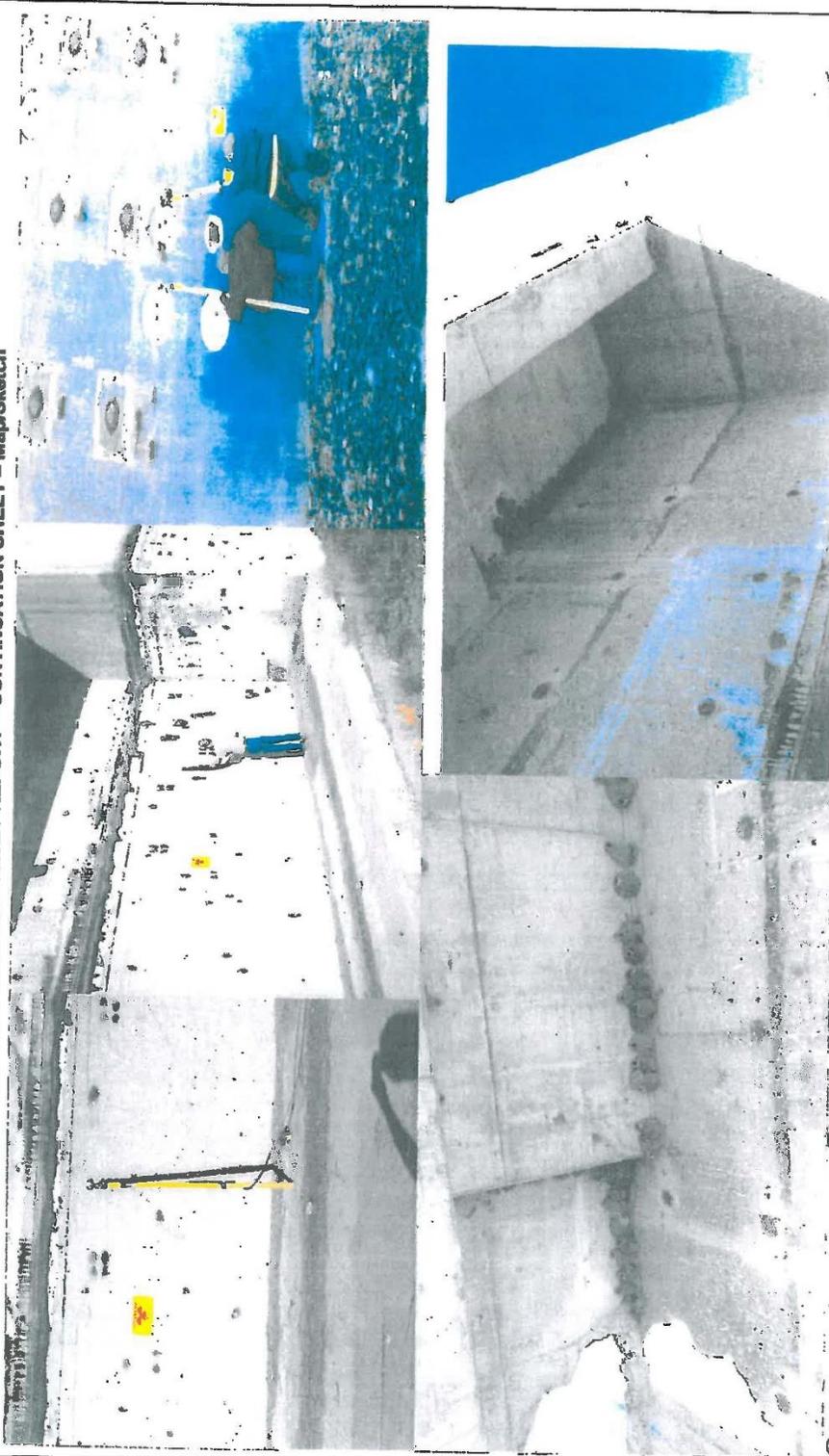


OFFICIAL USE ONLY - EXEMPTION 6

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Name/Org: *Chit Pradesh/SAs* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear
 Air Sample
 LAW
 Neutron
 ----- (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

Page 5 of 5 FC N Survey Report No. N-14-0469 A-8002-886.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 6

DOES NOT CONTAIN
 OFFICIAL USE ONLY INFORMATION
 Name/Org: *Chet Braswell/SRS* Date: *10-7-15*

Internal Radiological Survey

Radiological control technicians performed surveys along the surveillance routes.

MSA RADIOLOGICAL SURVEY REPORT

Job Description: Entry into 105C reactor bldg on tour path only. JW

Map/Sketch: COPY

Item(s) # N/A

Static Survey β/γ α
 Number of static measurements N/A / N/A
 Distance from the item (inches) N/A / N/A
 Count time (seconds) N/A / N/A
 Percentage of the item surveyed N/A / N/A
 No observable/audible counts above background (i.e., <D)

Item(s) # N/A

Large area wipe (LAW) β/γ α
 Survey speed (seconds) N/A / N/A
 Survey speed (inches/second) N/A / N/A
 Distance from the LAW (inches) N/A
 Percentage of item wiped N/A
 Area wiped for each LAW N/A
 No observable/audible counts above background (i.e., <D/LAW), or Observed activity above background (i.e., <D/LAW)

Item(s) # N/A

Scanning Survey β/γ α
 Survey speed (in./sec) N/A / N/A
 Distance from the item (inches) N/A / N/A
 Percentage of the item surveyed N/A / N/A
 No observable/audible counts above background (i.e., <D)

Purpose of Survey
 Job Coverage
 Verification
 Work/Job Control Pkg./ISA# N/A
 Required Task # N/A
 PAM Shipment # N/A
 Material Release Released to: N/A

Sample Analysis Reference
 Sample Counter Log Number: N/A

Contamination Incident
 Skin Clothing Spill
 Alarm Response CAM ARM AFM
 Exposure Incident HRA/HRA Work
 IIF No. N/A
 Other N/A
 Air sample taken - see attached log
 Emergency Response - see attached forms

Map Legend
 Smear LAW * Contact Reading
 Air Sample Neutron
 --- (designation inside) --- Radiological Area Boundary

Dose Rates in mrem/h unless otherwise noted

RCT Name(s) (Print) Joe Wiley

Signature(s) Joe Wiley

Supervisor or Designee (Print) J. Wiley

Signature J. Wiley

Date 04/20/2015

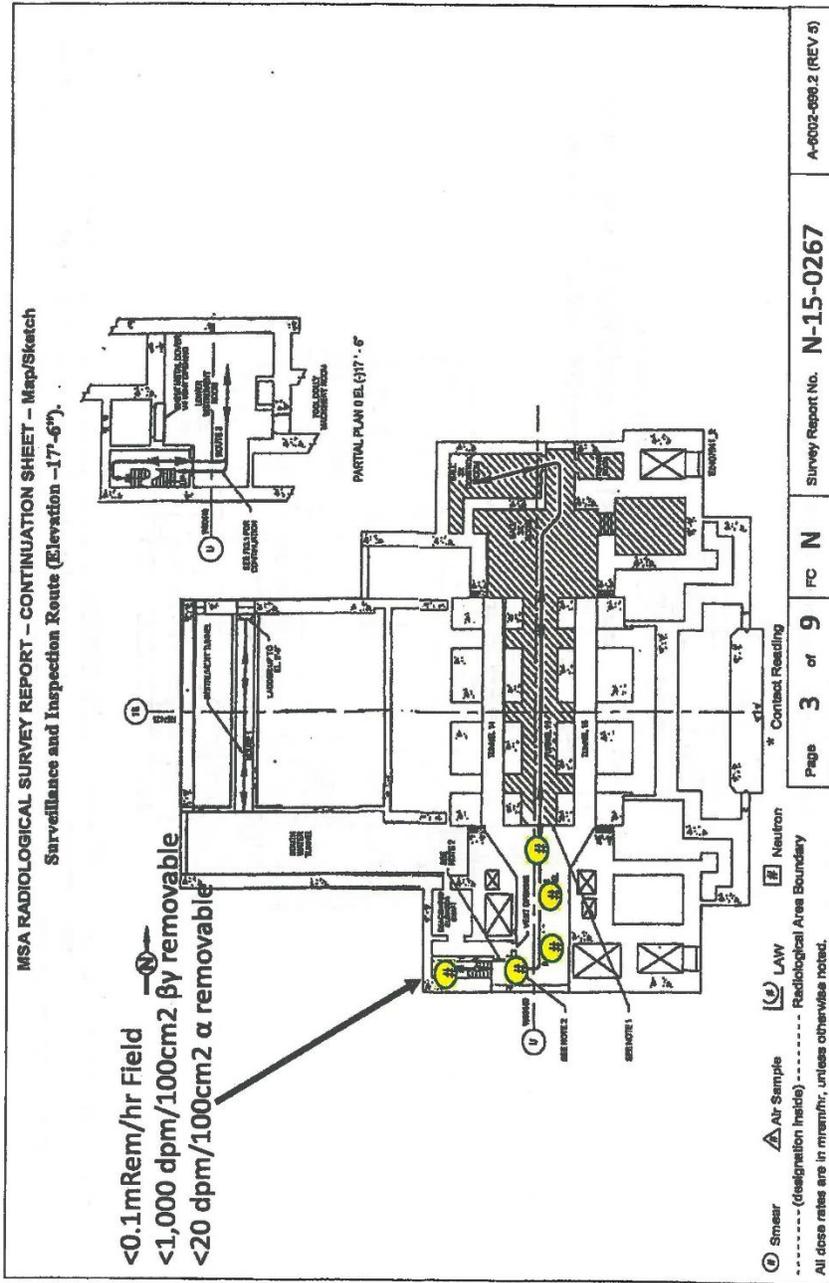
HID h.0058614

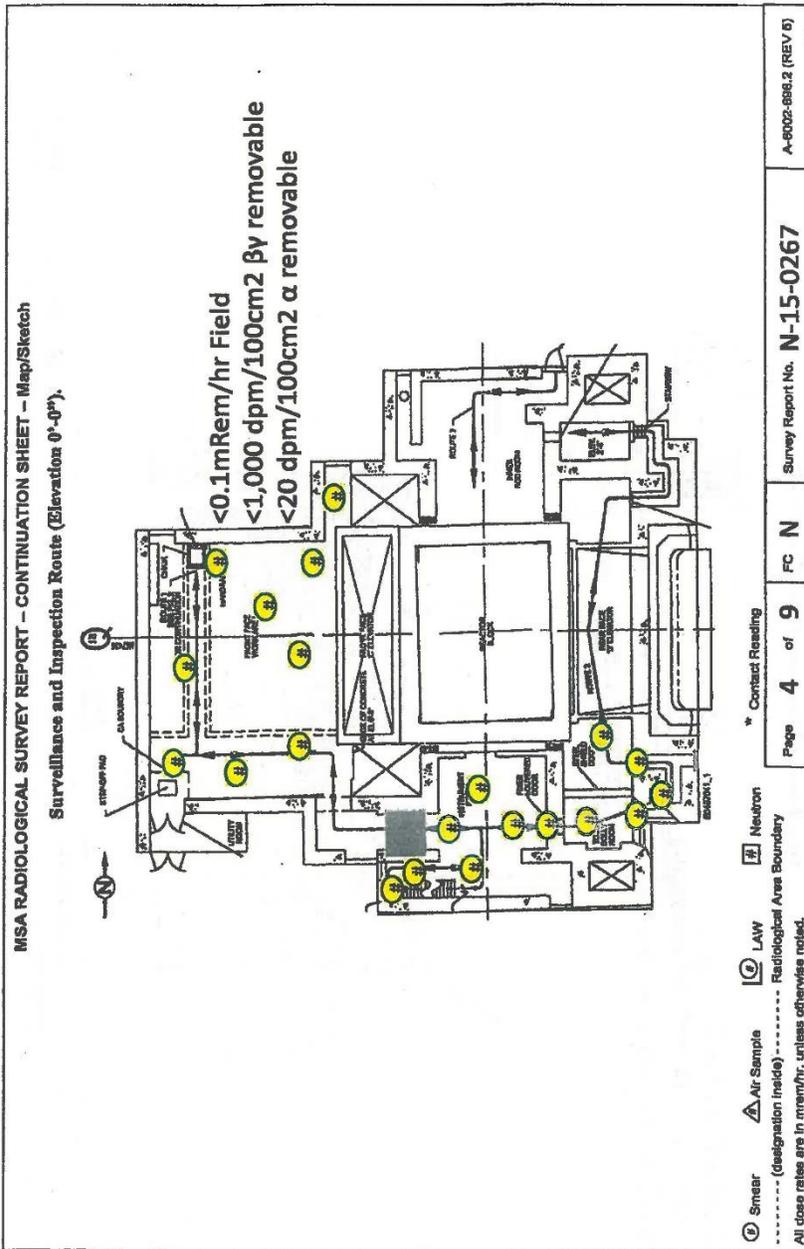
Date 4/22/15

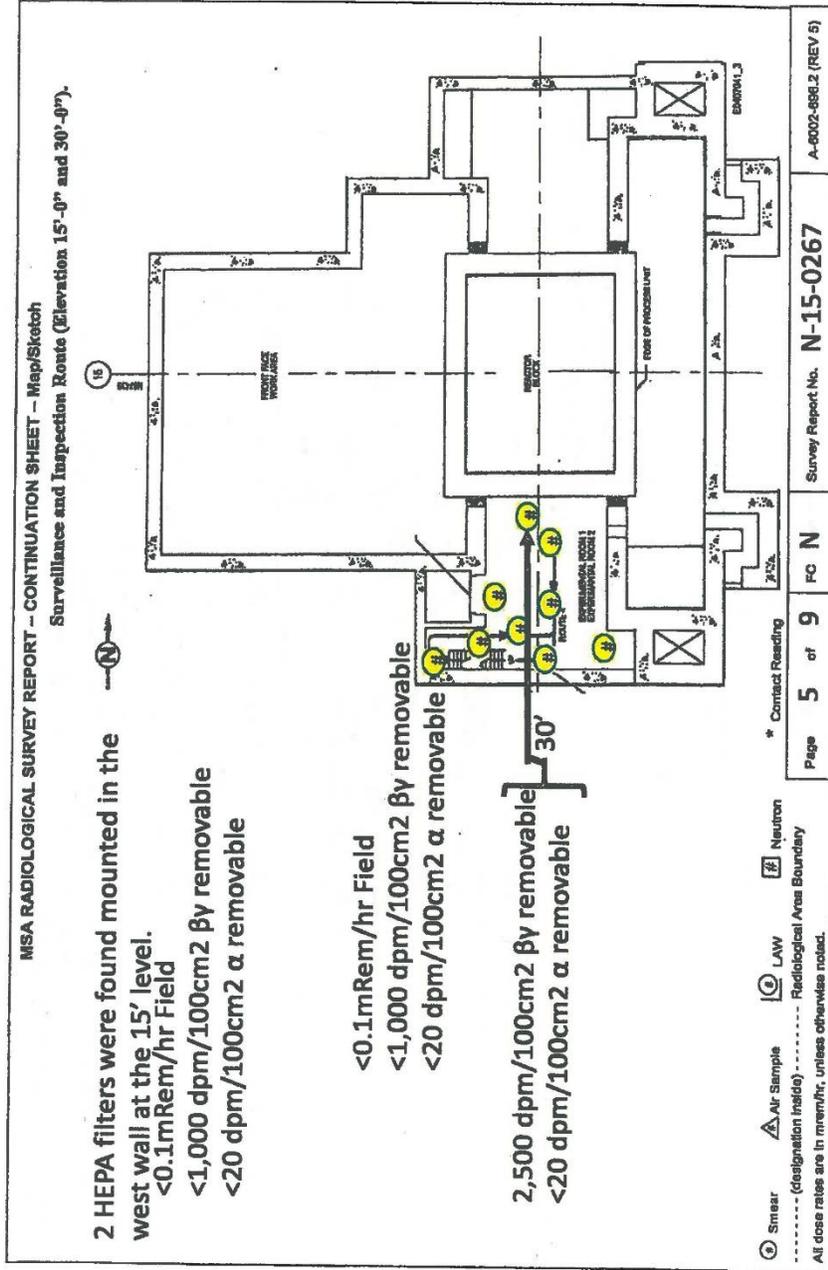
Page 1 of 9 Survey Report No. N-15-0267 A-6002-686 (REV 9)

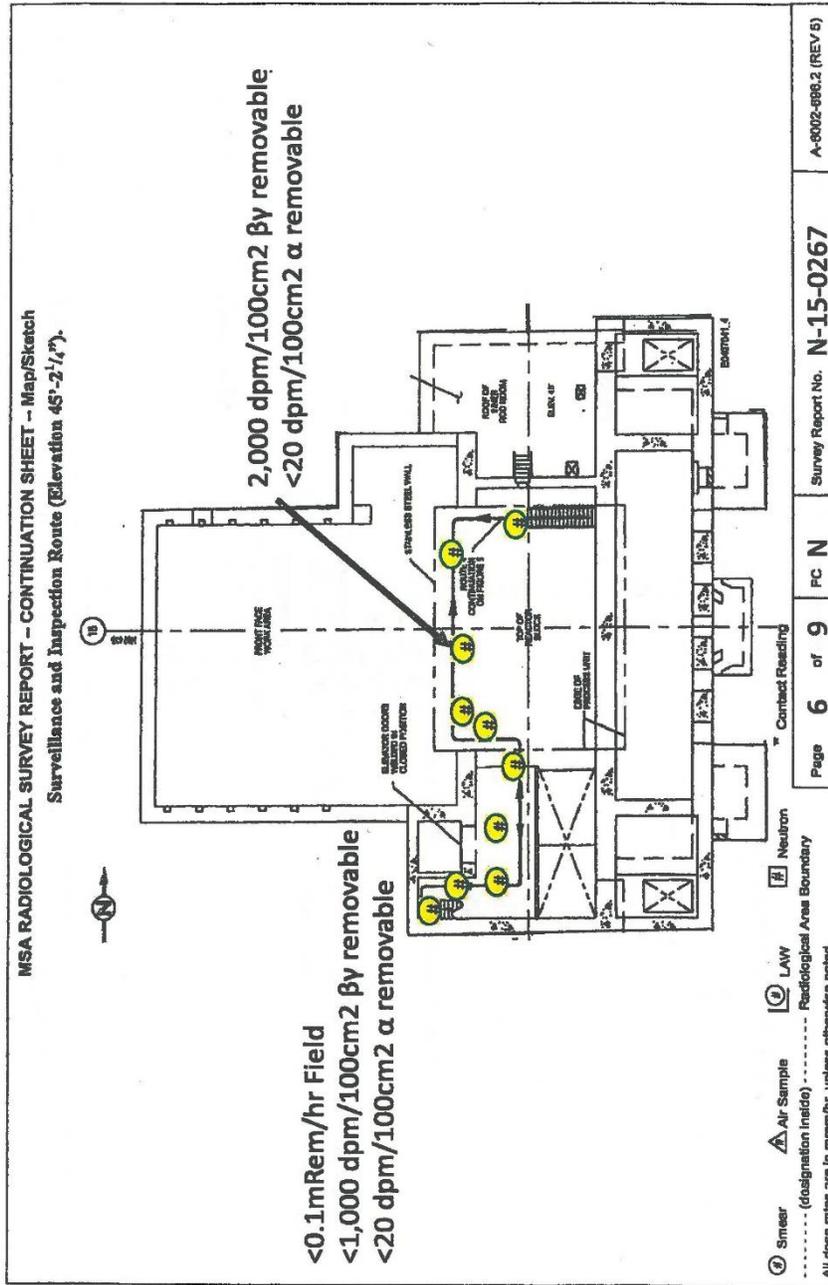
Instrument	RO-3B	GM Model	PAM	Model	3	N/A
Serial No.	ICB3-0277	Probe	44-9	N/A	N/A	N/A
Efficiency	N/A	Probe	ACBC1-0110	N/A	N/A	N/A
	N/A	Probe	DREB3-0727	N/A	N/A	N/A
	N/A	Probe	16%	N/A	N/A	N/A
	N/A	Probe	10%	N/A	N/A	N/A

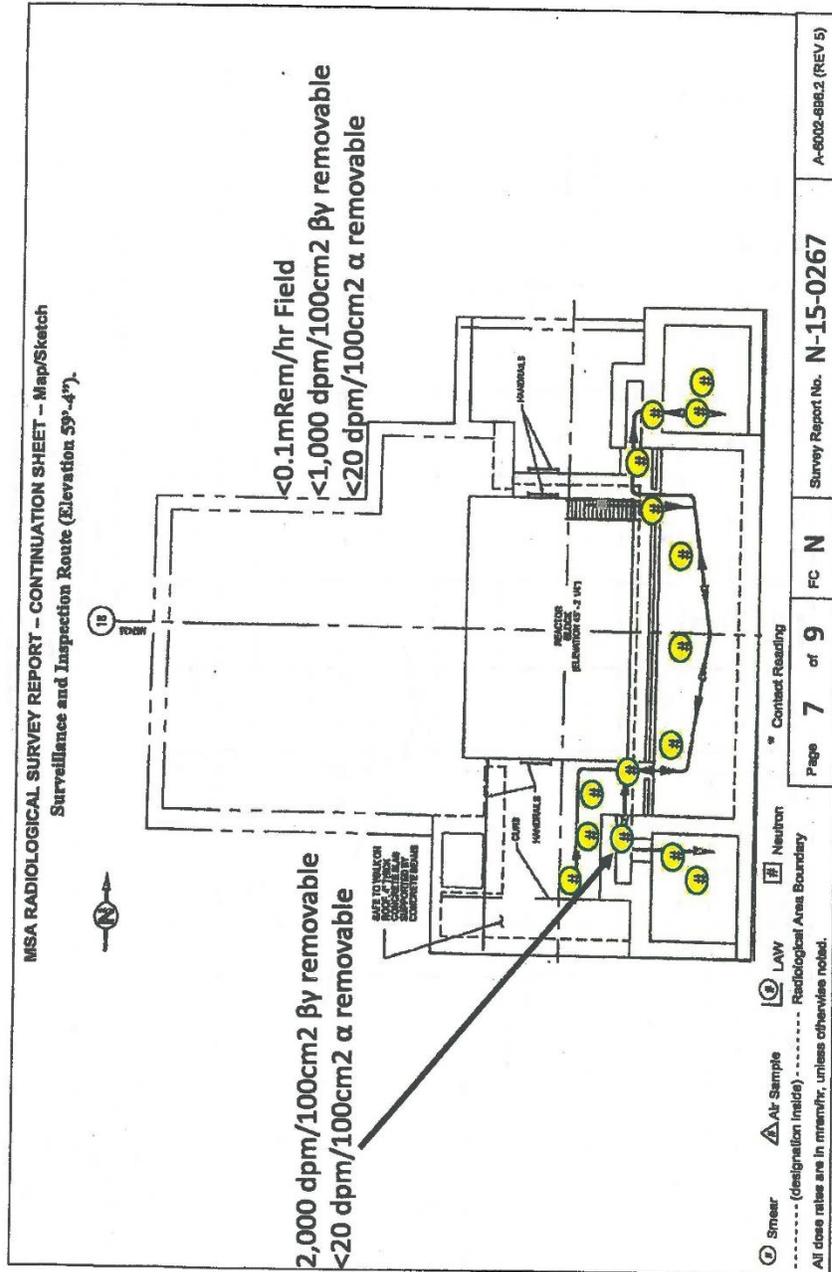
NOTE: If personal information is added to this survey that might cause distress, embarrassment, or risk identity theft, e.g., exposure data, medical data, payroll, or SSN, the RCT must add the words "OFFICIAL USE ONLY" on the bottom of each page and/or attachments. Ref: MSC-PRO-54603.











MSA RADIOLOGICAL CONTROL LAPEL AIR SAMPLE (LAS) ANALYSIS RECORD

Counter Information: Sample Log No. (Lapel-FC-IMDDYV) LAP-1-N-041815 Page 1 of 1

Alpha: SCLL7-00080303E5-9-15 DTLLC-0137 0.36 / 2.747 2 / 10 200E/MO-285
 Instrument ID No./Model/Cal. Expiration Detector ID No. DTLLC-0137 0.41 / 2.433 825 / 10 Counter Location (i.e., Area/Facility/Room) 200E/MO-285

Beta: SCLL7-00080303E5-9-15 DTLLC-0137 0.41 / 2.433 825 / 10 Counter Location (i.e., Area/Facility/Room) 200E/MO-285

No.	LAS ID No./Purpose	DATE/TIME LAS WORK	WORKER NAME (Print)	WORKER HID No.	Sample Media (V.P.)	ONE Flow Rate OFF: Flow Rate	PF	DL (cpm)	Sample T _g (min)	MD DAC-h	N _g (counts)	DAC-h	Total DAC-h	Survey No.	RCT Signature #	HID
1	25474-RX ENTRY Initial Count	04/16/15 11:16	JOE WILEY	H0009879	V	4.0	1	α 0.328 β 5.330	10.0	1.00	66.0	5.72	5.72	N-15-0218	<i>Joe Wiley</i> H0009879	
2	175474-RX ENTRY Initial Count	04/16/15 11:16	Tim Schwisow	N7528868	V	4.0	1	α 0.328 β 5.330	10.0	1.00	36.0	3.62	3.62	N-15-0218	<i>Joe Wiley</i> H0009879	
3	N/A															N/A
4																
5																
6																
7																
8																
9																
10	N/A															N/A

Flow rate = Start and ending flow rates of the lapel air sample (L/min)
 PF = Assigned protection factor for respiratory protection
 DAC = Derived Air Concentration (dCi/mL) from 10 CFR 83.54

Flowmeter ID No.: 3547 Cal Due: 7/6/2015

Flowmeter ID No.: 851# N-15-0267 Cal Due: 7/6/2015

Date: 4/22/15

Name (Org): Chet Braxwell (P) 10-7-15

Log Reviewed BY (Print/Sign): [Signature]

Official Use: Y - EXEMPTION 8

See MSC-15338 Section 3.2.7, for explanation of formable usage.

MSA-RC-SAL-L-101 (09/30)

MSA RADIOLOGICAL CONTROL LAPEL AIR SAMPLE (LAS) ANALYSIS RECORD

Counter Information: Sample Log No. (Lapel-FC-IMDDYY) LAPEL-N-042015 Page 1 of 1
 Alpha: SCL17-0008302E5-5-15 DTLLC-0137 0.36 / 2.747 3 / 10 0.30 20RE/MO-285
 Instrument ID No./Model/Cal Expiration Detector ID No. N_g (counts) / T_g (min) R_g (cpm) Counter Location (i.e., Area/Facility/Room)
 Beta: SCL17-0008302E5-5-15 DTLLC-0137 0.41 / 2.433 526 / 10 50.00 20RE/MO-285
 Instrument ID No./Model/Cal Expiration Detector ID No. N_g (counts) / T_g (min) R_g (cpm) Counter Location (i.e., Area/Facility/Room)

No.	LAS ID No./Purpose	DATE/TIME LAS WORN	WORKER NAME (Print)	WORKER HID No.	Sample Media (V, F)	CHK Flow Rate OFF/Flow Rate	PF	DL (cpm)	Sample T _g (min)	MD DAC-h	N _g (counts)	DAC-h	Total DAC-h	Survey No.	RCT Signature #	HID
1	2544H-RX ENTRY Intercount Dec 07/1/2015	04/18/15 11:16	JOE WILEY	H0009978	V	4.0	1	0.403	10.0	1.18	4.0	0.00	0.00	N-15-0218	Joe Wiley H0009978	
2	1794H-RX ENTRY Intercount Dec 07/1/2015	04/18/15 11:16	Tim Schillow	17628808	V	4.0	1	5.233	10.0	0.01	538.0	0.00	0.00	N-15-0218	Joe Wiley H0009978	
3	N/A							0.403	10.0	1.18	3.0	0.00	0.00			
4								5.233	10.0	0.01	531.0	0.00	0.00			
5																
6																
7																
8																
9																
10	N/A															

Definition: * If a recount, specify recount date/time. V = Vapor F = Fluorine
 E = Instrument counting efficiency (cpm/cpm)
 CF = Inverse of counting efficiency (cpm/cpm)
 N_g = Number of background counts recorded during background counting interval (T_g)
 T_g = Background counting interval (min)
 T_g = Total time the lapel air sampler was run (min)
 T_g = Lapel air sample count time (min)
 N_g = Gross number of counts measured (sample + background) during the gross count time (T_g)
 Flow rate = Start and ending flow rates of the lapel air sample (L/min)
 PF = Assigned protection factor for respiratory protection
 DAC = Derived Air Concentration (dCi/mL) from 10CFR85
 See MSC-1038 Section 2.2.7 for explanation of formulae used.

R_g = Background count rate (cpm)
 DL = Decision Level
 MDC = Minimum Detectable Concentration
 MD DAC-h = Minimum Detectable DAC-h
 R_h = Net count rate on the lapel air sample (cpm)
 Sample Conc = Lapel Air Sample concentration (dCi/mL)
 α = Counting Error
 DAC-h = Derived Air Concentration-hour

DAC (dCi/mL) Value Used:
 α = 5.E-12 (Default = 5E-12)
 β = 1.E-08 (Default = 1E-9)

Flowmeter ID No.: 3547 Cal Due: 7/8/2015
 RSR# N-15-0267 Pg 9 of 9
 Date: 4/22/15 MSA-RC-SAL-LAPEL-001 (09/00)

Signature: Joe Wiley
 Date: 4/22/15
 Name/Org: C. Hot Brassard Sr 10-7-15
 Date: 10-7-15

OFFICIAL USE ONLY - EXEMPT FROM CONTAINMENT INFORMATION
 OFFICIAL USE ONLY INFORMATION

Industrial Hygiene Report

The industrial hygienist conducted general-area, direct-reading instrument monitoring of the 105-C surveillance routes before additional personnel entered to complete surveillance activities. The monitoring was for carbon monoxide, flammable gas, oxygen, and volatile organic compounds.

SWIHD - DRI Completed Survey

Page 1 of 4

**Mission Support Alliance, LLC
IH DRI Monitoring Survey**

Date: 05/06/2015, 04:10 PM

Survey ID: 15-60147 - 105C Reactor Entry

Survey Date: 04/16/2015

Survey ID: 15-60147	Survey Date: 04/16/2015	Survey Status: Complete
Survey Title:	105C Reactor Entry	
Sample Plan:	IHSP-14-00179 - DRI (VOC, Multigas)	
WO/Procedure:	N/A	
BHA:		
Requestor:	Land & Facilities Management	Project IH: Thayn, Paterick P
Surveyor:	Thayn, Paterick P	
Job Contact:	Yount, Jeremiah L	
Contact Phone:	(509)373-4778	Contact Cell Phone: (509)222-9136
Engineering Cntls:	Administrative Cntls: Boundary, Work Package Instructions	

Meteorology Data			
Standard Conditions:	Yes	Weather Date: 04/27/2015	Time:
Pressure:		Humidity:	Wind Speed:
Wind Direction:		Temperature:	

Mission Support Alliance, LLC

Date: 05/06/2015, 04:10 PM

Survey ID: 15-60147 - 105C Reactor Entry

Survey Date: 04/16/2015

Calibration

Instrument		Pre Use Function Test	Post Use Function Test
ID:	3919	Date: 04/16/2015	Date: 04/16/2015
Type:	MiniRAE 3000 RAE	Time: 0630	Time: 1530
Last Cal Date:	03/26/2015	Leak Check: Yes	By: Thayn, Paterick P
Next Due Cal Date:	04/26/2015	Battery Check: Yes	Location: Office
Lamp:	11.7 eV	By: Thayn, Paterick P	
Serial Number:	592-902318	Location: Office	
Sensor(s)		Pre Use Function Test	Post Use Function Test
Sensor:	MiniRAE 3000 RAE PID	As Found: 9.6	As Left: 9.1
Calibration Source:	Isobutylene	Adjusted To: N/A	
Lot Number:	5-026-67		
Manufacture Date:	02/16/2015		
Expiration Date:	02/28/2018		
Cal Source Value:	10 ppm		

Mission Support Alliance, LLC

Date: 05/06/2015, 04:10 PM

Survey ID: 15-60147 - 105C Reactor Entry

Survey Date: 04/16/2015

Calibration

Instrument		Pre Use Function Test		Post Use Function Test	
ID:	1521	Date:	04/16/2015	Date:	04/16/2015
Type:	TMX-412 ISC	Time:	0630	Time:	1530
Last Cal Date:	04/01/2015	Leak Check:	No	By:	Thayn, Paterick P
Next Due Cal Date:	05/01/2015	Battery Check:	Yes	Location:	Office
Lamp:	N/A	By:	Thayn, Paterick P		
Serial Number:	0004057-154	Location:	Office		
DRI Sampling Pump: 2385 - SP402 ISC					
Last Done Date: 04/01/2015					
Next Due Date: 10/01/2015					
Flow Fault Check: Yes					
Sensor(s)		Pre Use Function Test		Post Use Function Test	
Sensor:	TMX-412 ISC CO	As Found:	70	As Left:	69
Calibration Source:	Tri-Gas (CO)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	70.0 ppm				
Sensor:	TMX-412 ISC H2S NA				
Sensor:	TMX-412 ISC LEL	As Found:	24	As Left:	24
Calibration Source:	Tri-Gas (Isopentane)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	25% LEL				
Sensor:	TMX-412 ISC O2	As Found:	19.2	As Left:	19.1
Calibration Source:	Tri-Gas (O2)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	19.0%				

Mission Support Alliance, LLC

Date: 05/06/2015, 04:10 PM

Survey ID: 15-60147 - 105C Reactor Entry

Survey Date: 04/16/2015

Readings

Type:	Area			
Zone - Location:	100C Bldg - 105C Cocooned Reactor BLDG			
Specific Location:				
Status:	N/A			
Activity:	Safety inspection of surveillance Routes			
Date/Time:	04/16/2015 1000			
Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide	<	0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas	<	0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3919 - PID	Volatile Organic Compound	<	0.000 ppm	2 ppm
Reading Details:	General area DRI monitoring of the 105 C surveillance routes was conducted on 4/16/2015 to verify atmospheric conditions prior to additional personnel entering to complete work. Safety inspection and routes reviewed were per work document 2M-73151/C - C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance. No abnormal readings were observed along the tour of the surveillance routes.			

Field Information Verified By: Thayn, Paterick P

Date: April 27, 2015

Approved By: Thayn, Paterick P

Date: May 5, 2015

(The electronic approval indicated above acts as the authentication of this record on the above date)

Industrial Safety Report

The industrial safety professional conducted a safety inspection of the surveillance routes before additional personnel entered to complete surveillance activities.

105 C Reactor Initial Safety Inspection

On 16 Apr. 2015 MSA Safety team made initial entry into the 105 C for a safety inspection prior to any work to be completed for the 5 year reactor surveillance. This safety team consisted of 2 Radcon personnel, 2 Biologist (looking for potential wildlife), an Industrial Hygienist, and an Industrial Safety Professional. This report only covers the Industrial Safety evaluation.

Of all the Reactors entered by MSA to date, this was the dustiest, darkest reactor. This particular reactor also housed several live Bats that were noted, as well as the most Bat droppings of all the others. By sticking to the prescribed routes there was not a lot of opportunity to run into any severe safety hazards except a concerned area of the -17' elevation route 1 inspection (summary attached). Biggest hazards along the prescribed inspection routes is lights not working, or in the case of the 45' and 59' elevations nonexistent. Entry teams going in with portable hand held lighting, to include several of the team carrying spot lights, so with a control of this nature there was plenty of light to perform inspections. There are also the normal trip type hazards throughout the building which is a normal hazard to be aware of in an industrial setting such as this.

The 105 C Reactor has the most "systems" still intact of any other of the Reactors that were inspected by the MSA, therefore could pose a lot more Industrial Safety hazards if entrants do not stay within the prescribed inspection routes.

Photo 1- Showing how dusty/dirty floors are in 105 C



Photo 2- Rear face, only reactor that route leads to this, lots of left over items that are potentially hazardous.



Photo 3- Top of block, not encased.



105 C REACTOR

INSTRUMENT TUNNEL -17' ELEVATION

Tim Schwisow, Safety Professional MSA

On 16 April 2016, while performing the initial Safety Inspection for the 5 year inspection of the 105 C reactor, the safety team, made up of Radcon, Industrial Hygiene, and Industrial Safety, noted an issue with Route 1 at the -17' elevation of the prescribed inspection routes.

This route consists of a fixed ladder attached to the north wall of the front face work area, passing through the floor from an opening that appears to be freshly cut, presumably during D&D activities. The hole in the floor is guarded on 2 sides by guard rail, and 1 side with a safety chain, and surrounded with "DANGER" tape, more than likely to draw attention to the hole but that is a guess and not known why it was marked "DANGER" which is normally used to warn of imminent danger. The entry to the space is identified as "NON-PERMIT REQUIRED CONFINED SPACE", which it does meet the definition of a confined space as it is 1) large enough to enter and perform work, 2) has limited means for entry or exit, and 3) is not designed for continuous work.

One of the biggest areas of concern that the Safety team has with entering this space to inspect this route is, although it is posted as a Non-Permit Space, we have no documentation on this space justifying its categorization, therefore based on only the limited visual assessment, we would need to classify this space as a Permit Required Space until we would be allowed to reclassify the space. Reclassification of this space would be based on confirming that it does not contain or have the potential to contain a hazardous atmosphere, which we can determine at the space, but not as far back as the tunnel goes. One other criteria that would be pertinent to reclassify this particular space, which is of the most concern, is confirming that the space does not contain any other recognized serious safety or health hazards. This particular floor is coated with a fine dust, and once it is disrupted could cause a very real health hazard especially if we are unclear of what the dust was created from, potentially the saw cut in the concrete which would most likely contain Silica.

Based on initial inspection, it is the opinion and recommendation of Industrial Safety and Industrial Hygiene that no one enter this space during this five year inspection. It is not the team's intention to "road block" this 5 year inspection, and will be happy to support the decision if there is important instrumentation to be inspected, or a structural concern to be inspected, but in the name of ALARA, we feel the hazards or potential hazards (unknowns) outweigh the benefit of putting someone into this space unless necessary.

If it is deemed necessary to put entrants into this tunnel we will post the space "PERMIT REQUIRED" until we can confirm and document that it is free of the hazards mentioned above. This means that all entrants will be confined space trained, an attendant (also confined space trained) will be at the space entrance to log entrants in and out and monitor the space, special rescue considerations will be put in place as this is a space that would warrant a rescue team get a downed entrant out, and respirator protection will be required due to the uncertainty of the dust contents. Other considerations are the

AJHA, and work package will need to be updated to document a confined space entry and respiratory protection.



Figure 1 Looking at guard rails around floor hole from 105 C door.



Figure 2 looking down into space

Structural Inspection Report

A team of engineers performed an inspection to determine the SSE conditions and structural adequacy. The rear face/discharge elevator was entered for the inspection.

Letter No. 15-MRM-004
May 29, 2015



Mr. Rick Moren
Director of Long-Term Stewardship
Mission Support Alliance, LLC
P.O. Box 650
Richland, WA 99352

Dear Mr. Moren,

SUBJECT: Contract 55534; 105-C Safe Storage Enclosure Engineering Inspection Report

References:

- 1) DOE/RL-98-44, Rev 1, Surveillance and Maintenance Plan for the 105-C Reactor Safe Storage Enclosure
- 2) MSA Work Package; 2M-73151/C, C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance
- 3) WCH-292 Rev 0., 105-C Safe Storage Enclosure, Five Year Surveillance in July 2008

This letter and report package is provided as deliverable #5 of the subject contract as part of the 105-C Interim Safe Storage (ISS) Building Surveillance / Inspections that was performed on April 20, 2015. In accordance with Ref. 1 and 2, an inspection was performed to determine the Safe Storage Enclosure (SSE) conditions and structural adequacy under ISS. An exterior and interior visual inspection of the SSE was performed. The surveillance routes used were as noted in Ref. 1; i.e., the same routes from the Ref. 3 inspection except that the rear face / discharge elevator was entered (part of Route 1) as well. Polestar's evaluation of significant items from the inspection data is described in Attachment A.

The inspections, assessment and any evaluations were performed by a team consisting of: Jaimie Ryan, Field Engineer; Tom Rodovsky, PE; Mike Custer, PE; and Mark Morton, PE. Not every person participated in each activity, but this team was engaged and available for each SSE inspection.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects – very similar to the conditions described in Ref. 3.

Recommendations from the 2015 105-C SSE inspection are in three categories:

1. SSE Structure / Electrical –To summarize a few items:
 - There is evidence of very slow water in-leakage at pourback / roof structure junction at grade level – so slow as to only form white deposits, but actively leaking.
 - An open J-box in the vestibule for the new SSE incoming power line was identified.

601 Williams Blvd,
Suite 4
Richland, WA 99354

www.polestartechnicalservices.com

Office: 509-946-8279

Page 1 of 4



- The interior and exterior of a steel door on the rear face exhibits a good deal of corrosion on the outside at its base and some dampness and corrosion on the inside at this location.
 - Small Openings in the Siding / Flashing - Consideration should be given to instituting a corrective maintenance program to close openings at the exterior and interior siding vertical corners that are currently suspected access points for bats and small birds.
 - There are a number of locations of dense swallow nesting at concrete interior corners and under ledges – not an issue presently, but continued buildup of feces around the building and on installed steel caps on the exterior rear face may present personnel or corrosion concerns in the future.
 - The main vestibule door posting needs to be updated to show DOE and MSA Long Term Stewardship information.
2. Future inspection of surveillance routes – Conditional recommendations for access to Route 3 (as shown on the right hand side of Figure 2-1 of Ref. 1) is as follow;
- i. Access for Route 3 is recommended:
 - a) If there is evidence of a large bat roosting issue in the other parts of the structure which may indicate that the Route 3 spaces may be vulnerable to that same condition, or
 - b) Prior to moving to significantly longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started.
3. S&M Plan– Recommend that Reference 1 be revised – in the near term to capture current accessibility conditions and rationale for including or excluding inspecting the various inspection routes in the future. Specifically:
- i. Surveillance route numbers need re-worked, i.e., there are two Route 3’s noted on Figures 2-1 and 2-2 (Ref. 1) that don’t connect in any way. In addition, all notes should be reviewed for proper references and coordination with Figures as they appear in the S&M Plan.
 - ii. That an additional door / step off / welded plate on the south side grade level for Route 3 must be opened for access to this route.
 - iii. On Figure 2-2 (Ref. 1) the “partial plan” elevation is incorrect, -8 feet is a more correct location for this floor / room.
 - iv. There is no reasonable access beyond the door called out by Note 2 in Figure 2-2 (Ref. 1).
 - v. Provide the rationale for skipping Route 3 at times and to call out under what conditions this route would be expected to be or required to be inspected.
 - vi. The end of Route 2 in the north end of the rear face area needs to be redone. There is no reasonable access past the “ladder down to 0’0” elevation” shown on the surveillance route map (Ref. 1, Figure 2-1).
 - vii. When these modifications are undertaken, consideration should be given to updating all of the maps and SSE footprint to match field observations for the 105-C SSE. The



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recommended modifications would not necessarily change the main surveillance routes, but would more accurately show the physical layout.

ATTACHMENTS – Attachment A is an assessment of the data collected and results of the SSE inspection completed in April 2015. Attachment B condenses the Attachment A information in a format suitable for direct inclusion into the MSA 2015 105-C SSE Inspection document.

Available photos from the earlier inspection in 2008 and similar view new photos are contained in the Attachment C and D. The outcome from the April 2015 inspection, as detailed in Attachment C and D, fall into three categories that are recommended to form the basis for the next 105-C SSE inspection.

- (a) Attachment C includes Reference 3 items that were re-inspected in April 2015 and recommended to continue on the inspection / maintenance list considerations for future action;
- (b) Attachment C also includes newly identified items from April 2015 that require future inspection or maintenance action.
- (c) Attachment D includes new photos and Reference 3 items that were observed either specifically or generally in April 2015 and are not required for future inspections but are preserved herein for possible comparisons in future 105-C SSE inspections.

We are pleased to provide these inspection and reporting services to MSA and request that you contact me at 509-946-8279 if you have any questions concerning this report letter and attachments.

Kind regards,

A handwritten signature in black ink, appearing to read "Mark R Morton". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Mark R Morton PE

ISS Support Project Manager



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cc: Finney, S – MSA Procurement
Bailey, P;
Miller, K;
Morton, M;
File / LB

Enclosure(s)

Attachment A – ASSESSMENT OF INSPECTION DATA
Attachment B - 105-C BUILDING INSPECTION REPORT INSERT FOR MSA
Attachment C – 105-C SSE INSPECTION RESULTS - For Further Consideration
Attachment D – 105-C SSE INSPECTION RESULTS – Historic Record

601 Williams Blvd,
Suite 4
Richland, WA 99354

www.polestartechnicalservices.com

Office: 509-946-8279

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Attachment A – ASSESSMENT OF INSPECTION DATA

The interior and exterior inspection of the 105 C SSE was conducted by Mark Morton and Jaimie Ryan of Polestar Technical Services on April 20th, 2015. The interior inspection team included MSA RCT Joe Wiley as well. The weather on that day was approximately 60 to 70 degrees, sunny with light winds, there was no rain showers for 5 or 6 days prior to the inspection.

- A. **Interior Conditions** – noteworthy items from the interior SSE inspection are discussed below. Items 2 and 3 are of a structural / design criteria nature and results in recommendations for continued monitoring with each SSE entry.
1. The below grade rooms shown in Ref. 1 Figure 2-2 were noted as being exceptionally dry and free of defects. Although a significant amount of dirt was noted on the stairs and floors, the concrete floors, walls and ceiling showed no signs of water in-leakage during the ISS period. A large amount of concrete debris was observed in and above the elevator pit, owing to the hand demolition of portions of elevator shaft above during the SSE construction.
 2. Attachment C-1; photos 3581 and 3582 show evidence of very slow water in-leakage at pourback / roof structure junction.
 3. Attachment C-1; photo 3579 shows an open J-box in the vestibule for the new SSE incoming power line.
 4. Attachment C-1; photo 3594 and 3646, and item 21 from 2008, show the interior and exterior of a steel door on the rear face that exhibit a good deal of corrosion on the outside at its base and some dampness and corrosion on the inside at this location.
 5. Observation of SSE metal sheathing at the 45' and 59' levels showed multiple openings at junction points where outside light could be seen – evidence of a possible access point for small birds, bats, insects, spiders, etc. While not every pinpoint of outside light is big enough for bird or bat access, there is ample evidence of a number of bats being in the structure in the past and reports of one or two seen during the inspection on April 20th. If any closure of these openings is considered, timing is an issue with the biological team, but a program of maintenance may be recommended to close off the identifiable openings with a wire mesh or metal fabric from the outside. Adhesive or self-tapping screws with a non-corrosive metal mesh or metal fabric would seem to provide an effective and fast way to inhibit further entries, this approach would presumably use an articulated man-lift of significant size. Additionally, consideration for galvanic corrosion with the galvalum roof / siding materials must be accounted for when selecting a material for closure. The area shown in Attachment C-3, Item 70 and Attachment C-4, photo 3622 are a few typical instances. If or when a maintenance program is planned, the timing noted in the 105-C SSE ecological reviews must be considered. Further, it is recommended that this maintenance be completed prior to significantly extending the SSE surveillance periodicity.
-



- B. Exterior Conditions** – Several areas of spalled concrete appeared in the 2008 inspection with no changes noted in the April 2015 inspection. Overall, the exterior of this (oldest SSE) appears in better condition than some of the other (newer) installations. No specific noteworthy structural items of concern were noted during the exterior inspection. One action that should be considered is to update the vestibule door contact information which is outdated as shown in Attachment C-5, photo 3656.
- C. Surveillance Routes**
1. Route 3 is listed on both Figures 2-1 and 2-2 (Ref. 1), these are not continuations but an error in the Ref 1 Figures that should be corrected to avoid confusion as inspectors in the future will likely have less and less first hand SSE knowledge.
 2. The end of Route 2 in the north end of the rear face area needs to be redone. There is no reasonable access past the “ladder down to 0’0” elevation” shown on the surveillance route map Figure 2-1 (Ref. 1).
 3. Figure 2-2 (Ref. 1) the “partial plan” elevation is incorrect, -10 feet is a more correct location for this floor / room.
 4. There is no reasonable access beyond the door called out by Note 2 in Figure 2-2 (Ref. 1) as shown in Attachment D-1, photos 3586 and 3587.
 5. Route 3 for the Inner Rod Room (as shown in Figure 2-1) was not accessed nor was this area entered in the 2008 inspection.
 - i. The man door noted in Ref 1, Figure 2-1 for Route 3 was inspected but not opened per direction of MSA management. Exterior inspection of the roof, siding and flashings in this area showed no signs for concern.
 - ii. Two potential changes in the SSE or S&M Program could support a future recommendation to open the door for access to Route 3: (a) Moving to longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started, (b) Evidence of a large bat or other biota roosting issue in the other parts of the structure would indicate that these spaces may be vulnerable to that same condition.
 6. Since the conditions noted in 5.i and 5.ii above are similar to other areas of the SSE that were inspected inside and out without significant issues, it is reasonable to reach a conclusion that the interiors of this space is acceptable at this point in time.



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Attachment B - 105-C BUILDING INSPECTION REPORT INSERT FOR MSA

ENGINEERING INSPECTION – Appendices X and X+1 provides the record of the inspection, discussion, pictures, and checklist of the structural inspection of the interior and exterior of the structure. Appendix X contains those items with a maintenance and or continued monitoring recommendation, while Appendix X+1 photos and notes are provided as a general record of the condition of the Safe Storage Enclosure.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects.

Recommendations - Recommendations from the 2015 105-C SSE inspection amount to four items, two corrective actions for the structure and two general documentation items:

1. SSE Structure – investigate the slow water in-leakage at the 0'0" pourback and corrosion at the 0'0" rear face door.
2. SSE Electrical – install a cover on the open J-box in the vestibule.
3. Update the contact information on the vestibule door.
4. Future use of surveillance routes and S&M Plan revision should be considered to reflect actual conditions / maps in the SSE and to provide guidance when and how Routes 3 to the Inner Rod Room at grade elevation shown in the S&M Plan Figure 2-1 should be used.



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C 105-C SSE Inspection Results – For Further Consideration

This section presents the Surveillance photos for areas which require continued monitoring as identified in the April 2015 inspection and the inspection documented in WCH 292 from 2008.

Each elevation of the building with concerns is a separate section of this attachment and includes

1. a map showing the photo locations
2. a portion of the inspection table that applies to that elevation and
3. comparison photos from 2008 to 2015 (when available)

When a new area of concern is identified within the area covered in a particular section, the new area will be listed in the location table and photo(s) will be provided. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

If there is no particular area/item for concern on any given elevation, no map or table will be included in this section.



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 C-3– Elevation 45’-2 1/4” Map 11

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 C-4 –Elevation 59’- 4” Map..... 14

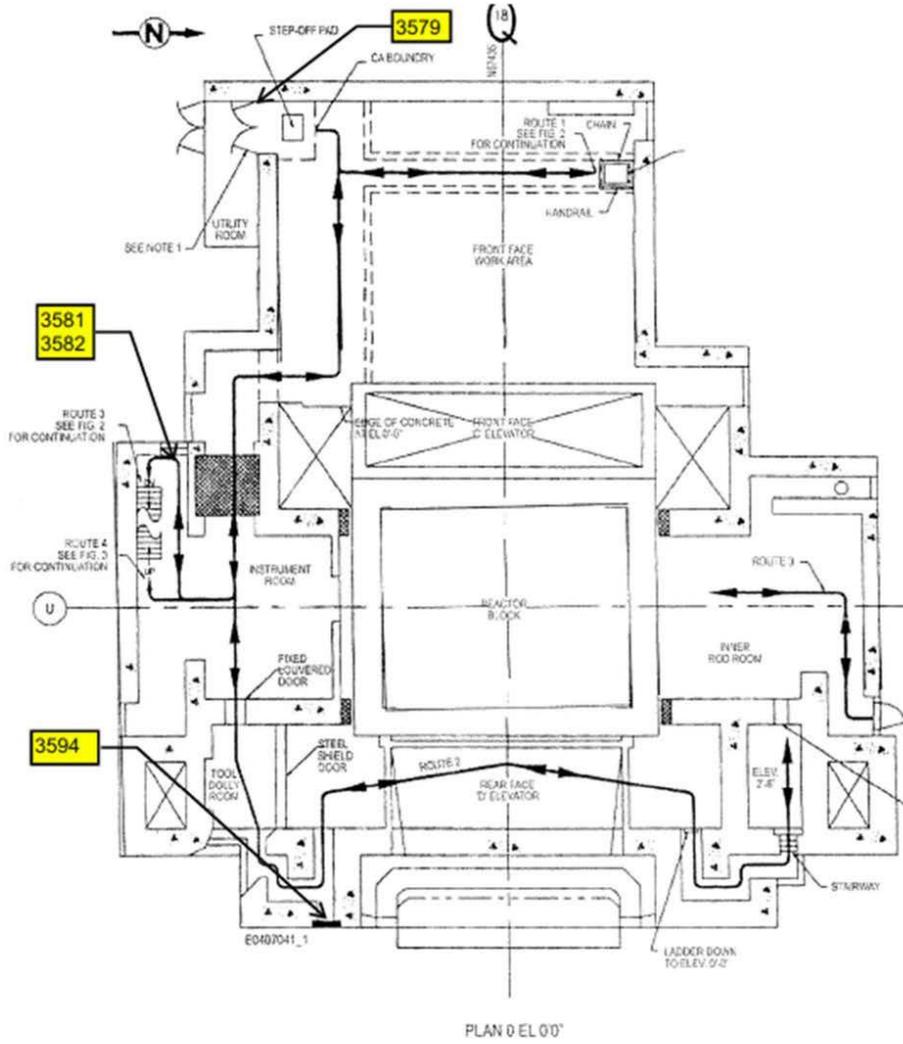
 C-4 - Summary Table & Photos Elevation 59’4” 15

 C-5 – Elevation 0’ Exterior Areas Map 16

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C-1 – At Grade Map Elevation 0'0" Interior Map



C-3



C-1 - Summary Table & Photos At Grade Elevation 0'0" Interior

#	New Photo #	Description	Area / Location	Recommendation	Notes
	3579	Vestibule. Open Junction box	Elev. 0'	Install cover	Open junction box
	3581	White deposit on wall	Elev. 0'	Continue to watch and repair if signs of additional in-leakage appear	When chipped off a small chunk of this white deposit had a drop of water inside..somehow from recent water (rain). Also found some of this white deposit on outside of bldg at this location
	3582	White deposit on interior wall	Elev. 0'		
	3594	Original Building Structural Details Building Interior	Elev. 0' interior	Continue to watch and repair if signs of additional in-leakage appear	Evidence of water/rust at bottom of door
	3646	Exterior door to location in pic 3594	Elev. 0' Exterior		



3579 Open junction box in vestibule



3581 When chipped off, a small chunk of this white deposit had a water drop inside. Somehow from recent water (rain). Also found some of this deposit on outside of bldg at same location



3582 white deposit on building interior

C-5



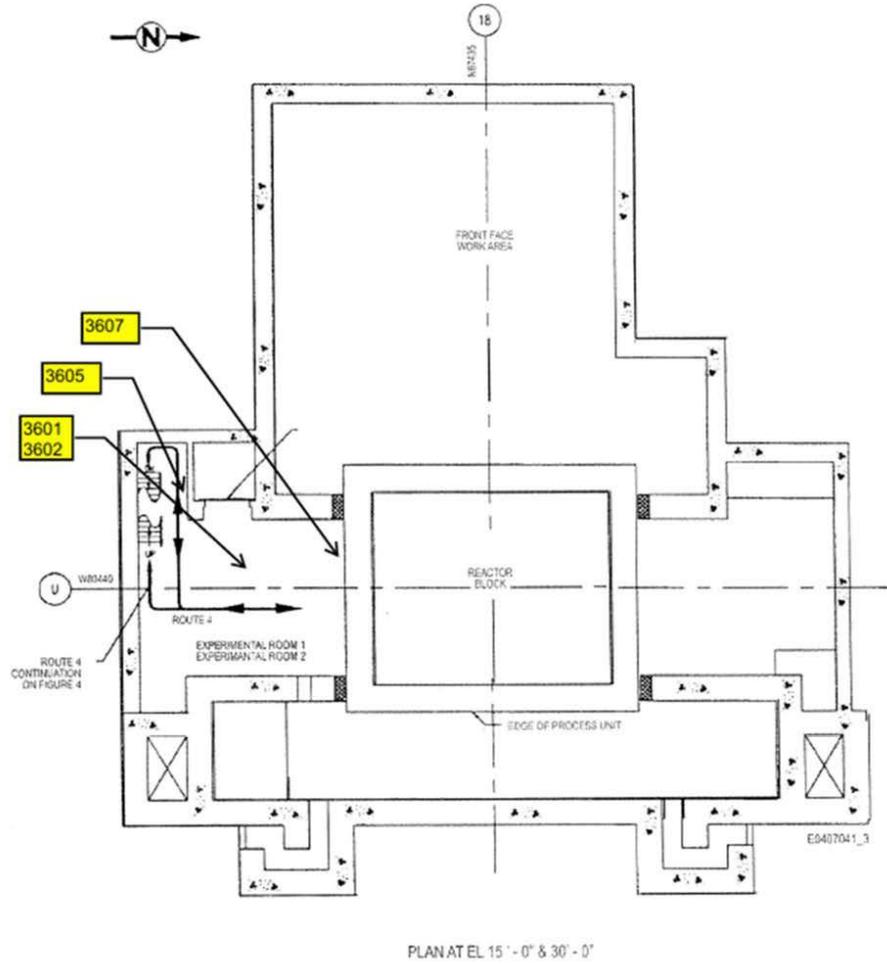
3594 Match THIS PICTURE WITH #3646
Evidence of water/rust at bottom of door



3646 Rear face shield door.. Evidence of rusting inside Possible weather protection issue



C-2 – Elevation 15' and 30' Map

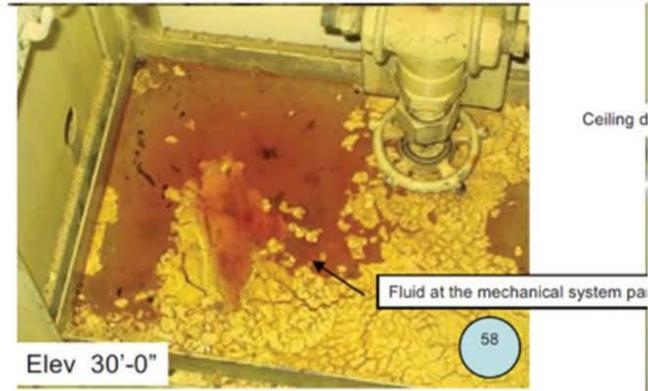


C-7



C-2 – Summary Table & Photos Elevation 15' and 30'

#	New Photo #	Description	Area / Location	Recommendation	Notes
Item # 58	3605	Unknown Liquid at a Mechanical System Component	Elev. 30'-0"	Recommend continuing observation and clean up / removal when possible	Hydraulic fluid is staying well within the equipment pan. Entire area 2' x 3x fluid is from op sys for shield door in pic 3607
	3601	Fluid on floor from overhead winch	Elev.. 30'-0"		
	3602	Overhead winch	Elev.. 30'-0"		
	3607	Shield door with hydraulic operating system	Elev.. 30'-0"		Slow drip releasing hydraulic fluid in pic 3605



Item 58 2008 – Unknown Liquid at a Mechanical System Component, Elev. 30'-0", recommend cleanup



3605 Hydraulic fluid is staying well within the equipment pan. Entire area 2' x 3'



3601 Fluid on floor from overhead winch



3602 Overhead winch

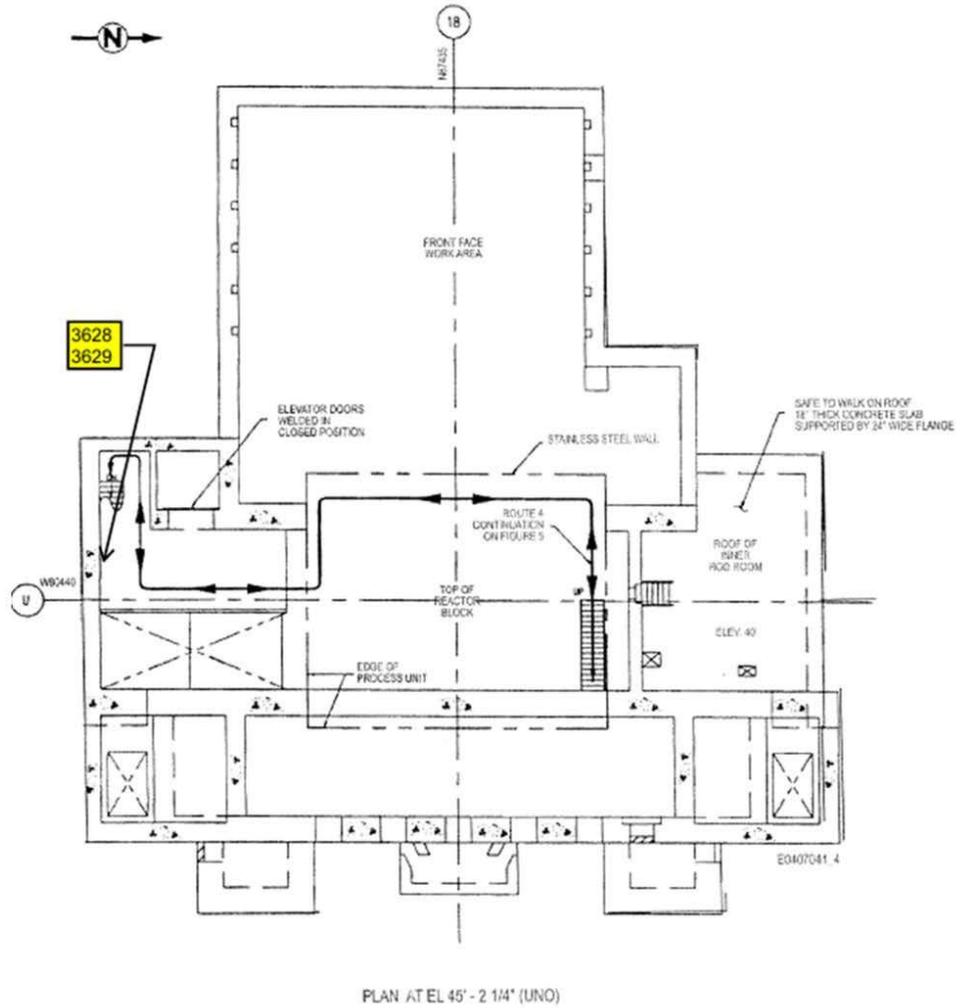


3607 Hydraulic fluid from this op system for this shield door dripping in pic 3605

C-10



C-3- Elevation 45'-2 1/4" Map

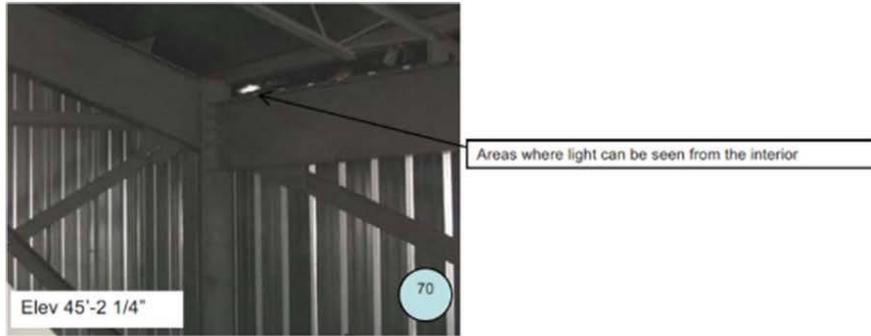




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C-3 –Summary Table & Photos Elevation 45'-2 1/4"

#	New Photo #	Description	Area / Location	Recommendation	Notes
Item #70	No new picture	ISS Details, Soffit area between wall and roof,	Elev. 45'-2 1/4"	Recommend continued observations	See pic # 3622 at Elev. 59' for visible light thru gaps
	3628	Possible PCBs in transformer	Elev. 45'-2 1/4"	Recommend continued observation	No leakage observed
	3629	Possible PCBs in transformer	Elev. 45'-2 1/4"		



Item 70 – 2008 Detail SS Details, Soffit area between wall and roof, Elev. 45'-2 1/4", visible light thru gaps,



3628 Possible PCB in transformer

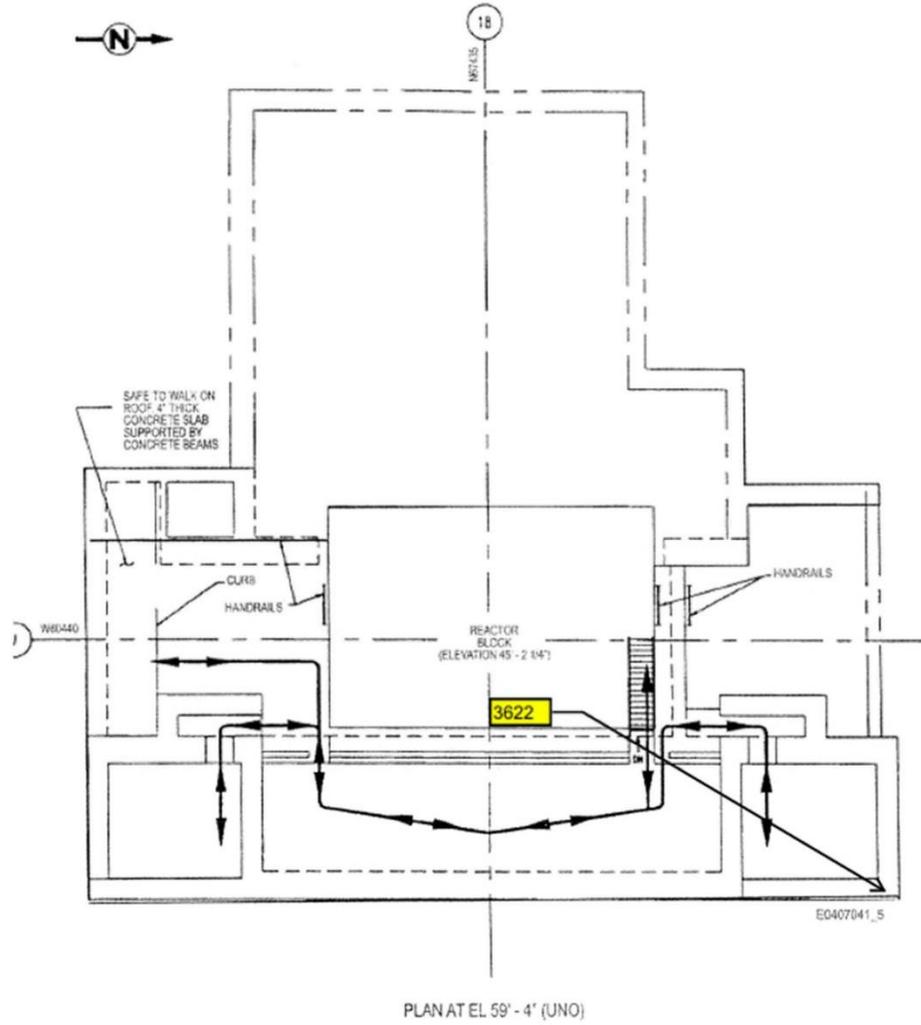


3629 Possible PCB in transformer

C-13



C-4 - Elevation 59' - 4" Map



C-14



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C-4 - Summary Table & Photos Elevation 59' 4"

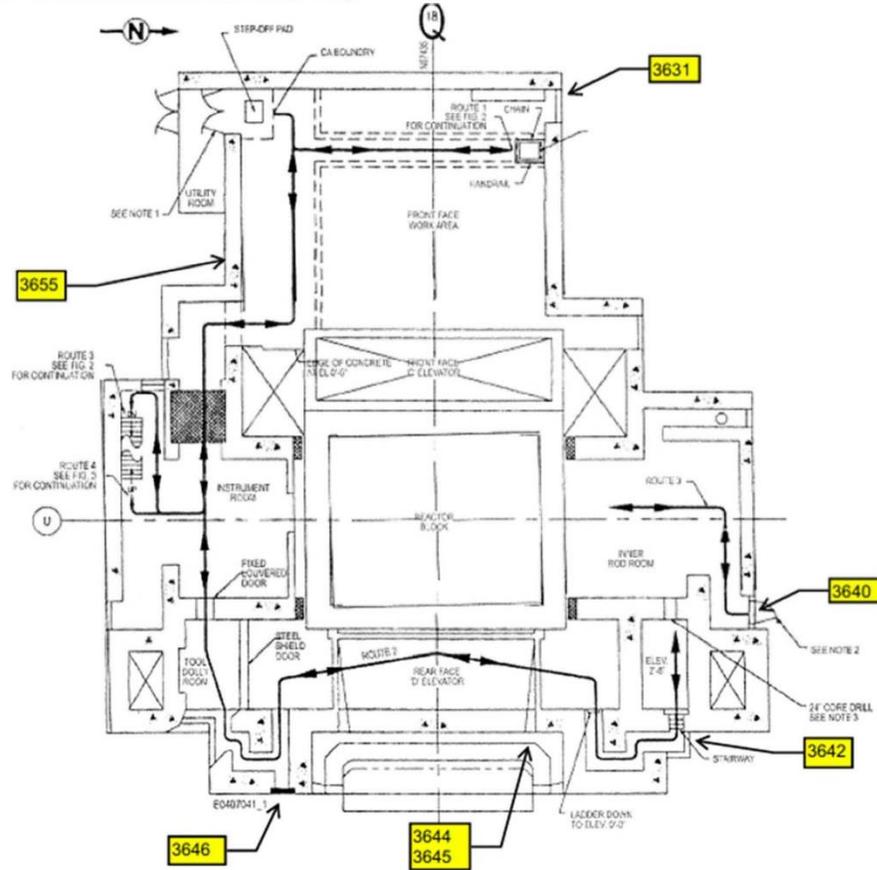
#	New Photo #	Description	Area / Location	Recommendation	Notes
	3622	General ISS Roofing structure	Elev. 59'-4"	Close corner openings. Continued observation to assure no change	Other than openings at corners, structure in very good condition. See pic # 70 on Elev. 45' for another example



3622 Other than openings at corners—structure in very good condition.



C-5 – Elevation D' Exterior Areas Map





C-5 – Summary Table & Photos Elevation 0' Exterior

#	New Photo #	Description	Area / Location	Recommendation	Notes
Item # 3	3655	Exposed ISS Closure Details SW Wall of Building	Exterior, Elev. 0'-0"	Recommend plugging conduit opening on exterior	Open conduit
Item # 20	3646 3647	Existing Metal Door at SE of Exterior Building, Rear face shield door	Exterior, Elev. 0'-0"	Continue to observe, repair or replace with a pourback or plate if significant corrosion continues	See #3594 at 0" interior, minor corrosion
Item # 21	No new picture	Existing Reactor Metal Door at SE of Exterior Building Area	Exterior, Elev. 0'-0"	Soil removal recommended	Minor corrosion
Item # 27	3642	Exposed Aggregate at E Corner Wall of Building	Exterior, Elev. 0'-0"	Periodically remove dirt from ledge to reduce likelihood of growing grass	Grass growing on ledge provides an attractive habitat
Item # 33	3640 3641	Metal Door at N Wall of Building Exterior	Exterior, Elev. 0'-0"	Area of soil removal needs to be more of a gradual slope rather than a hole funneling right to the bottom of the door jam	Mild corrosion
Item # 34	3641	Metal Door Detail Exposed to Earth at N Wall of Building Exterior	Exterior, Elev. 0'-0"		
Item # 44	3631	View of NW Wall of Building Exterior	Exterior, Elev. 0'-0"	Recommend continued observation	Concrete pourback has cracks across top.. not an issue but should be watched for changes



	3638	Swallows nesting	Exterior, Elev. 0'-0"	Recommend continued observation	
	3656	Main Vestibule Entrance	Exterior, Elev. 0'-0"	Update posting	Postings on main vestibule entrance outdated



Item 3 –2008 Detail Exposed ISS Closure Details SW Wall of Building Exterior minor corrosion



3655 Open Conduit



Item # 20 2008 Detail – Existing Metal door @ SE of Exterior building Elevation 0'0"



3646 Rear face shield door. See picture # 3594. Possible WEATHER Protection issue
See pic # 3594 @ 0' level interior



3647



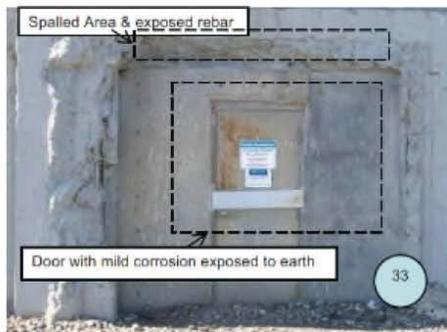
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Item 21 – 2008 Detail Existing Reactor Metal Door at SE of Exterior Building Area , Elev. 0'-0", minor corrosion, soil removal recommended



3642 Grass growing on ledge



Item 33 – 2008 detail Metal Door at N Wall of Building Exterior, Elev. 0'-0", mild corrosion.



3640 Metal door @ N wall. Depression near door and mild corrosion



3641 Area of soil removal needs to be more of a gradual slope rather than a hole funneling rain water to the bottom of door jam.



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Item 44 – 2008 detail View of NW Wall of Building Exterior, from Elev. 0'-0"



3631 Concrete pourback has cracks across top...Not an issue but should be watched for changes.



3638 swallows nesting



3644 swallow nests under ledge



3545



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3656 Postings on main vestibule entrance outdated



D 105-C SSE Inspection Results – Historic Record

This section presents the Surveillance photos for the C Reactor ISS building. Photos from both the inspection documented in WCH-292 from 2008 and the April 2015 inspection are included. These photos are organized by building elevation and a map of each elevation and a table of itemized description is included. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

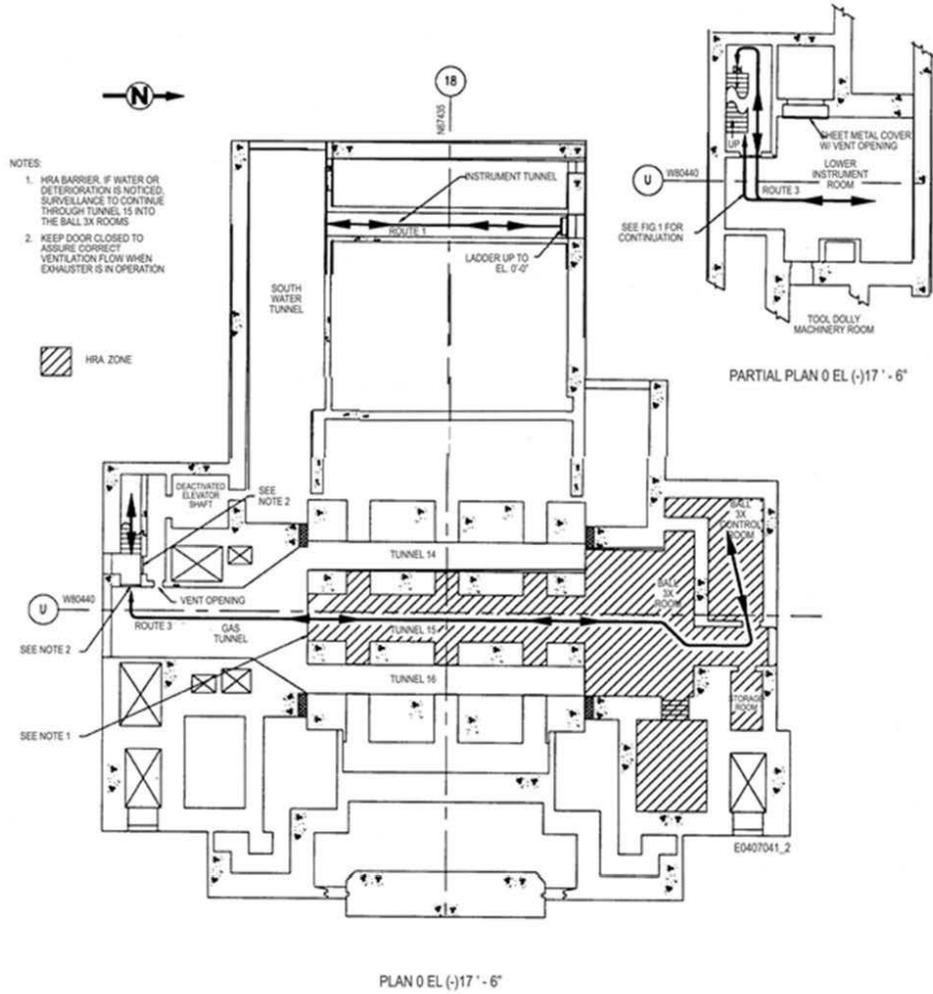
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D-1



D-1 - Elevation -17'-6" Map





D-1 – Summary Table & Photos Elevation -17'-6"

#	New Photo #	Description
Item 52	3586	View from doorway into gas tunnel
Item 53	3587	Can't go beyond door @ bottom of stairs with window
Item 54		Original Building Structure Floor Detail
Item 55	3584	View into water tunnel-Dry
	3585	View from doorway in gas tunnel toward reactor block



Item 52 2008 detail ISS Details rebar and pour back, no visible structural defects



3586 Gas tunnel south end at door.



Item # 53 2008 Detail ISS Door Detail, Elev. -17'-6", no visible structural degradation

D-4



3587 Can't go beyond door @ bottom of stairs with window...



Item # 54 2008 Original Building Structure Floor Detail, Elev. -17'-6", moderate corrosion



Item # 55 2008 detail spalling

D-5



3584 View into water tunnel... Dry



3583 Bottom of F elevator support



3585 View from doorway in gas tunnel toward Reactor block



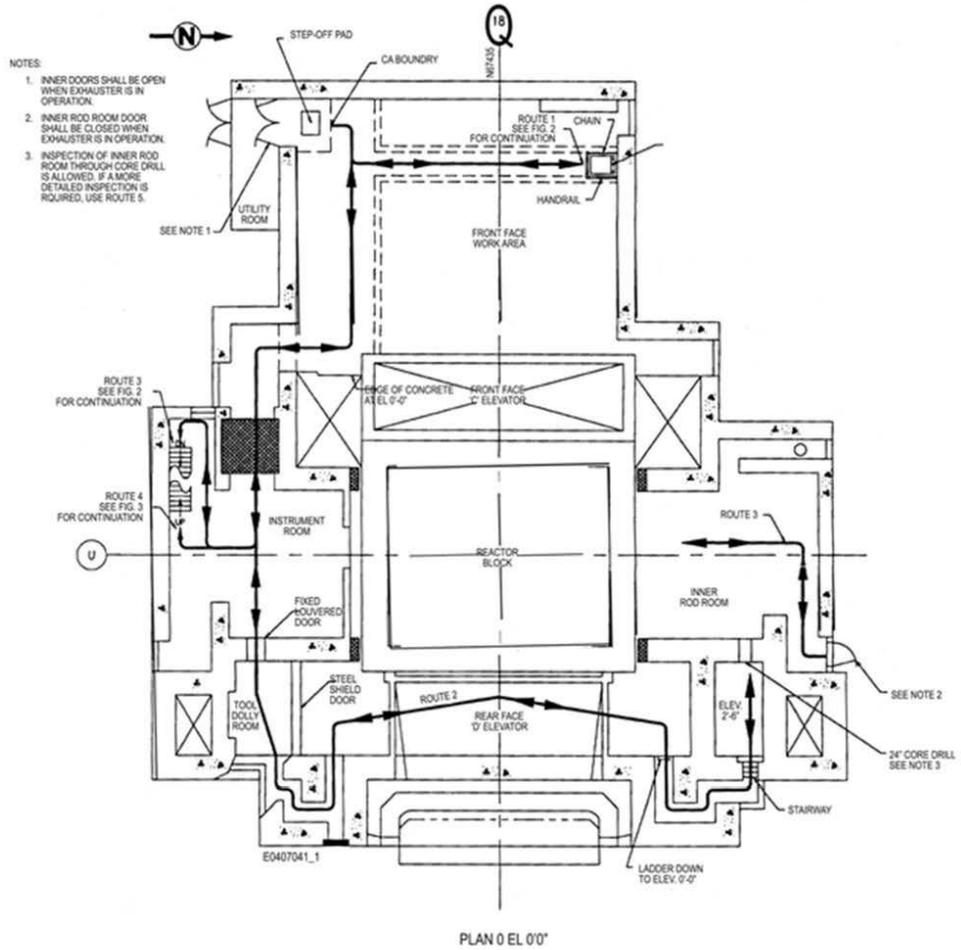
3588 -10' level



3590 -10' level Dried mud several feet below grating floor (@ -17' grade). Mud dried like tile pattern...cracked mud floor..very dry for a long time.



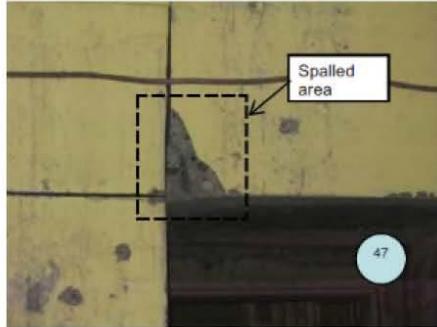
D-2 – At Grade Map





D-2 - Summary Table & Photo At Grade Elevation 0'0"

#	New Photo #	Description
Item 47	3591 3592	Cut at doorway, wedge missing, no issues and stable between 2008 and 2015
Item 48	No new photo	Original building beam details at building interior
Item 49	No new photo	Original building ladder at building interior
Item 50	No new photo	Original building structural details at building interior
Item 51	No new photo	Original building structural details building interior
	3580	Tunnel below front face – minor concrete debris and dry
	3596	D elevator pit
	3597	Rear face - looking up from D elevator



Item # 47 2008 Exposed Aggregate Detail at Building Interior, Elev 0'-0", spalling



3591 No spalling—piece came out during saw cut of doorway



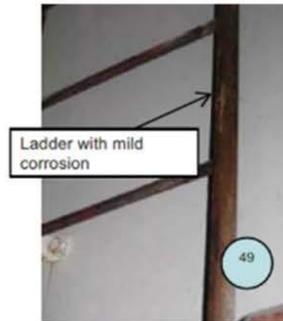
3592



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Item # 48 2008 Original Building Beam Details at Building Interior, Elev. 0'-0", no visible defect



Item # 49 2008 Original building details Mild corrosion



Item # 51 2008 Original Building Structural details @ building interior moderate corrosion



3580 Front face 0' level



3596 D elevator pit Dry

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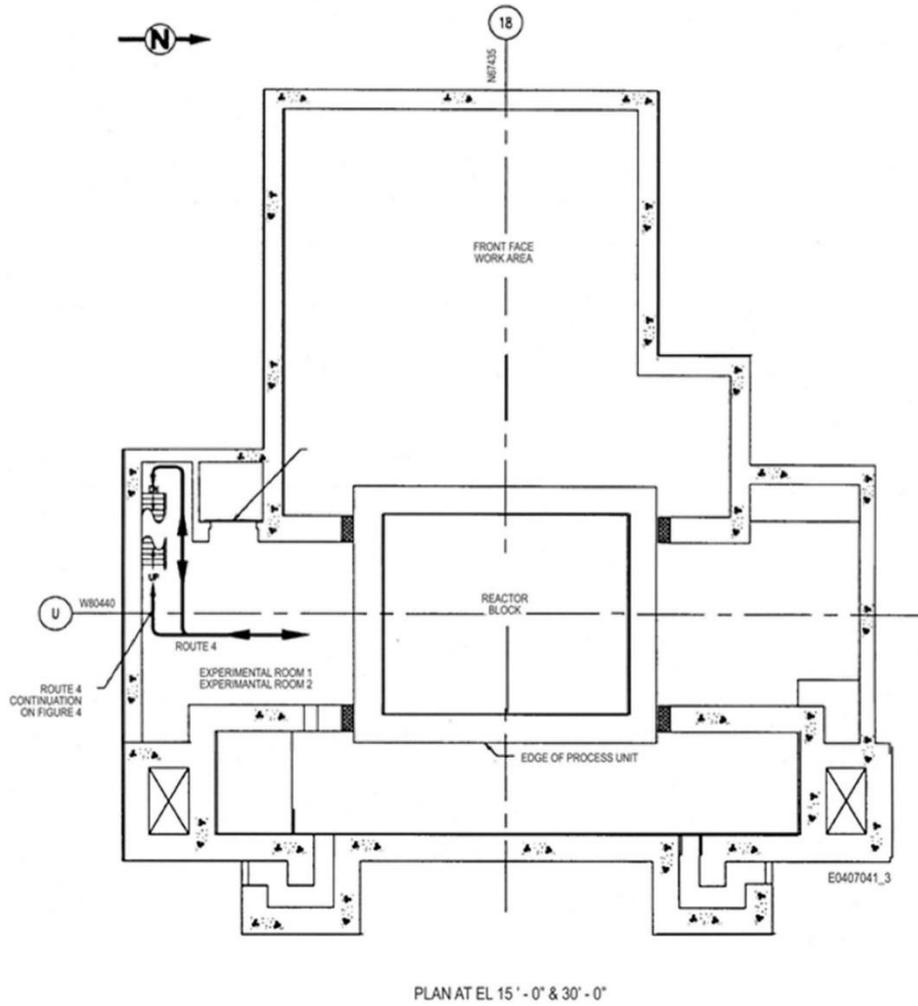


3597 Rear face – looking up from D elevator

D-14



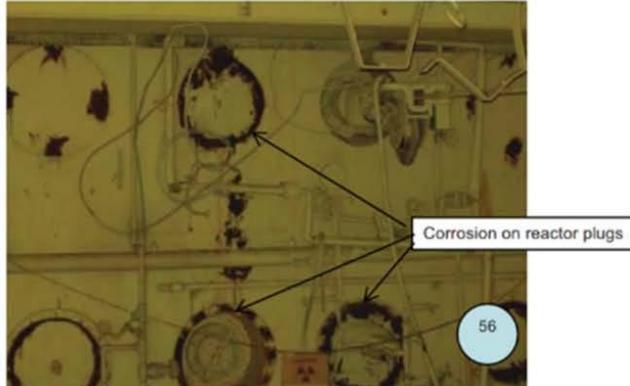
D-3 – Elevation 15' and 30" Map





D-3 – Summary Table & Photo Elevation 15' and 30"

#	New Photo #	Description
Item # 56	3598	Existing Reactor Block wall
Item # 57	No new photo	Existing Reactor masonry and flashing at Building Interior
Item # 59	No new photo	Wall Discoloration at Building Interior
	3599	Cutouts to rear face from +15' and +30' Experimental Rooms
	3600	
	3603	
	3604	



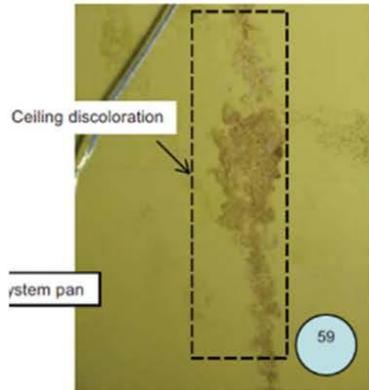
Item 56 2008 – Existing Reactor Block Wall, Elev. 30'-0", moderate corrosion



3598 No visible change



D-17



Item # 59 2008 Discoloration at Building Interior, Elev. 30'-0", no visible structural defect



3599 Cutout to rear face



3600 Cutout to rear face



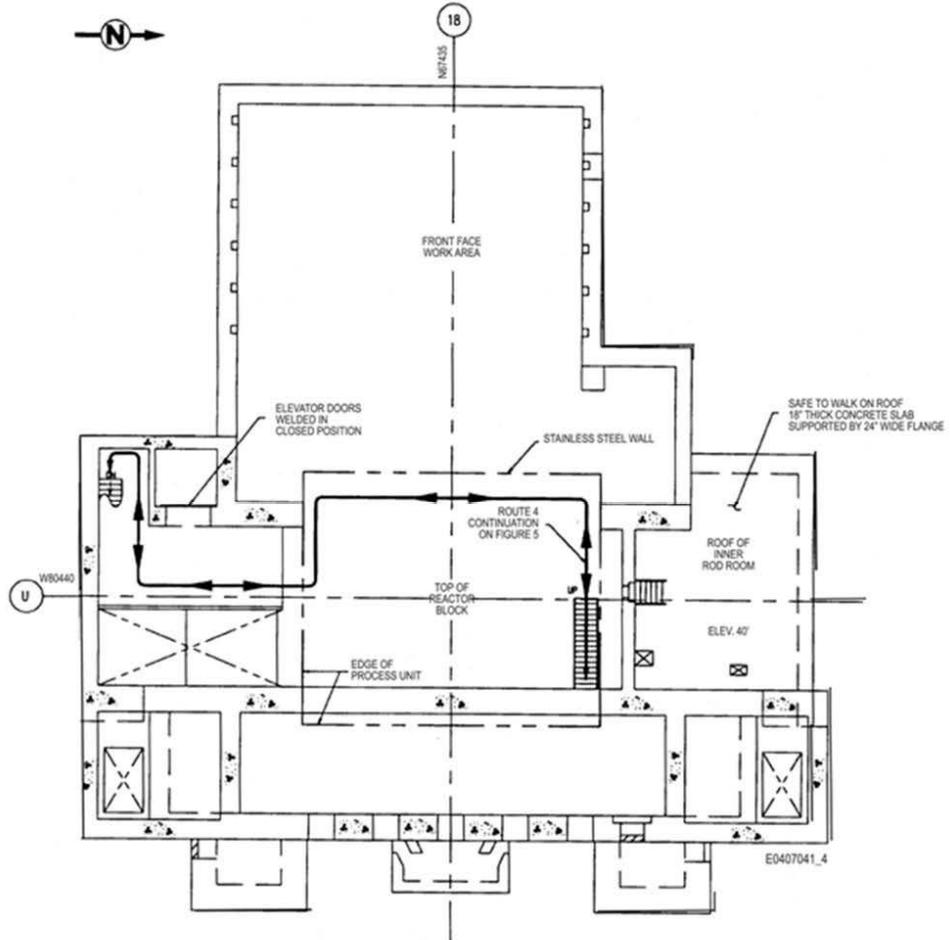
3603 Cut out to rear face



3604 Cut out to rear face



D-4 - Elevation 45'-2 1/4" Map



PLAN AT EL 45' - 2 1/4' (UNO)

D-20

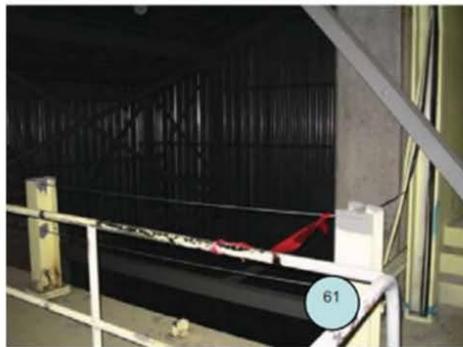


D-4 – Summary Table & Photos Elevation 45'-2 1/4"

#	New Photo #	Description
Item # 60	No new picture	ISS Details, walls & girts
Item # 61	No new picture	ISS Details, Trusses
Item # 62	No new picture	ISS Details, Columns and Beams
Item # 63	No new picture	ISS Details
Item # 64	No new picture	ISS Details, rafters,
Item # 65	No new picture	ISS Details, trusses
Item # 66	No new picture	ISS Details, Original Beam
Item # 67	No new picture	ISS Details, Soffit area between wall and roof,
Item # 68	No new picture	ISS Details, column base plates & bolts,
Item # 69	No new picture	ISS Details, fasteners,
	3611	Vent penetration to top of reactor block / below HEPA filter housing



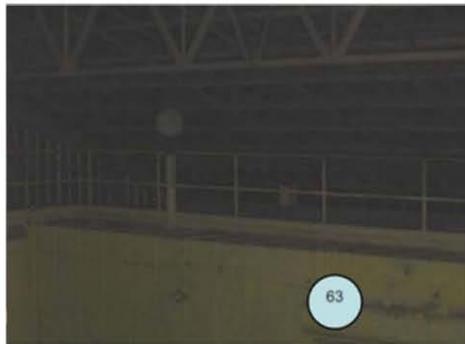
Item 60 –2008 Detail ISS Details, walls & girts, Elev. 45'-2 1/4", no visible structural defects



Item 61 –2008 Detail ISS Details, trusses, Elev. 45'- 2 1/4", no visible structural defects



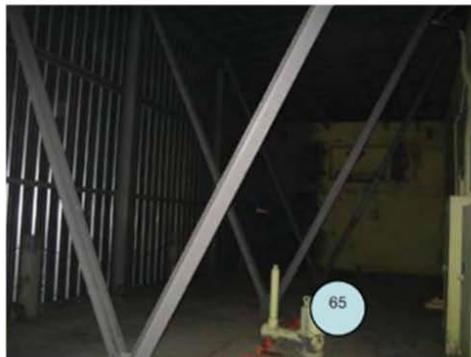
Item 62 2008 Detail – ISS Details, Columns & Beams, Elev. 45'-2 1/4", no visible structural defects



Item 63 – 2008 Detail ISS Details, Elev. 45'-2 1/4", no visible structural defects



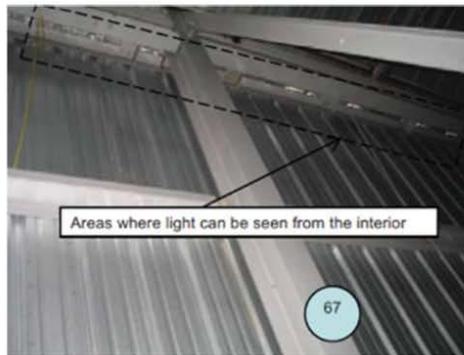
Item 64 – 2008 Detail SS Details, rafters, Elev. 45'-2 1/4", no visible structural defects



Item 65 – 2008 Detail ISS Details, trusses, Elev. 45'-2 1/4", no visible structural defects



Item 66 – 2008 Detail ISS Details, Original Beam, Elev. 45'-2 1/4", no further structural degradation



Item 67 – 2008 Detail ISS Details, Soffit area between wall and roof, Elev. 45'-2 1/4", visible light thru gaps.



Item 68 –2008 Detail ISS Details, column base plates & bolts, Elev. 45'-2 1/4", no visible structural defects



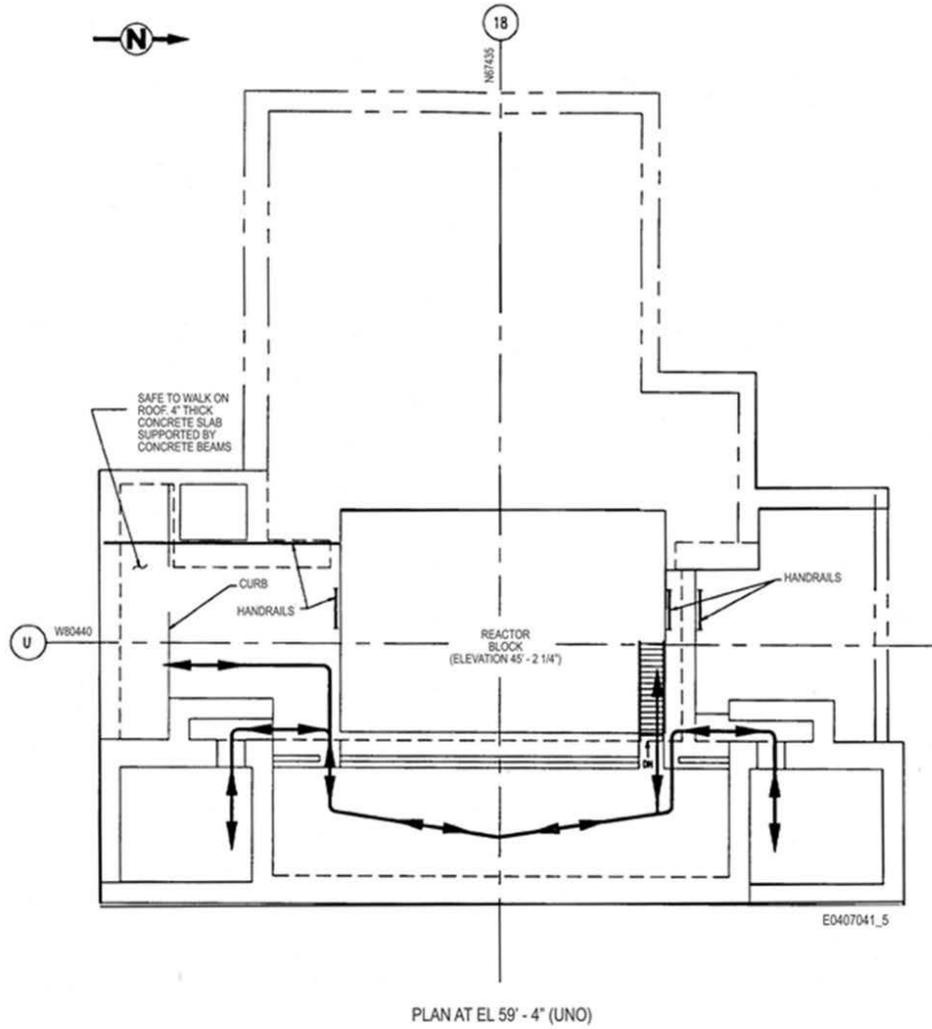
Item 69 – 2008 Detail ISS Details, fasteners, Elev. 45'-2 1/4", no visible structural defects



3611 vent penetration to top of reactor block / below HEPA filter housing



D-5 - Elevation 59' - 4" Map



D-28



D-5 - Summary Table & Photos Elevation 59'4"

#	New Photo #	Description
Item # 71		ISS Details, removed original structure
Item # 72	3624	ISS Details, pourbacks
Item # 73		ISS Details, pourbacks
	3619	Demolition beyond access boundary
	3620	Demolition beyond access boundary
	3621	Demolition beyond access boundary
	3625	Old ceiling/roof plugs



Item 71 –2008 Detail ISS Details, removed original structure, Elev. 59'-4", no further structural damage

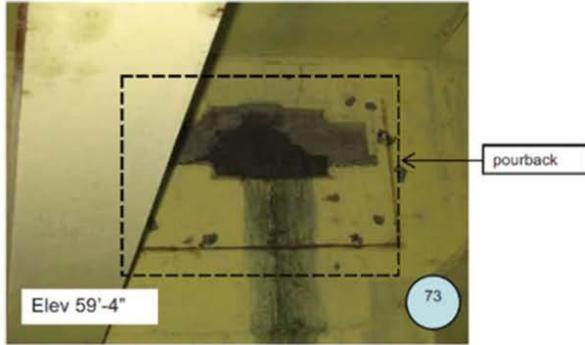


Item 72 – 2008 Detail ISS Details, pourbacks, Elev. 59'- 4", no visible structural defects



3624 No change to condition

D-30



Item 73 – 2008 Detail ISS Details, pourback, Elev. 59'-4", no visible structural defects



3619 Demolition beyond access boundary



3620 Demolition beyond access boundary

D-31



Letter No. 15-MRM-004
May 29, 2015

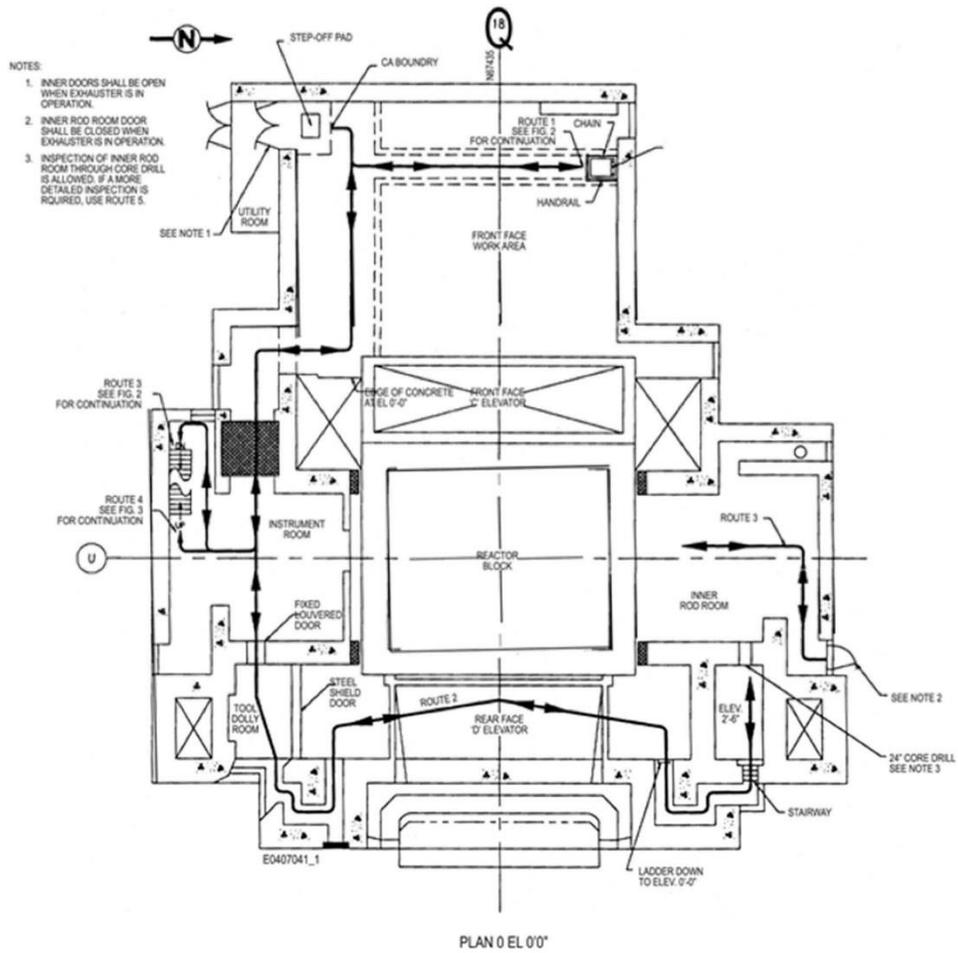


3625 old ceiling/roof plugs

D-32



D-6 – Elevation 0' Exterior Areas Map





D-6 – Summary Table & Photos Elevation of Exterior Areas

#	New Photo #	Description
Item # 1	No new picture	Wall Discoloration at SW Wall of Building "
Item # 2	No new picture	Wall Discoloration at SW Corner of Building
Item #4, 5& 6	3648	Exposed Aggregate & Rebar at SW Wall Corner of Building
Item # 7&11	3652	View of South Wall HEPA filter covers on South Side
Item # 8	No new picture	Exposed Foundation/Floor Rebar at S Wall of Building
Item # 9	No new picture	Exposed Foundation/Floor Rebar at S Wall of Building
Item 10	No new picture	Exposed Foundation/Floor Rebar at S Wall of Building
Item # 12	No new picture	Exposed Aggregate Detail at S Wall of Building
Item # 13	No new picture	Exposed Aggregate at SE Wall Corner of Building Exterior
Item # 14	No new picture	Wall Corner of Building Exterior
Item # 15	No new picture	Exposed Aggregate at SE Wall Corner of Building Exterior
Item # 16	No new picture	Exposed Aggregate at SE Wall Corner of Building Exterior
Item # 17	No new picture	Exposed aggregate at SE Corner Wall of Exterior Building,
Item # 18	No new picture	Exposed Aggregate at SE Corner Wall of Exterior Building,



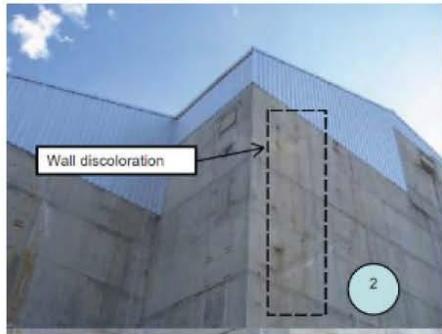
Item # 19	No new picture	Exposed ISS Detail at SE Wall of Exterior Building,
Item # 22	No new picture	ISS Closure Detail
Item # 23	No new picture	ISS Closure detail
Item # 24	No new picture	ISS Closure Detail,
Item # 25	No new picture	Exposed Aggregate at E Corner Wall of Building Area ,
Item # 26	No new picture	Exposed Aggregate at E Corner Wall of Building
Item # 28	No new picture	Exposed Aggregate at E Corner Wall of Building
Item # 29	No new picture	Exposed Aggregate at NE Corner Wall of Building Exterior
Item # 30	No new picture	Exposed Aggregate at NE Corner Wall of Building Exterior
Item # 31	No new picture	Pourback ISS Detail at NE gWall of Building Exterior, as seen from Elev 0'-0",
Item # 32	No new picture	Exposed Aggregate from ISS detail at Wall of Building Exterior, as seen from Elev. 0'-0",
Item # 35	3635	Pourback ISS Detail at N Wall of Building Exterior, as seen from Elev. 0'-0
Item # 36	3639	ISS details @ NW wall of bldg exterior
38 39	3637	Ventilation Connection
Item # 40	No new picture	Item 40 – ISS Detail at NW Wall, from Elev. 0'-0"
Item # 41	No new picture	Discoloration at NW Wall of Building Exterior, from Elev. 0'-0", unknown substance



Item # 42	No new picture	Exposed Aggregate & Rebar at NW Wall of Building Exterior
Item # 43	3635	Pourback ISS details at NW Wall of Building Exterior, from Elev. 0'0"
	3636	
	3633	
	3634	
Item # 45	No new picture	Exposed ISS detail at NW Wall of Exterior Building, from Elev. 0'-0
Item # 46	No new picture	Exposed ISS details at NW Wall of Building Exterior
	3630	105 C Exterior detail
	3632	105-C Exterior detail
	3643	105 C exterior detail
	3644	Swallow nest under ledge
	3645	Swallows nesting under ledge



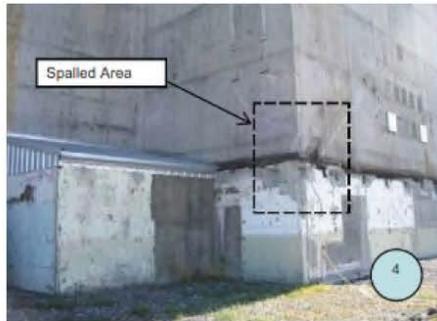
Item 1 – 2008 Detail Wall Discoloration at SW Wall of Building Exterior, Elev. 0'-0", minor corrosion



Item 2 – 2008 Detail Wall Discoloration at SW Corner of Building Exterior, Elev. 0'-0", minor corrosion



Item 3 –2008 Detail Exposed ISS Closure Details SW Wall of Building Exterior minor corrosion



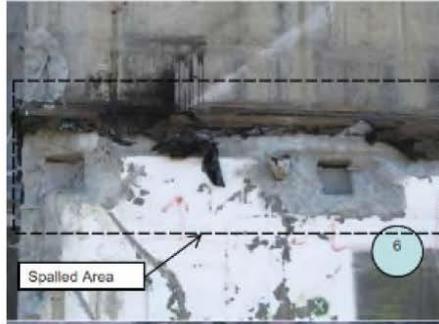
Item #4 2008 Detail Exposed aggregate and rebar at SW corner of building exterior- spalling



3648 demo damage no issue



Item 5 – 2008 Detail Exposed Aggregate and Rebar at S Wall of Building Exterior, Elev. 0'-0", minor corrosion, and spalling



Item 6 – 2008 Detail Exposed Aggregate at S Wall of Building Exterior, Elev. 0'-0", spalling

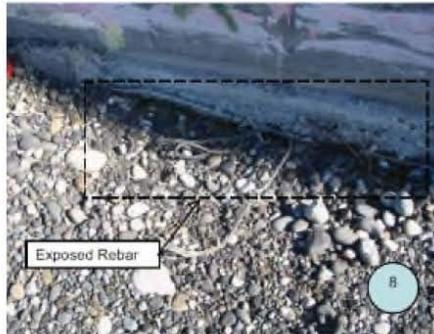


Item 7 – 2008 Detail View of South Wall, Elevation 0'-0"

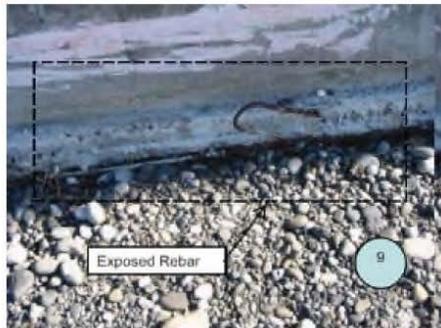


3652 HEPA Filter covers on south side of building, HEPA filter noted on interior +15' Experimental Room

D-40



Item 8 –2008 Detail Exposed Foundation/Floor Rebar at S Wall of Building Exterior, Elev 0'-0", recommend soil removal

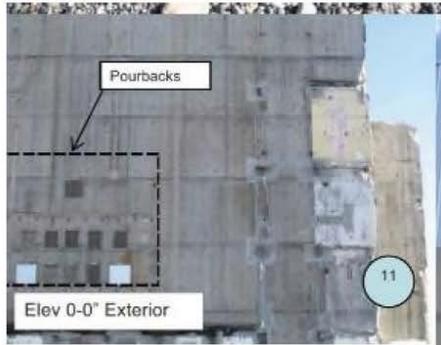


Item 9 2008 Detail– Exposed Foundation/Floor Rebar at S Wall of Building Exterior, Elev 0'-0", recommend soil removal

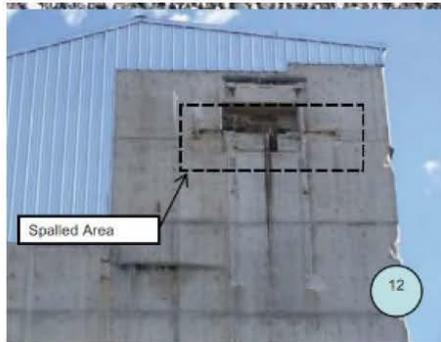


Item 10 –2008 Detail Exposed Foundation/Floor Rebar at S Wall of Building Exterior, Elev. 0'-0", recommend soil removal

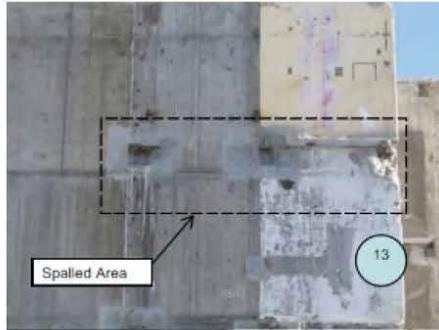
D-41



Item 11 – 2008 Detail Pourback ISS Detail at S Wall of Building Exterior, as seen from Elev. 0'-0", no visible defect



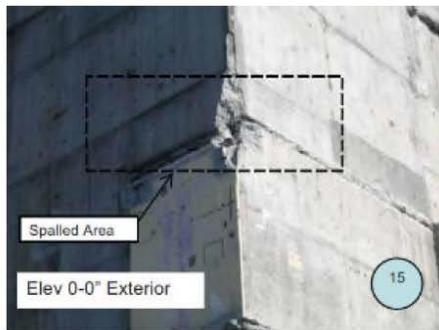
Item 12 – 2008 Detail Exposed Aggregate Detail at S Wall of Building Exterior, as seen from Elev. 0'-0", no visible defect



Item 13 –2008 Detail Exposed Aggregate at SE Wall Corner of Building Exterior, Elev. 0'-0", spalling

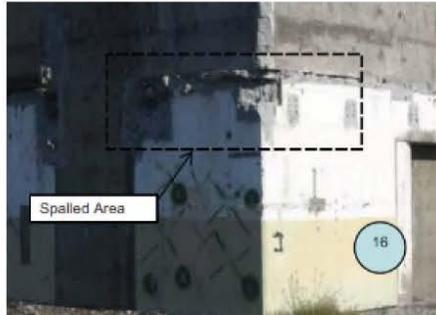


Item 14 2008 Detail– Exposed Aggregate at SE Wall Corner of Building Exterior, Elev. 0'-0", spalling

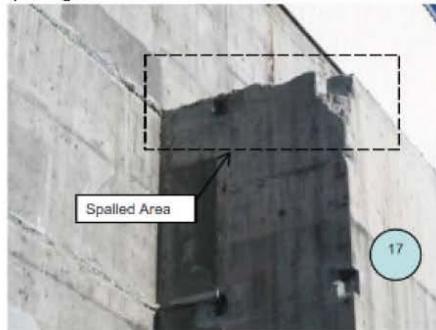


Item 15 2008 Detail– Exposed Aggregate at SE Wall Corner of Building Exterior, Elev. 0'-0", spalling

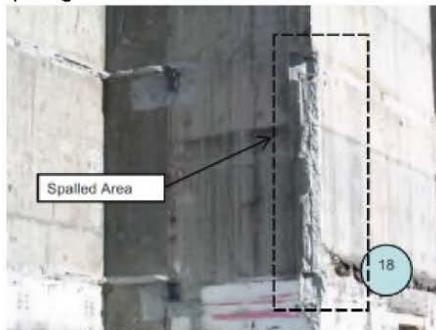
D-43



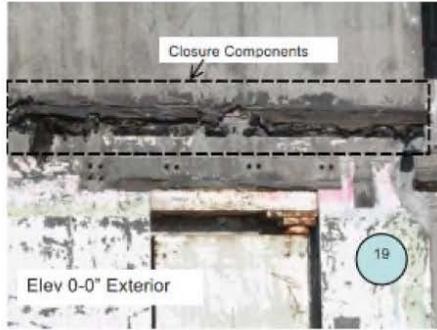
Item 16 2008 Detail– Exposed Aggregate at SE Wall Corner of Building Exterior, Elev. 0'-0", spalling



Item 17 –2008 Detail Exposed Aggregate at SE Corner Wall of Exterior Building, Elev. 0'-0", spalling



Item 18 2008 Detail– Exposed Aggregate at SE Corner Wall of Exterior Building, Elev. 0'-0", spalling



Item 19 – 2008 Detail Exposed ISS Detail at SE Wall of Exterior Building, Elev. 0'-0", discoloration Item



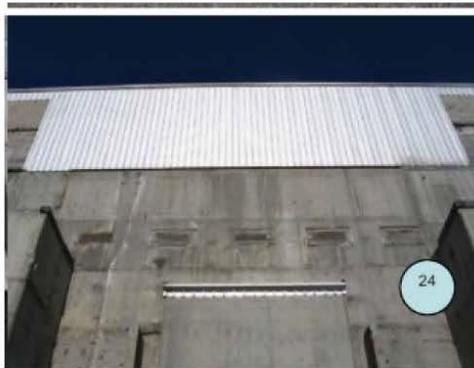
Item 22 – 2008 Detail ISS Closure Detail , Elev. 0'-0", no visible defect



D-45



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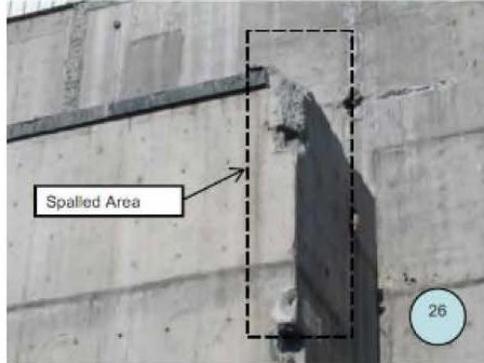


Item 24 2008 Detail – ISS Closure Detail, as seen from Elev. 0'-0", no visible defect

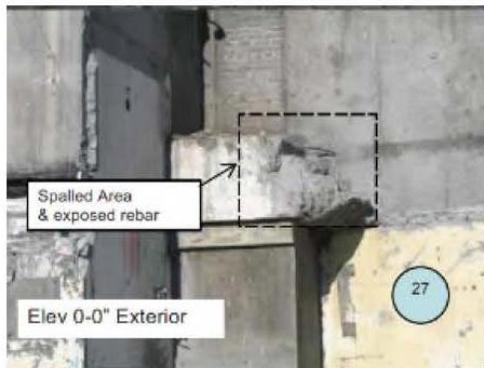


Item 25 –2008 Detail Exposed Aggregate at E Corner Wall of Building Area , Elev. 0'-0", spalling

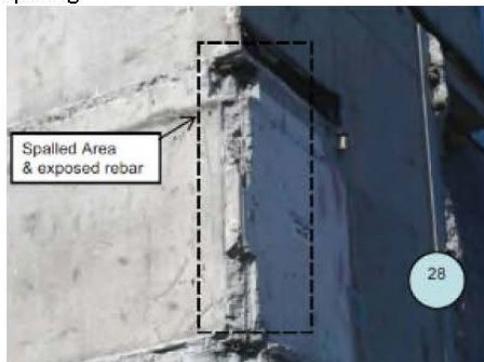
D-46



Item 26 –2008 Detail Exposed Aggregate at E Corner Wall of Building Area , Elev. 0'-0", spalling



Item 27 –2008 Detail Exposed Aggregate at E Corner Wall of Building Area , Elev. 0'-0", spalling



Item 28 –2008 Detail Exposed Aggregate at E Corner Wall of Building Area , Elev. 0'-0", spalling

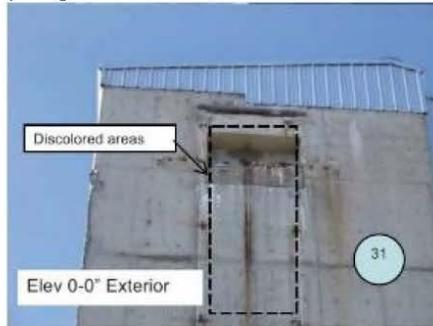
D-47



Item 29 –2008 Detail Exposed Aggregate at NE Corner Wall of Building Exterior, Elev. 0'-0", spalling



Item 30 – 2008 Detail Exposed Aggregate at NE Corner Wall of Building Exterior, Elev. 0'-0", spalling

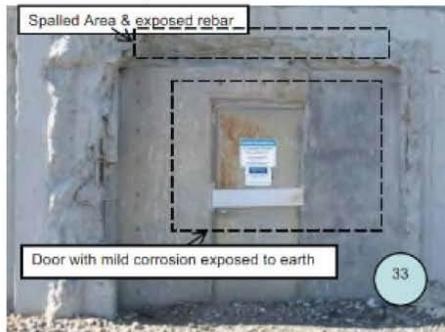


Item 31 –2008 Detail Pourback ISS Detail at NE Wall of Building Exterior, as seen from Elev. 0'-0", discoloration

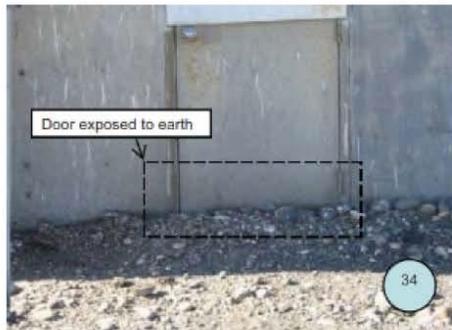
D-48



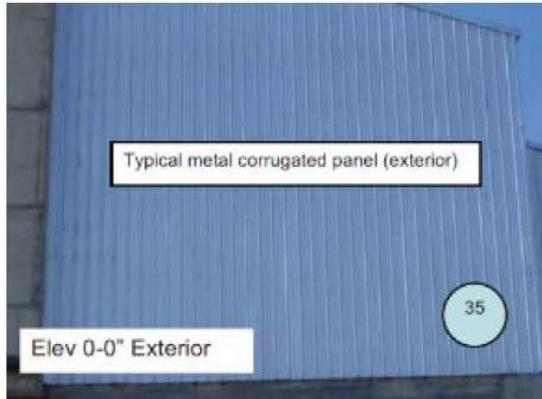
Item 32 2008 Detail Exposed Aggregate from ISS detail at Wall of Building Exterior, as seen from Elev. 0'-0", no further visible defect



Item 33 – 2008 detail Metal Door at N Wall of Building Exterior, Elev. 0'-0", mild corrosion.



Item 35 – 2008 detail Pourback ISS Detail at N Wall of Building Exterior, as seen from Elev. 0'-0", no visible defects



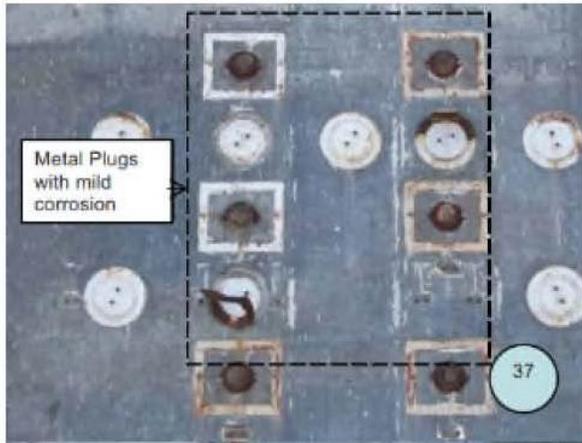
Item 35 –2008 detail Pourback ISS Detail at N Wall of Building Exterior, as seen from Elev. 0'-0", no visible defect



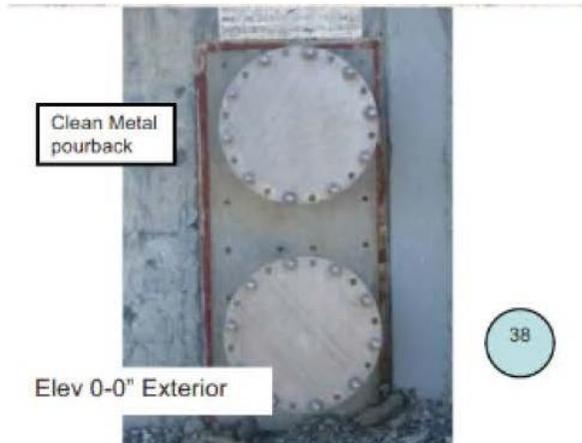
3635



3639



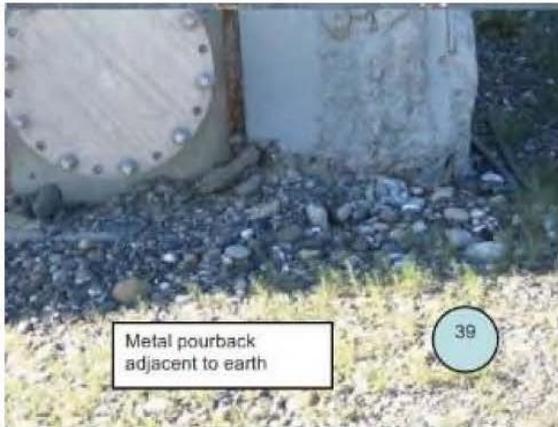
Item 37 – Exposed Metal Plugs at North Wall of Building Exterior, Elev. 0'-0", moderate corrosion



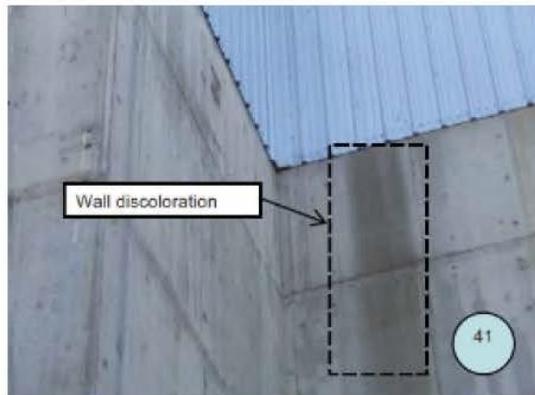
38 – Pourback ISS Detail at N Wall of Building Exterior, Elev. 0'-0", no visible defect



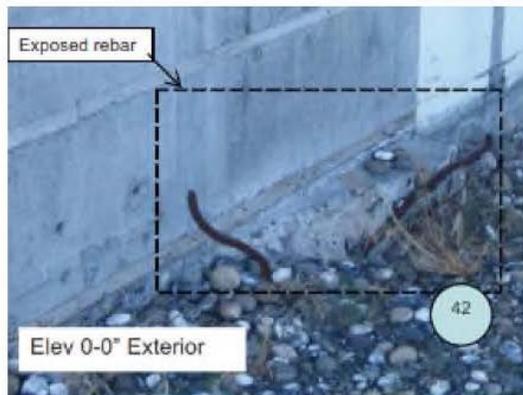
3637



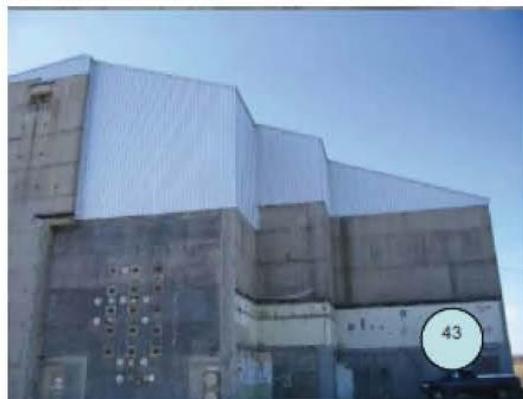
Item 39 – 2008 Detail Pourback ISS detail at N Wall of Building Exterior, Elev. 0'-0", recommend soil removal



Item 41 – 2008 Detail Discoloration at NW Wall of Building Exterior, from Elev. 0'-0", unknown substance, no visible structural degradation



Item 42 – 2008 Detail Exposed Aggregate & Rebar at NW Wall of Building Exterior, Elev. 0'-0", moderate corrosion



Item # 43 2008 Details Pourback ISS details @ NW wall of bldg. exterior



3636



3633

D-55



3634



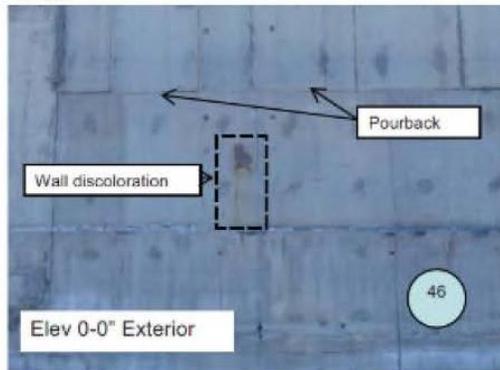
Item 44 – 2008 detail View of NW Wall of Building Exterior, from Elev. 0'-0"

D-56

B-111



Item 45 –2008 detail Exposed ISS detail at NW Wall of Exterior Building, from Elev. 0'-0" , no visible



Item # 46 2008 detail Exposed ISS details @ NW wall of bldg. exterior. Minor corrosion



3630 general building exterior discoloration

APPENDIX C
S&M ACTIVITIES REPORTS FOR 105-D SSE ASSESSMENT

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APPENDIX C
S&M ACTIVITIES REPORTS FOR 105-D SSE ASSESSMENT

This appendix presents reports associated with the surveillance and maintenance activities. The appendix is arranged so that each activity is listed separately, followed by the applicable documents.

The activities inside the 105-D SSE were conducted along the surveillance routes identified in DOE/RL-2004-59, *Surveillance and Maintenance Plan for the 105-D Reactor Safe Storage Enclosure*, Rev. 0. These surveillance routes also are included in Work Package 2M-73252/C.

Internal Radiological Survey

Radiological control technicians performed surveys along the surveillance routes.

MSA RADIOLOGICAL SURVEY REPORT

Job Description
Entry into 105D reactor bldg on tour path only. JW

Map/Sketch
N/A

COPY

N/A

Purpose of Survey
 Job Coverage
 Verification
 Work/Job Control Pkg./ISA# N/A
 Required Task # N/A
 RAM Shipment # N/A
 Material Release Released to: N/A

Item(s) # N/A
 Static Survey β/γ α
 • Number of static measurements N/A / N/A
 • Distance from the item (inches) N/A / N/A
 • Count time (seconds) N/A / N/A
 • Percentage of the item surveyed N/A / N/A
 No observable/audible counts above background (i.e., <D)

Sample Analysis Reference
 Sample Counter Log Number: N/A

Contamination Incident
 Skin Clothing Spill
 Alarm Response CAM ARM APM
 Exposure Incident HRAVHRA Work
 IIF No. N/A
 Other N/A
 Air sample taken - see attached log
 Emergency Response - use attached forms
 Check appropriate box(es) above

Item(s) # N/A
 Large area wipe (LAW) β/γ α
 • Survey speed (inches/second) N/A / N/A
 • Distance from the LAW (inches) N/A
 • Percentage of item wiped N/A
 • Area swiped for each LAW N/A
 No observable/audible counts above background (i.e., <DLAW, or Observed activity above background (i.e., <4pm/LAW)

Item(s) # N/A
 Scanning Survey β/γ α
 • Survey speed (in./sec) N/A / N/A
 • Distance from the item (inches) N/A / N/A
 • Percentage of the item surveyed N/A / N/A
 No observable/audible counts above background (i.e., <D)

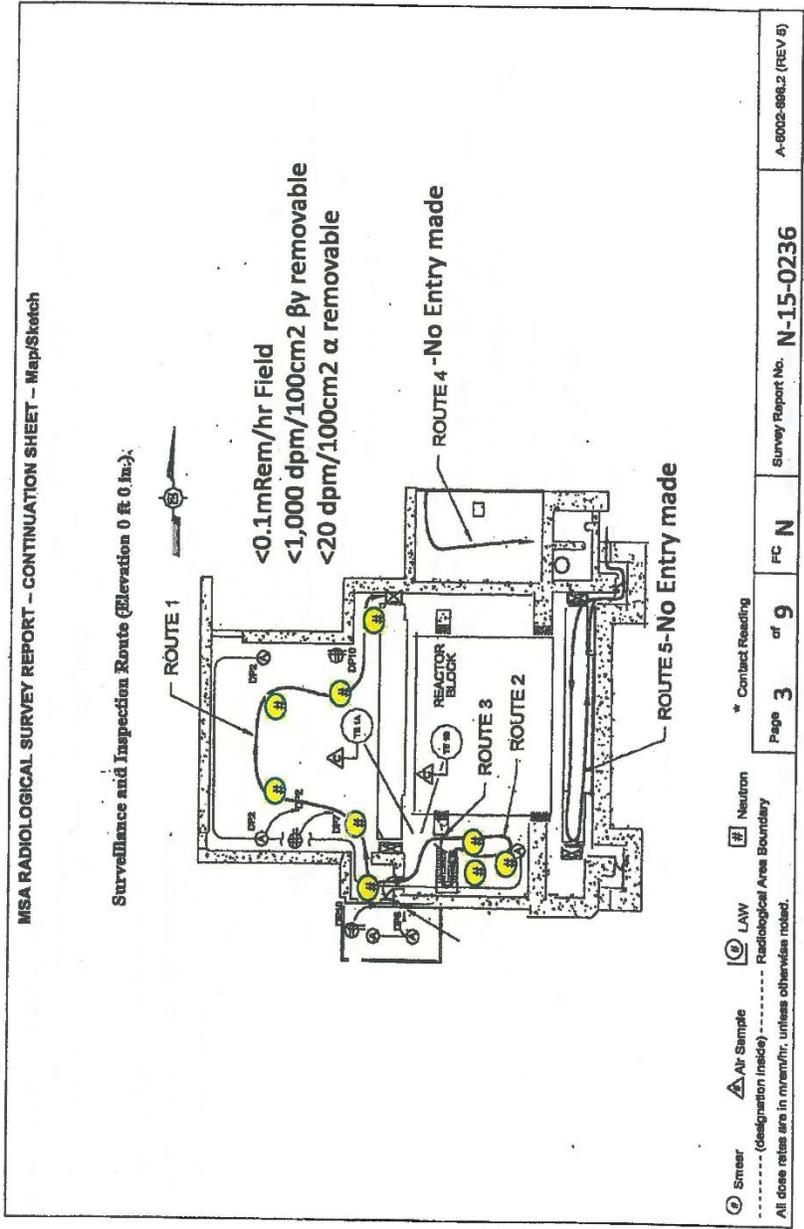
Map Legend
 Smear LAW * Contact Reading
 Air Sample Neutron
 --- (designation inside) --- Radiological Area Boundary
 Dose Rates in mrem/h unless otherwise noted

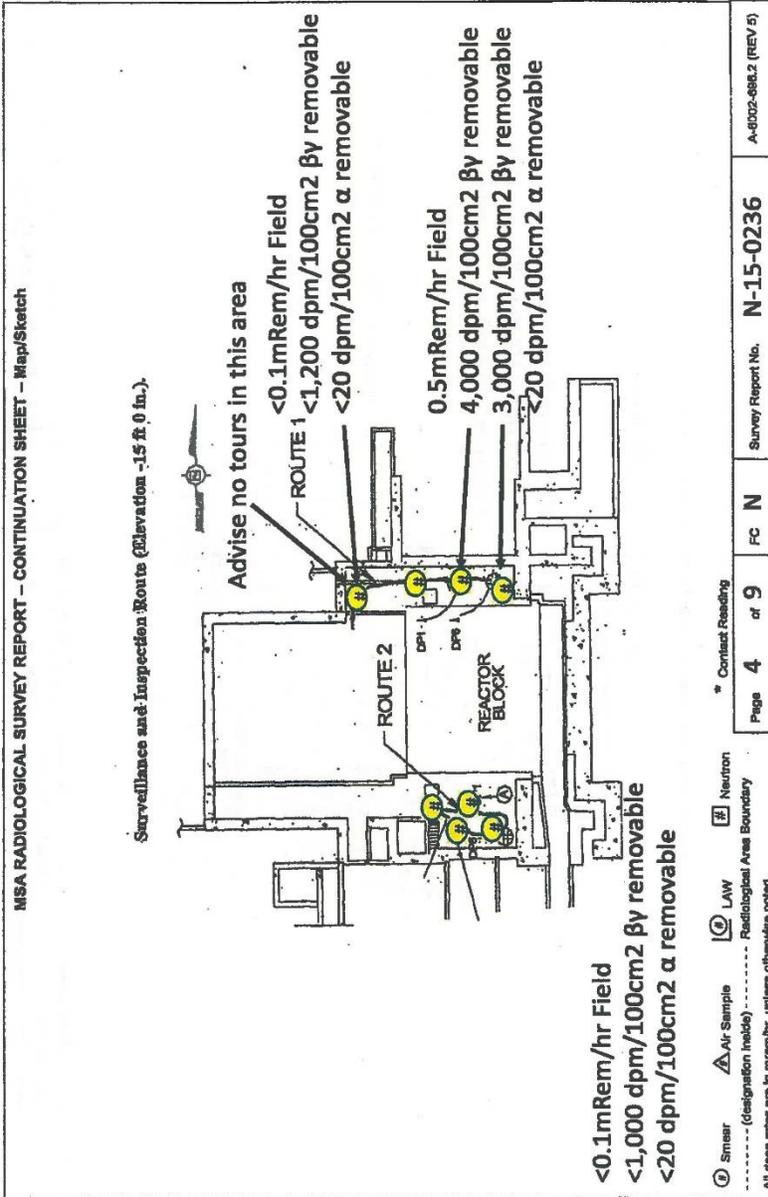
RCT Name(s) (Print) Joe Wiley
 Signature(s) *Joe Wiley*
 Supervisor or Designee (Print) E. Schiller
 Signature *E. Schiller*

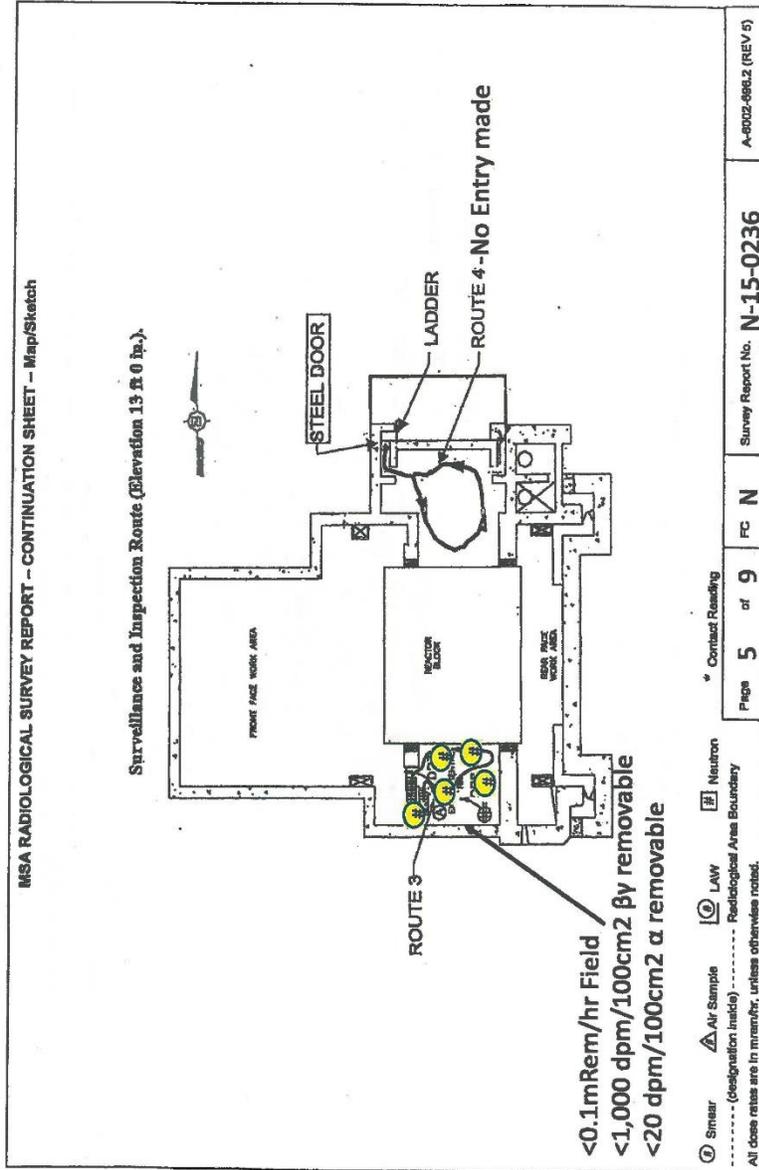
RO-3B	GM Model	PAM	Model	3	N/A
Micro Rem	Probe	Probe	44-9	44-9	N/A
ICBB3-0612	N/A	ACBC1-0096	CMLL2-0244	CMLL2-0244	N/A
N/A	N/A	DTRNE-0012	DTL7-0037	DTL7-0037	N/A
N/A	N/A	16%	10%	10%	N/A

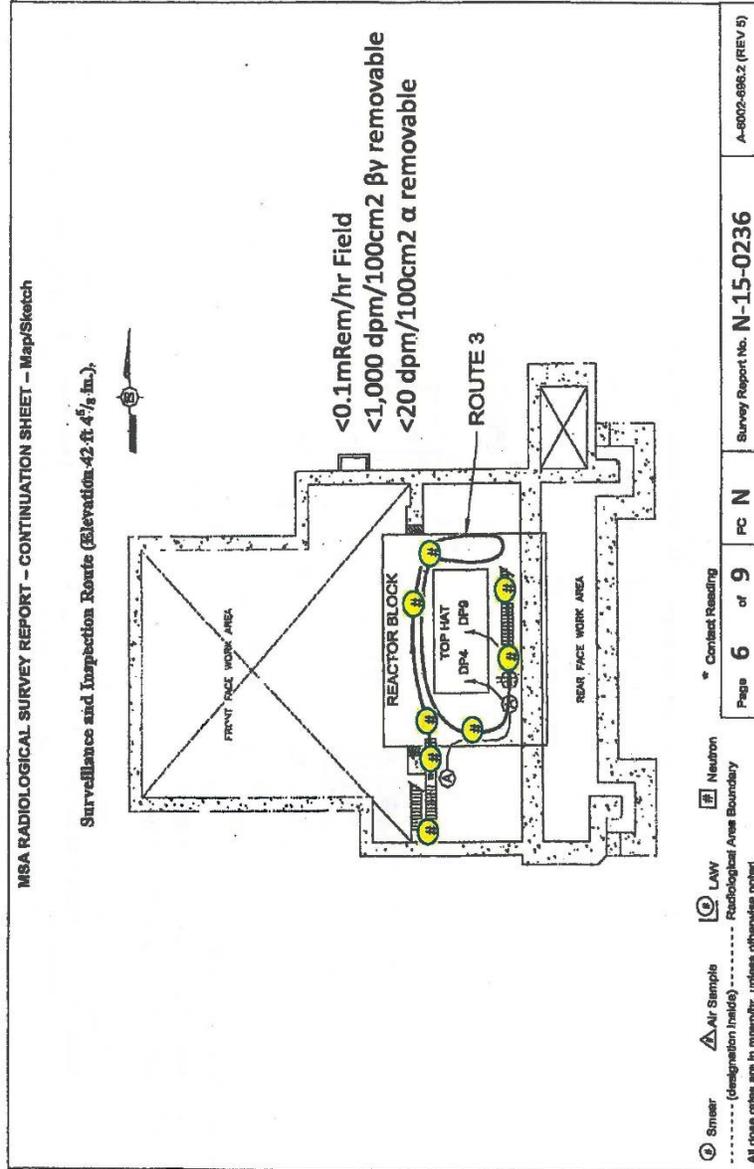
Page 1 of 9 Survey Report No. N-15-0236 A-6002-696 (REV 9)

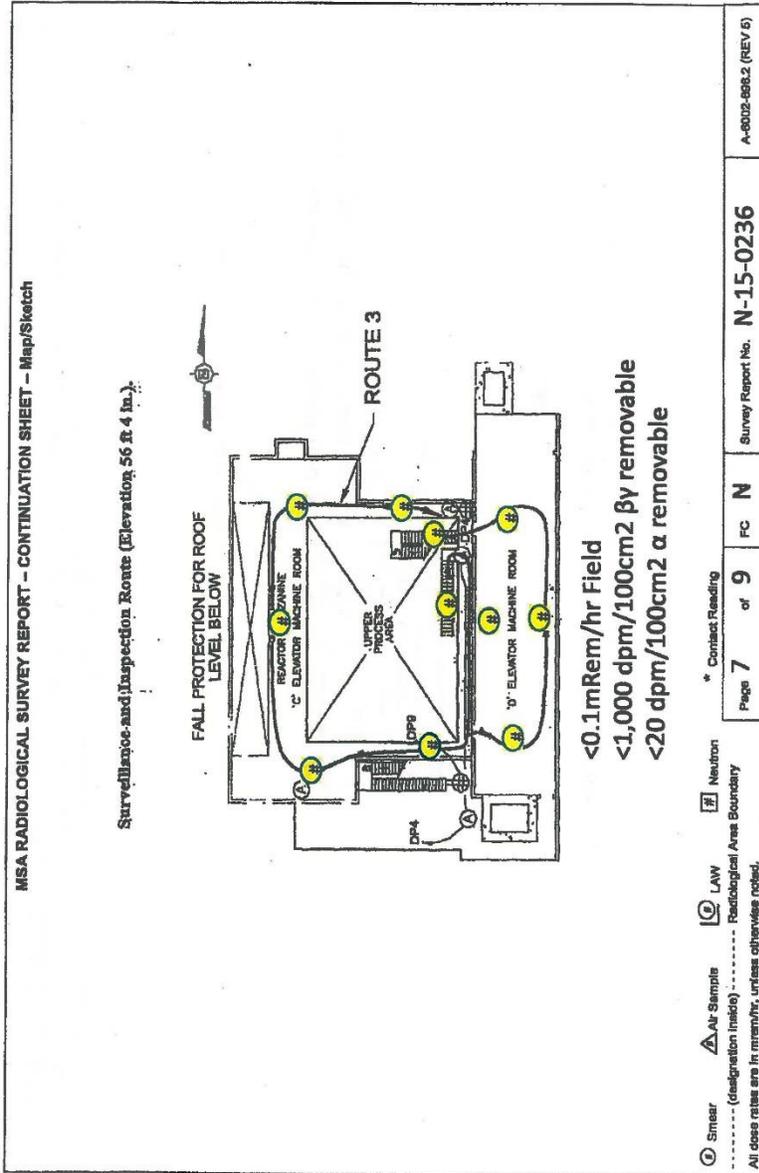
NOTE: If personal information is added to this survey that might cause distress, embarrassment, or risk identity theft, e.g. exposure data, medical data, payroll, or SSN, the RCT must add the words "OFFICIAL USE ONLY" on the bottom of each page and/or attachments. Ref. MSC-PRO-54603.

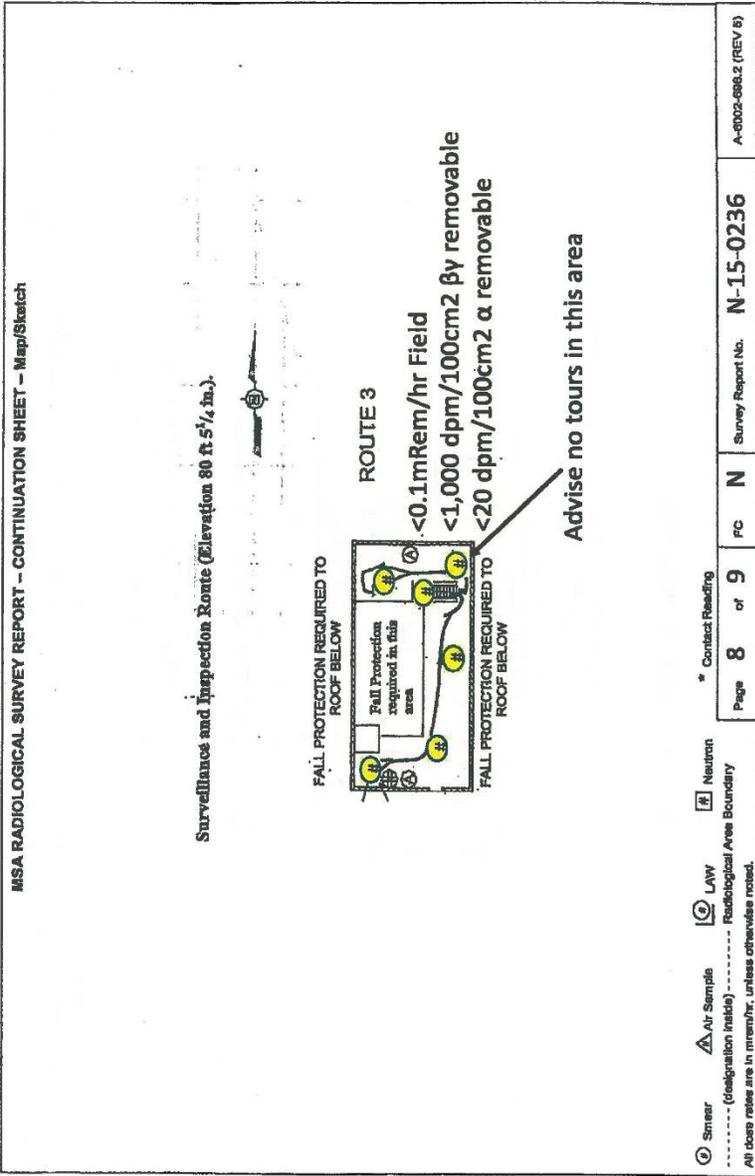












MSA RADIOLOGICAL CONTROL LAPEL AIR SAMPLE (LAS) ANALYSIS RECORD

Counter Information: Sample Log No. (Lapel-FC-HMDDYY) LAPEL-N-040815 Page 1 of 1

Alpha: SCLL7-0008030E5-5-15 DTLLC-0137 0.36 / 2.747 200E/AMO-285
 Instrument ID No./Model/Cal Expiration
 Beta: SCLL7-0008030E5-5-15 DTLLC-0137 0.41 / 2.432 200E/AMO-285
 Instrument ID No./Model/Cal Expiration

No.	LAS ID No./Purpose	DATE/TIME LAS WORKER	WORKER NAME (Print)	WORKER HID No.	Sample Media (V/P)	ON: Flow Rate (l/min) OFF: Flow Rate	PF	DL (cpm)	Sample T _g (min)	MD DAC-h	N _g (counts)	DAC-h	Total DAC-h	Survey No.	RCT Signature #	HID
1	9544H-RX ENTRY Initial Count	04/09/15 9:48	JOE WILEY	H000879	V	4.0	1	0.233	10.0	0.79	3.0	0.00	0.00	N-15-0236	<i>Joe Wiley</i> H000879	H000879
2	1794H-RX ENTRY Initial Count	04/09/15 9:48	Tim Schwabow	H752838	V	4.0	1	5.182	10.0	0.01	484.0	0.00	0.00	N-15-0236	<i>Tim Schwabow</i> H000879	H000879
3	N/A															N/A
4																
5																
6																
7																
8																
9																
10	N/A															N/A

**DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION**

Name: Chet Brandy Date: 10-7-15

DL = Instrument counting efficiency (cpm/dpm)
 CF = Inverse of counting efficiency (dpm/cpm)
 N_g = Number of background counts recorded during background counting interval (T_g)
 T_g = Background counting interval (min)
 T_s = Total time the lapel air sampler was run (min)
 T_r = Lapel air sample count time (min)
 N_s = Gross number of counts measured (samples + background) during the gross count time (T_g)
 Flow rate = Start and ending flow rates of the lapel air sample (L/min)
 PF = Assigned protection factor for respiratory protection
 DAC = Derived Air Concentration (uCi/mL) from 10CFR835
 See MSC-13338 Section 6.2.7, for explanation of formulae used.

RB = Background count rate (cpm)
 DL = Decision Level
 MDC = Minimum Detectable Concentration
 MD DAC-h = Minimum Detectable DAC-h
 Sample Conc = Lapel Air Sample concentration (uCi/mL)
 DAC-h = Derived Air Concentration-hour

DAC (uCi/mL) Value Used:
 α = 5.E-12 (Default = 5E-12)
 β = 1.E-08 (Default = 1E-8)

Flowmeter ID No.: 3548 Cal Due: 4/14/2015

Log Reviewed By (Print/Sign): Tim Schwabow Date: 4/9/15

RSR # N-15-0236 pg 9 of 9
 MSA-RC-SAL-LAPEL-001 (09/30)

OFFICIAL USE ONLY - EXEMPTION

Industrial Hygiene Report

The industrial hygienist conducted general-area, direct-reading instrument monitoring of the 105-D surveillance routes before additional personnel entered to complete surveillance activities. The monitoring was for carbon monoxide, flammable gas, oxygen, and volatile organic compounds.

**Mission Support Alliance, LLC
IH DRI Monitoring Survey**

Date: 05/06/2015, 04:11 PM

Survey ID: 15-60146 - 105D Five Year Surveillance

Survey Date: 04/09/2015

Survey ID: 15-60146	Survey Date: 04/09/2015	Survey Status: Complete
Survey Title:	105D Five Year Surveillance	
Sample Plan:	IHSP-14-00179 - DRI (VOC, Multigas)	
WO/Procedure:	NA	
BHA:		
Requestor:	Land & Facilities Management	Project IH: Hokanson, Eric J
Surveyor:	Hokanson, Eric J	
Job Contact:	Yount, Jeremiah L	
Contact Phone:	(509)373-4778	Contact Cell Phone: (509)222-9136
Engineering Cntls:	Administrative Cntls:	

Meteorology Data		
Standard Conditions:	Yes	Weather Date: 04/09/2015
Pressure:		Humidity:
Wind Direction:		Temperature:
		Time:
		Wind Speed:

Mission Support Alliance, LLC

Date: 05/06/2015, 04:11 PM

Survey ID: 15-60146 - 105D Five Year Surveillance

Survey Date: 04/09/2015

Calibration

Instrument		Pre Use Function Test	Post Use Function Test
ID:	3919	Date: 04/09/2015	Date: 04/09/2015
Type:	MiniRAE 3000 RAE	Time: 0755	Time: 1204
Last Cal Date:	03/26/2015	Leak Check: Yes	By: Hokanson, Eric J
Next Due Cal Date:	04/26/2015	Battery Check: Yes	Location: Office
Lamp:	11.7 eV	By: Hokanson, Eric J	
Serial Number:	592-902318	Location: Office	
Sensor(s)		Pre Use Function Test	Post Use Function Test
Sensor:	MiniRAE 3000 RAE PID	As Found: 10.2	As Left: 10.7
Calibration Source:	Isobutylene	Adjusted To: N/A	
Lot Number:	5-026-67		
Manufacture Date:	02/16/2015		
Expiration Date:	02/28/2018		
Cal Source Value:	10 ppm		

Mission Support Alliance, LLC

Date: 05/06/2015, 04:11 PM

Survey ID: 15-60146 - 105D Five Year Surveillance

Survey Date: 04/09/2015

Calibration

Instrument		Pre Use Function Test		Post Use Function Test	
ID:	4175	Date:	04/09/2015	Date:	04/09/2015
Type:	iTX ISC	Time:	0800	Time:	1210
Last Cal Date:	03/26/2015	Leak Check:	Yes	By:	Hokanson, Eric J
Next Due Cal Date:	04/26/2015	Battery Check:	Yes	Location:	Office
Lamp:	N/A	By:	Hokanson, Eric J		
Serial Number:	10051RJ002	Location:	Office		
DRI Sampling Pump: 2025 - ISP ISC					
Last Done Date: 11/24/2014					
Next Due Date: 05/24/2015					
Flow Fault Check: No					
Sensor(s)		Pre Use Function Test		Post Use Function Test	
Sensor:	ITX ISC CO	As Found:	69	As Left:	67
Calibration Source:	Tri-Gas (CO)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	70.0 ppm				
Sensor:	ITX ISC H2S NA				
Sensor:	ITX ISC LEL	As Found:	24	As Left:	25
Calibration Source:	Tri-Gas (Isopentane)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	25% LEL				
Sensor:	ITX ISC NO2 NA				
Sensor:	ITX ISC O2	As Found:	18.8	As Left:	19.0
Calibration Source:	Tri-Gas (O2)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	19.0%				
Sensor:	ITX ISC SO2 NA				

Mission Support Alliance, LLC

Date: 05/06/2015, 04:11 PM

Survey ID: 15-60146 - 105D Five Year Surveillance

Survey Date: 04/09/2015

Readings

Type:	Area			
Zone - Location:	100D BLDG - OTHER (Roads etc.)			
Specific Location:	105D Surveillance Routes			
Status:	N/A			
Activity:	Safety Inspection of 105D Surveillance Routes			
Date/Time:	04/09/2015 0915			
Device	Agent	Range	Result	Action Limit
Inst-3919 - PID	Volatile Organic Compound	<	0.000 ppm	2 ppm
Inst-4175 - CO	Carbon Monoxide	<	0.000 PPM	12 ppm
Inst-4175 - LEL	Flammable Gas	<	0.000 %	25 %
Inst-4175 - O2	Oxygen		20.900 %	23.5 %
Reading Details:	General area monitoring of the 105D surveillance routes was conducted to verify conditions prior to additional personnel entering to complete work. Safety inspection and routes reviewed were per work document 2M-73151/C - C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance. No abnormal readings were observed along the surveillance routes.			

Field Information Verified By: Hokanson, Eric J

Date: April 27, 2015

Approved By: Hokanson, Eric J

Date: April 27, 2015

(The electronic approval indicated above acts as the authentication of this record on the above date)

Industrial Safety Report

The industrial safety professional conducted a safety inspection of the surveillance routes before additional personnel entered to complete surveillance activities.

105 D Reactor Initial Safety Inspection

On 9 Apr. 2015 MSA Safety team made initial entry into the 105 D for a safety inspection prior to any work to be completed for the 5 year reactor surveillance. This safety team consisted of 2 Radcon personnel, 2 Biologist (looking for potential wildlife), an Industrial Hygienist, and an Industrial Safety Professional. This report only covers the Industrial Safety Evaluation, and each item will be in a bullet for ease of understanding the issue and the location.

Below Grade Level:

- **North Vestibule**- Lamp burnt out. As a team we determined that based on the portable lights being used at the time of surveillance entries, there is plenty of light in this area and it was not worth the risk of putting an electrician in to re-lamp one light. We also feel as a team that this area should be excluded from the tour based on the light situation and stairs leading to this area are not ideal as well as this area is very dirty.
- **South Area**- There is a very large tank protruding out into the walk area at the bottom of the stairs leading into this area, this makes for a tight walk area around the tank, and offers a struck against hazard at about the shoulder level. (Photo 1)

Ground Level:

- The ground level was found to be clear. There was a small hydraulic puddle in the north end of the room that appears to be caused by the over head hoist. (Photo 2)

20' Elevation (Experimental Rm):

- Trip hazard at the top of the stairs leading into the room (Painted Orange). (Photo 3)
- Tray protruding into walk way (Painted Orange). (Photo 4)
- Metal floor seam pulling apart and curling up posing a trip hazard, this is not painted orange but can be avoided by staying on the walk path.
- Trip hazard at bottom of stairs leading up to the 42' level. This is the metal flooring turns up like a "drip pan" (Painted Orange). (Photo 5)

42' Elevation ("Top Hat"):

- Rise on top steps of bridge are taller than normal making this small stair case ununiformed.
- Conduit protruding into walkway while crossing the bridge between the stairs and "top hat" floor. (Photo 6)
- Wooden platform covering "top hat" floor has step down on west end of "top hat" posing tripping hazard (Painted Orange). (Photo 7)

- “Top hat” floor has approx. 1” rib at seam posing a tripping hazard (Painted Orange). (Photo 8)
- Back side of tank on SE corner of top hat has a picking eye protruding into the walkway posing a struck against hazard (Painted Orange). (Photo 9)

56’ Elevation:

- Narrow walkway on South end of this elevations. Snow fencing on guard rails is rolled over at the top moving into the walkway potentially rubbing entrant’s arms.

80’ Elevation:

- Head knocker at top of the stairs and all along the East end of the route. Although these are padded and painted orange they are very low hanging along this side. (Photo’s 10 & 11)
- Grating all along the route in this area is very “rocky”.

It is the Safety team’s opinion that this area is not accessed during the tour.

In summary, this reactor does have a lot of hazards, and most are well identified with orange paint, but they are minimal hazards provided entrants pay close attention while walking these routes. Hard hat requirements have been lifted UNLESS entrants are accessing the top (80’ Elevation) of the reactor building. One noteworthy comment is the stairs in this reactor are all very solid as compared to the previous two reactors, none were noted to be damaged or “loose”.

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

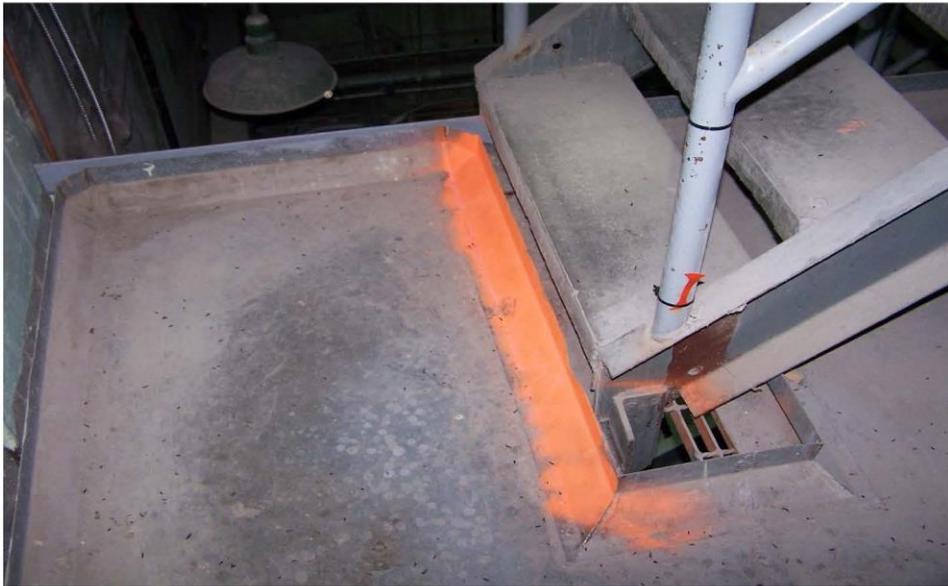


Photo 6



Photo 7



Photo 8



Photo 9 (Struck by hazard is actually on the back side of this tank, painted orange)



Photo 10



Photo 11



Structural Inspection Report

A team of engineers performed an inspection to determine the SSE conditions and structural adequacy.



15-MRM-008
June 5, 2015

Mr. Rick Moren
Director of Long-Term Stewardship
Mission Support Alliance, LLC
P.O. Box 650
Richland, WA 99352

Dear Mr. Moren,

SUBJECT: Contract 55534; 105-D Reactor Structural Engineering Inspection Report

References:

- 1) DOE/RL-2004-59, Rev 0, *Surveillance and Maintenance Plan for the 105-D Reactor Safe Storage Enclosure*
- 2) MSA Work Package; 2M-73151/C, C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance
- 3) WCH-469 Rev 0., *105-D Safe Storage Enclosure Five Year Surveillance in January 2010*
- 4) WCH Task Instruction SMU-09-09-01-001, 105-D Perform 5 Year Surveillance and Maintenance (2009)

This letter and report package is provided as deliverable #5 of the subject contract as part of the 105-D Interim Safe Storage (ISS) Building surveillance / inspections that were performed on April 13th 2015. In accordance with references 1 and 2, an inspection was performed to determine the Safe Storage Enclosure (SSE) conditions and structural adequacy under ISS. An exterior and interior visual inspection of the SSE was performed. The surveillance routes used were as noted in Reference 1 with some limitations and the same routes as were used in the prior inspection. Polestar's evaluation the inspection data is described in Attachment A.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects. There is one location on an SSE wall within and above the entry vestibule viewable from the exterior of the SSE where a vertical crack in the concrete exists. Our investigations has shown that similar cracks occur at this location at 105-F and 105-B as well, and that all of these cracks originate around a temporary opening designed into (and appropriately reinforced) during original construction in 1943 and 1944.

Recommendations - The 2015 105-D SSE Structural Inspection can be divided into three categories:

1. SSE Structure – There are a few specific items noted in Attachment A that are recommended for future inspection to demonstrate the continued stability of the SSE. Most notable is the crack that was observed in the primary shield wall (now the exterior SSE wall near the vestibule). Similar cracks were found at 105-F in October, 2014 and 105-B in May, 2015 – all of these in exactly the same place and

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Suite 4
Richland, WA 99354

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found to be attributable to a construction temporary opening in the original design. Although crack monitors are installed and should be monitored in the future – the openings and associated reinforcements were part of the original 1943 design of the shield walls.

2. Future inspection of surveillance routes – Conditional recommendations for access to Routes 4 and 5.
3. S&M Plan (Reference 1) – Recommend that Reference 1 be revised – in the near term to capture current accessibility conditions and rationale for including or excluding inspecting the various inspection routes in the future.

While not part of the scope of this effort it was noted that when leaving the walk down of the 105-D SSE, very large swarms of birds were observed at the 105-DR SSE rear face (east side of SSE) entering the area below the small roof covered area at the +20' to +30' into and around the observation platform roof area.

ATTACHMENTS – Attachment A is an assessment of the data collected and results of the SSE inspection completed in April 2015. Attachment B condenses the Attachment A information in a format suitable for direct inclusion into the MSA 2015 105-D SSE Inspection document.

Available photos from the earlier inspection in 2008 and similar view new photos are contained in Attachment C and D. The outcome from the April 2015 inspection, as detailed in Attachment C and D, fall into three categories that are recommended to form the basis for the next 105-D SSE inspection.

- (a) Attachment C includes Reference 3 items that were re-inspected in April 2015 and recommended to continue on the inspection / maintenance list for future action;
- (b) Attachment C also includes newly identified items from April 2015 that require future inspection or maintenance action.
- (c) Attachment D includes new photos and Reference 3 items that were observed either specifically or generally in April 2015 and are not required for future inspections but are preserved herein for possible comparisons in future 105-D SSE inspections.

We are pleased to provide these inspection and reporting services to MSA and request that you contact me at 509-946-8279 if you have any questions concerning this report letter and attachments.

Kind regards,

Mark R. Morton, PE
ISS Support Project Manager

601 Williams Blvd,
Suite 4
Richland, WA 99354

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cc: Finney, S – MSA Procurement
Bailey, P;
Miller, K;
Morton, M;
Rodovsky, T;
File / LB

Enclosure(s)

Attachment A – ASSESSMENT OF INSPECTION DATA
Attachment B - 105-D BUILDING INSPECTION REPORT INSERT FOR MSA
Attachment C – 105-D SSE INSPECTION RESULTS – For further consideration
Attachment D – 105-D SSE INSPECTION RESULTS – Historic record

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Attachment A – ASSESSMENT OF INSPECTION DATA

The interior and exterior inspection of the 105 D SSE was conducted by Tom Rodovsky and Jaimie Ryan of Polestar Technical Services on April 13th, 2015. The weather on that day had a high of 65 degrees and the previous night had a low of 37 degrees. The conditions were dry and rain had not fallen the previous days prior to the inspection.

- A. Interior Conditions – noteworthy items from the interior SSE inspection are discussed below.
- a. A large vertical crack exists in entrance vestibule to the SSE (southwest corner of the SSE) that extends from just above the floor (0' level) to the ceiling of the vestibule. Specific portions of the crack are large enough that pieces (~1"x1") of concrete have fallen out of the wall. Photos of the crack from the interior of the vestibule are shown in Attachment C, Photos 3543, 3544, 3545, and 3546.
 - o A crack monitor was installed onto the crack within the vestibule. Photos of the crack monitor are shown in Attachment C, Photos 3561 and 3562. The monitor was labeled Crack Monitor D-1. A second crack monitor, labeled D-2, was installed on this same crack on the inside of the facility (on the opposite side of the wall from the vestibule). The crack appears to be smaller than within the vestibule. Photos of the crack and second crack monitor are shown in Attachment C, Photos 3659 and 3669, respectively. The crack was visible one elevation above the vestibule and can be viewed from the exterior of the building. Photos of the crack from the exterior of the SSE (above the vestibule) are shown in Attachment C, Photos 3547, 3548, 3674, and 3676.
 - o The Polestar team's structural engineer (Michael Custer PE) completed the review of the pictures and information concerning the concrete crack in the original shield wall (now south SSE wall) near the vestibule at 105-D.

"Using information found on some of the available design drawings (used during construction of the facility) I have identified a temporary opening on the drawings, consistent with the location of the cracks in the wall at 105-D, 105-F and 105-B. A temporary opening or blockout was provided to allow access into and out of the wall for installations to be completed later in the construction schedule. The temporary opening is located through Column T-Line wall at approximately Column 11-Line. The opening is shown on the following drawings:

- i. W-70834, Architectural Drawing - (West Elevation, Bldg 105F and South Elevation, Bldgs 105B and D);
- ii. W-70841 Concrete Drawing - (South Elevation, Bldg 105D);
- iii. W-73336, Concrete Drawing - (Plan - Bldg 105F); and
- iv. W-73325, Concrete Drawing - (West Elevation, Bldg 105F).

Please refer to Figure 1 below which was taken from these drawings to show the temporary opening. The opening dimensions are 1 foot wide by 35 feet high and has been provided with additional trim reinforcement to maintain the structural integrity of

the wall during construction, pending closure of opening after completion of the activities requiring the opening.

The cracks at the wall opening do not compromise the overall structural integrity of the wall, however water access into concrete in the opening will occur and during stormy winter conditions, this water will freeze and thaw eventually deteriorating the concrete in the opening over time. The cracks may be repaired using epoxy grout, if weather or air tightness is of serious concern."

Michael R. Custer, P.E

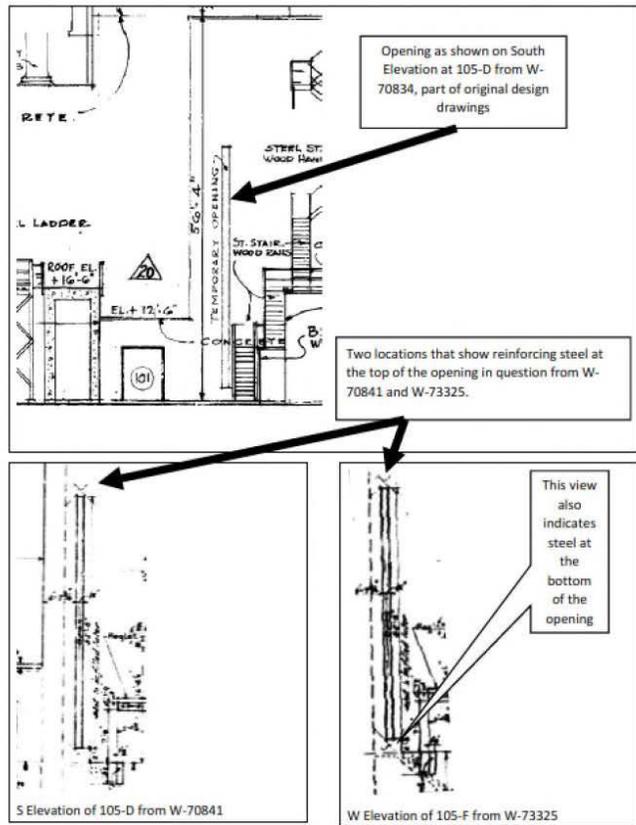


Figure 1 – Selected Drawing Sections w/ Steel at Shield Wall Opening



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- b. A winch is leaking oil/grease in the front face room. Winch is located along north wall of room 40'+ above the front face floor. Oil/grease spots observed on floor of front face room appeared to be new. Photos are shown in Attachment C, Photos 3540 and 3542.
ASSESSMENT / RECOMMENDED ACTION: Monitor during future walk downs. The leak appears to be slow and an easily managed industrial hazard. Placing absorbent material below the winch could be a satisfactory solution.

- c. A winch located above the reactor above the 80' elevation is leaking oil/grease. Oil/grease is dripping down a chain/hook to the floor below. The chain/hook can be seen while standing in northwest portion of 56'4" level looking up. Photos are shown in Attachment C Photo 3527 shows the winch. Photo 3515 shows the hook coated with grease and photo 3514 shows the area directly below the hook where grease has discolored the floor.
ASSESSMENT / RECOMMENDED ACTION: ASSESSMENT / RECOMMENDED ACTION: Monitor during future walk downs. The leak appears to be slow and an easily managed industrial hazard. Placing absorbent material below the winch could be a satisfactory solution.

- d. On east side of the 56'4" level, various locations were observed in which light from the outside could be seen through gaps in the siding. Photos are shown in Attachment C, Photos 3519, 3520, 3521, 3522, 3523, and 3524.
ASSESSMENT / RECOMMENDED ACTION: Evidence of a possible access point for small birds, bats, insects, spiders, etc. While not every pinpoint of outside light is big enough for bird or bat access, there is ample evidence of a number of bats being in the structure in the past at various 100 Area Reactors Buildings and also during recent SSE inspections. If any closure of these openings is considered, timing is an issue with the biological team, but a program of maintenance may be recommended to close off the identifiable openings with a wire mesh or metal fabric from the outside. Adhesive or self-tapping screws with a non-corrosive metal mesh or metal fabric would seem to provide an effective and fast way to inhibit further entries. This approach would presumably use an articulated man-lift of significant size. Additionally, consideration for galvanic corrosion with the galvalum roof / siding materials must be accounted for when selecting a material for closure. If or when a maintenance program is planned, the timing noted in the Recommendations within Ref. 5 must be considered. Further, it is strongly recommended that this maintenance be completed prior to significantly extending the SSE surveillance periodicity.

- e. Metal floor sheeting on 13' level was lifting up in one location. Sheetting can be a tripping hazard. Photos of the metal floor sheeting are shown in Attachment C, Photos 3505, 3506, 3507 and shown as Items 14/14a.
ASSESSMENT / RECOMMENDED ACTION: Paint metal floor sheeting a highly visible color, identify the tripping hazard OR fasten metal floor sheeting to the concrete floor below using some sort of fastener (e.g. bolt).



- f. The concrete spanned walkway on west side of 56'4" level had several hairline cracks which run perpendicular to the walkway. Photos are shown in Attachment C, Photos 3525 and 3526.
ASSESSMENT / RECOMMENDED ACTION: No action suggested. Monitor during future walk downs.

- B. Exterior Conditions
 - i. Swallow nests were noted at various locations on the exterior of the facility. Locations of the nests don't appear to be a current problem. Photos are shown in Attachment D, Photos 3497, 3549, 3552, 3553, 3554, 3558, and 3559.
ASSESSMENT / RECOMMENDED ACTION: If recommended actions for Item in Section A, vi, suggest removal of nests.
 - ii. Foam insert appeared to be missing on the west side of the SSE (outside of front face) located on the bottom edge of the siding. Photo is shown in Attachment C, Photo 3550.
ASSESSMENT / RECOMMENDED ACTION: Same recommended action as Section A, vi.
 - iii. Tumbleweed accumulation on east side of SSE. Photos are shown in Attachment D, Photos 3556 and 3557.
ASSESSMENT / RECOMMENDED ACTION: Periodic removal of tumbleweeds is suggested.

- C. Surveillance Routes
 - 1. Routes 4 and 5 were not accessed nor were these areas entered in the 2008 inspection
 - i. For Route 4 - The man door noted in Reference 1 for Route 4 was inspected but not opened per direction of MSA management. Exterior inspection of the roof, siding and flashings in this area showed no signs for concern.
 - ii. For Route 5 – Inspections of the exterior wall of the rear face space (east side of the SSE) and Route 3 at elevation 56' showed no signs for concern with the integrity of the concrete envelope of the rear face / D elevator area.
 - iii. Two potential changes in the SSE or S&M Program could support a future recommendation to open the door for access to Route 4: (a) Moving to longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started, (b) Evidence of a large bat or other biota roosting issue in the other parts of the structure would indicate that these spaces may be vulnerable to that same condition.
 - 2. Since the conditions noted in 1.i and 1.ii above are similar to other areas of the SSE that were inspected inside and out without significant issues, it is reasonable to reach a conclusion that the interiors of these spaces are acceptable at this point in time.
 - 3. On 42' elevation of Inspection Route # 3, accessibility on the north side of the top hat is blocked and should be noted on any S&M Plan (Ref 1) revisions.



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Attachment B - 105-D BUILDING INSPECTION REPORT INSERT FOR MSA

Engineering Inspection – Appendices C and D provide the record of the inspection, discussion, pictures, and checklist of the structural inspection of the interior and exterior of the structure. Appendix C contains those items with a maintenance and or continued monitoring recommendation, while Appendix D photos and notes are provided as a general record of the condition of the Safe Storage Enclosure.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects with one exception.

A vertical crack in the SSE wall near the vestibule was identified and determined to be at an opening that occurred during original construction. Crack monitors were installed, and will be monitored on future entries. The opening was to be reinforced per the design drawings, has been evaluated and does not pose a concern at this time.

Recommendations - Recommendations from the 2015 105-D SSE inspection amount to two items, one very specific corrective action and a general documentation clarification:

1. SSE Structure – Record readings from the crack monitors D-1 (in the vestibule) and D-2 (inside the SSE near the vestibule), evaluate any changes from the 0-0 readings that were confirmed upon installation of the monitors.
2. Future use of surveillance routes and S&M Plan revision should be considered to reflect actual conditions / maps in the SSE and to provide guidance when and how Routes 4 and 5 shown in the S&M Plan should be used.



Attachment C – 105-D SSE INSPECTION RESULTS – For Further Consideration

This section presents the Surveillance photos of new items to monitor and areas which require continued monitoring as identified in the April 2015 inspection and the inspection documented in WCH 469 from 2010.

Each elevation with anything of concern is a separate section of this attachment and includes:

1. a map showing the photo locations
2. a portion of the inspection table that applies to that elevation and
3. comparison photos from 2010 to 2015 (when available)

When a new area of concern is identified within the area covered in a particular section, the new area will be listed in the location table and photo(s) will be provided. If there is no particular area/item for concern on any given elevation, no map or table will be included in this section NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

Contents

Attachment C – 105-D SSE INSPECTION RESULTS – For Further Consideration.....1

 C-1 – 0’0” Elevation Map.....2

 C-1– Summary Table & Photos Elevation 0’0”3

 C-2 – Elevation 13’ Map.....8

 C-2 – Summary Table & Photo Elevation 13’9

 C-3 – Elevation 20’9” Map..... 11

 C-3 – Summary Table & Photos Elevation 20’9” 12

 C-4 – Elevation 42’ Area Map..... 16

 C-4 – Summary Table & Photos Elevation 42’ 17

 C-5 – Elevation 56’4” Areas Map..... 20

 C-5 – Summary Table & Photos Elevation 56’4 21

 C-6 – Elevation 80’ Areas Map..... 26

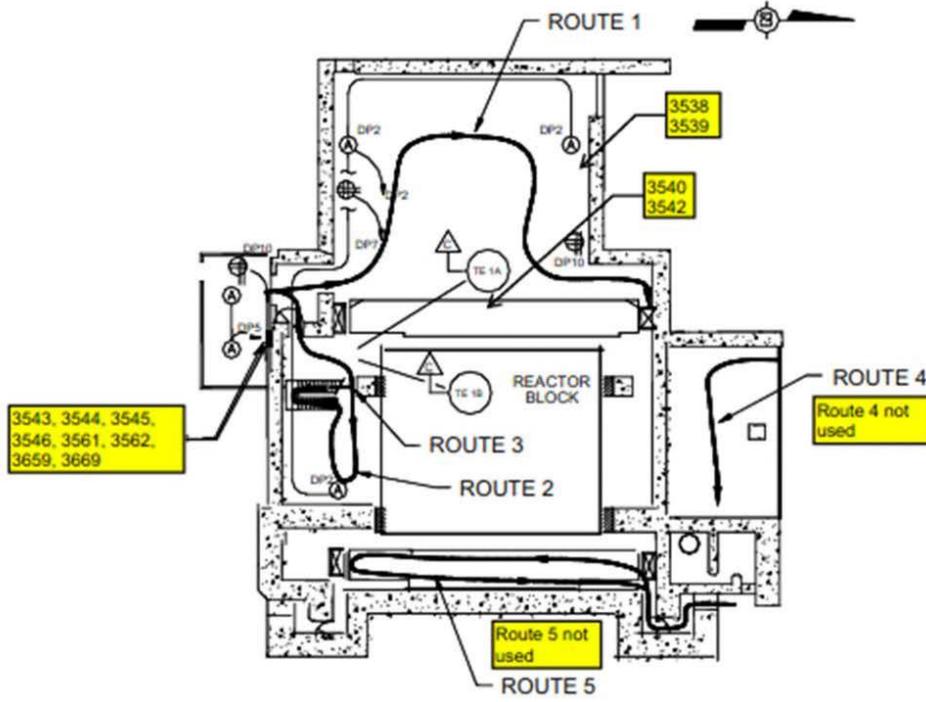
 C-6 – Summary Table & Photos Elevation 80’ 26

 C-7 – Exterior Area Map 27

 Section C-7 – Summary Table & Photos 105-D SSE Exterior 28



C-1 - 0'0" Elevation Map





C-1– Summary Table & Photos Elevation 0’0”

Item #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3538	Dripping equipment		Abandoned airline filter. Has dead bugs and oily residue. Appears to have been dented with something previously.
	3539	Oil on floor under equipment		3539 under dripping airline filter on pic 3538 Recommend continuing observation
	3540	Oily spot on floor under equipment	0’ level	Winch is located along north wall of room 40’+ above the front face floor. Oil/grease spots observed on floor of front face room appeared to be new. Recommend continued observations
	3542	Dripping equipment	40 foot level	Winch is located along north wall of room 40’+ above the front face floor. Oil/grease spots observed on floor of front face room appeared to be new. Recommend continuing observation
	3543	Wall crack	0’ level Outer vestibule	inside vestibule crack on wall under electrical box Recommend continuing observation
	3544	Wall crack	0’ level Outer vestibule	Recommend continuing observation
	3545	Wall crack	0’ level Outer vestibule	Recommend continuing observation
	3546	Wall crack	0’ level Outer vestibule	Recommend continuing observation
	3561	Wall crack with monitor installed	0’ level Outer vestibule	Crack monitor installed in vestibule on concrete wall crack Recommend continuing observation
	3562	Wall crack with monitor installed	0’ level Outer vestibule	Crack monitor installed in vestibule on concrete wall crack. Same as picture 3561.
	3659	Wall crack showing on interior wall	0’ level inside— opposite side of vestibule wall	Recommend continuing observation
	3669	Wall crack with monitor installed	0’ level inside— opposite side of vestibule wall	Recommend continuing observation



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3538 Air line filter has residual fluid dripping from it



3539 floor below air line filter



3540 under dripping winch from 40' level



3542 looking up from 0' level up to 40' level above drip on floor..front face



3543 inside vestibule crack on wall under electrical box



3544 vestibule crack



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3545 vestibule crack



3546 vestibule crack



3561 crack monitor installed in vestibule on concrete wall crack



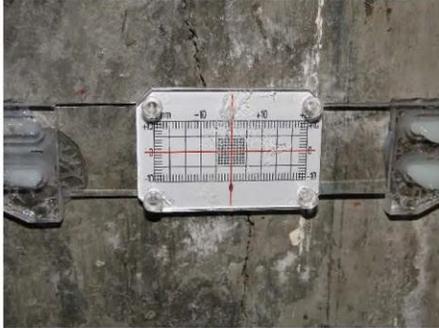
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3562 Crack monitor installed in vestibule on concrete wall crack

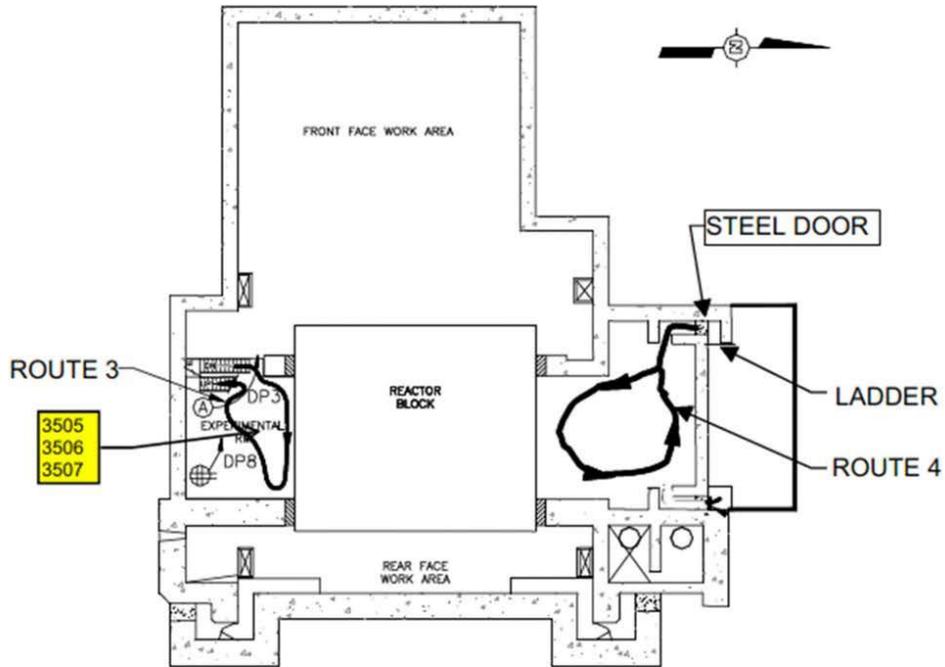


3659 Wall crack inside facility other side of vestibule wall



3669 Wall crack with crack monitor installed. Other side of vestibule wall

C-2 – Elevation 13' Map

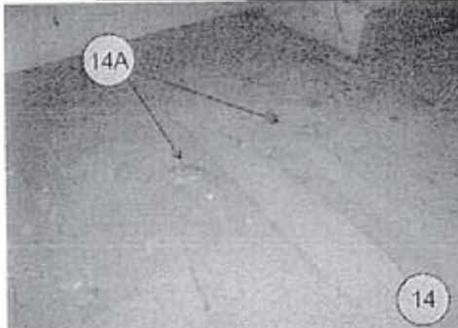




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C-2 – Summary Table & Photo Elevation 13'

Item #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
14, 14A	3505 3506 3507	Floor	Interior – Elev. 13'-0"	Floor panel previously just discolored, now seems to be lifting at edge Recommend continuing observation



14A 2009 Detail - Elev 13'-0", Floor Discoloration



3505



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14 2015 Detail



3506



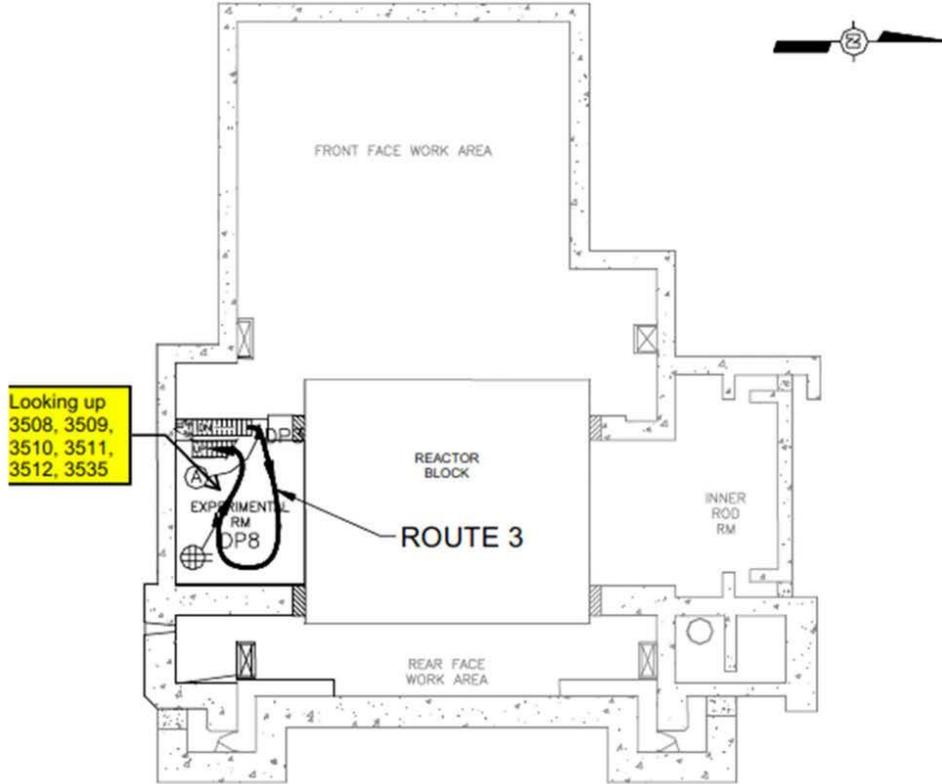
3507 floor panel lifting at edge

C-10

C-42



C-3 – Elevation 20'9" Map



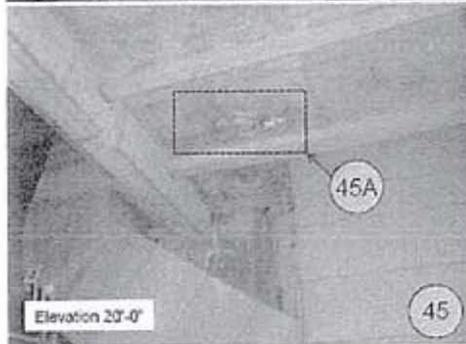


C-3 – Summary Table & Photos Elevation 20'9"

Item #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
45, 45A	3509	Ceiling	Elev. 20'-9"	White discoloration on surface on concrete looking up at ceiling in multiple locations Recommend continuing observation
	3508	Concrete/steel beam in stairwell	Elev. 20'-9"	
	3510	Concrete and steel beams	Elev. 20'-9"	
	3511	Concrete underside of 42' level White stains on concrete	Elev. 20'-9"	
	3512	Concrete structure	Elev. 20'-9"	
	3535	Concrete/steel structure as seen from stairwell looking up from under stairs @ 42'-56' level	Elev. 20'-9"	When looking up from the 13' level at the underside of the staircase located on the 42'5" level, spalling has occurred. Spalling is on concrete that is no longer weight bearing given the metal grate staircase is used and not the concrete which has spalled. Recommend continuing observation



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45A – 2009 Detail Interior – Elev. 20'-9", Ceiling, Discoloration, Moisture



3509 White discoloration on surface of concrete looking up at ceiling in multiple locations



3508 White discoloration on surface of concrete looking up at ceiling in multiple locations

C-13

C-45



3510 White discoloration on surface of concrete looking up at ceiling in multiple locations



3511 White discoloration on surface of concrete looking up at ceiling in multiple locations



3512 White discoloration on surface of concrete looking up at ceiling in multiple locations

C-14

C-46



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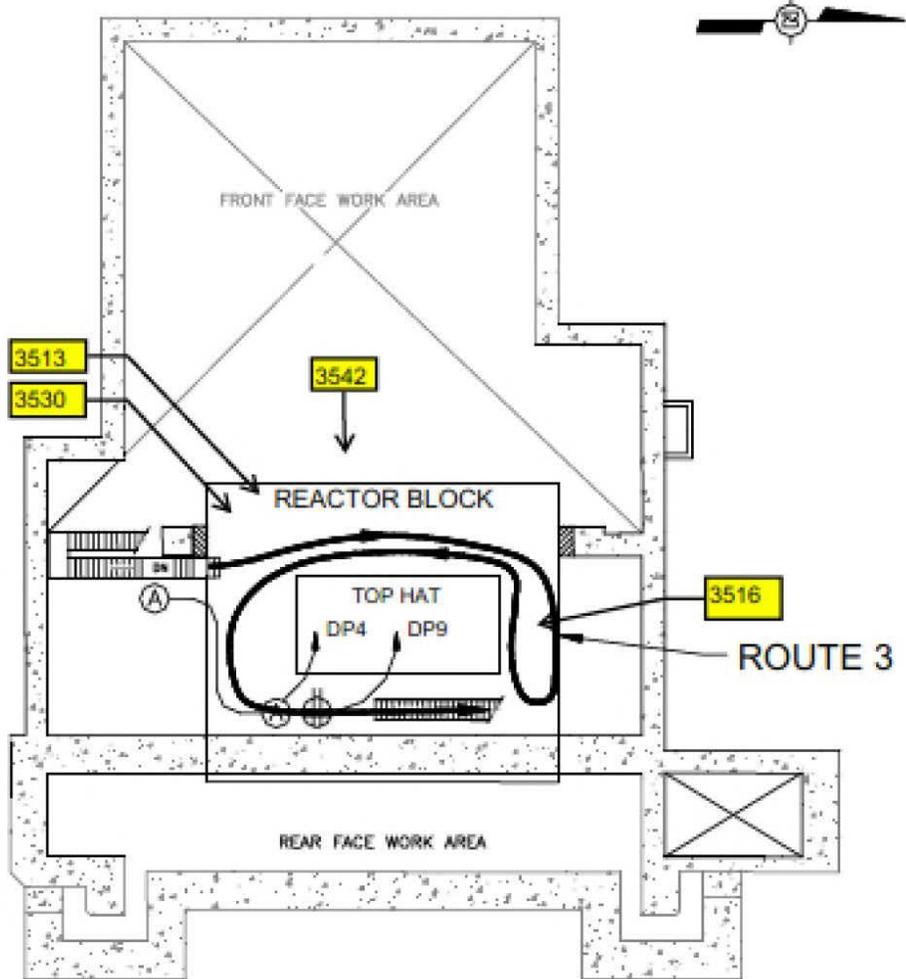


3535 Looking up under stairwell from 56 to 42. actually standing at 20 foot level looking up.

C-15

C-47

C-4 – Elevation 42' Area Map



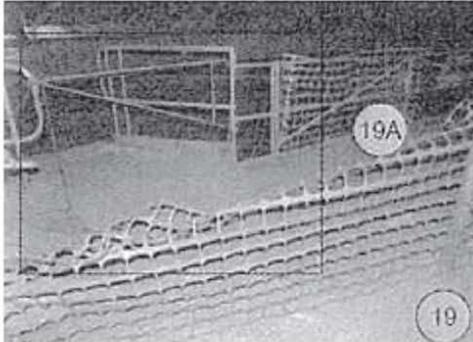


C-4 – Summary Table & Photos Elevation 42'

Item #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
19, 19A	3513	Guard Rails	42' 4 5/8"	Fall Hazard
	3516	Mechanical equipment blocking Surveillance path	42' 4 5/8"	S & M plan needs to be revised to show proper path. Unable to get all around top hat
	3530	Under side of floor above	42' 4 5/8"	42' elevation looking up under 56' elevation...several "holes" in floor with darkness around them... Same type of "holes" on other side of bldg. at exact same place....previous equipment used these penetrations Recommend continuing observation



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19 2009 Detail Guard Rails, Fall Hazard



3513



3530 at stairwell @ 42' elevation looking up under 56' elevation...several "holes" in floor with darkness around them... Same type of "holes" on other side of bldg. at exact same place....previous equipment used these penetrations

C-18

C-50



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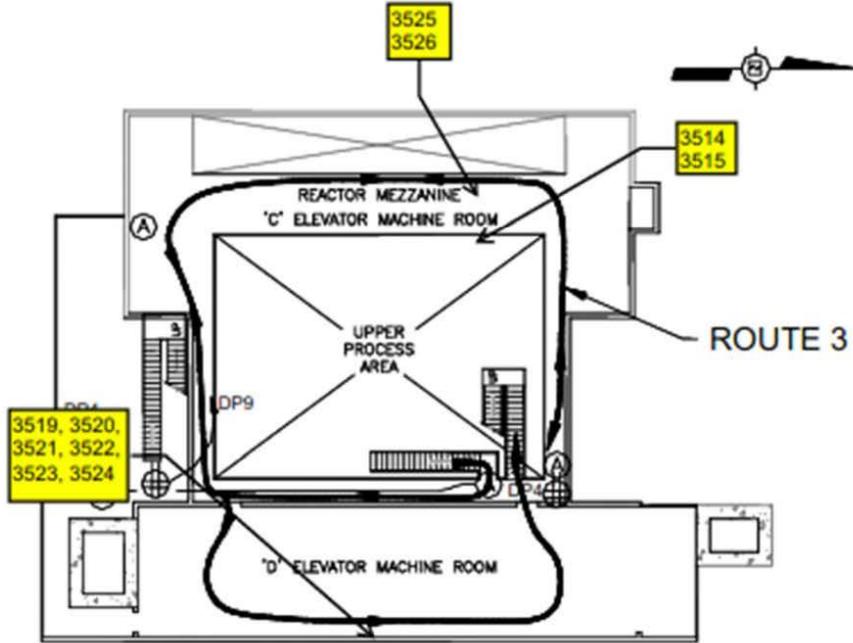
3516 On the current surveillance route behind the top hat on the west side... route should be revised so as not to walk "behind" the top hat. Very narrow area.

C-19

C-51



C-5 – Elevation 56'4" Areas Map





C-5 – Summary Table & Photos Elevation 56' 4"

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3514	Oil/grease spot on floor		Winch located above the reactor above the 80' elevation is leaking soil/grease. Oil/grease is dripping down chain/hook and floor below chain/hook which can be seen while standing in northwest portion of 56'4" level looking up.
	3515	Metal hook w fluid drip		Winch located above the reactor above the 80' elevation is leaking soil/grease. Oil/grease is dripping down chain/hook and floor below chain/hook which can be seen while standing in northwest portion of 56'4" level looking up.
	3519, 3520, 3521, 3522, 3523, 3524	ISS Steel Cross Brace and Steel Girt	Elev. 56'-4"	On east side of structure various locations were observed in which light from the outside could be seen through gaps
	3525	Concrete "catwalk" area around top hat	Elev. 56'-4"	Several hairline cracks in concrete in an area only a few feet long. Recommend continuing observation
	3526	Concrete "catwalk" area around top hat		Several hairline cracks in concrete in an area only a few feet long. Recommend continuing observation



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3514 Winch located above the reactor above the 80' elevation is leaking soil/grease. Oil/grease is dripping down chain/hood and floor below chain/hood which can be seen while standing in northwest portion of 56'4" level looking up.



3515 Winch located above the reactor above the 80' elevation is leaking soil/grease. Oil/grease is dripping down chain/hood and floor below chain/hood which can be seen while standing in northwest portion of 56'4" level looking up.



3519 On ease side of structure, various locations were observed in which light from the outside could be seen through gaps

C-22

C-54



3520 On ease side of structure, various locations were observed in which light from the outside could be seen through gaps



3521 On ease side of structure, various locations were observed in which light from the outside could be seen through gaps



3522 On ease side of structure, various locations were observed in which light from the outside could be seen through gaps

C-23

C-55



3523 On ease side of structure, various locations were observed in which light from the outside could be seen through gaps



3524 On ease side of structure, various locations were observed in which light from the outside could be seen through gaps



3525 Hairline cracks in concrete across "catwalk" around top hat. Several cracks exist, most across entire width of walkway. No crack visible from underside of concrete from stairway underneath. Vibrations felt on walkway when outside trucks drove by. No way to know if cracks have been there for duration due to past equipment use, or if they are newly appearing.



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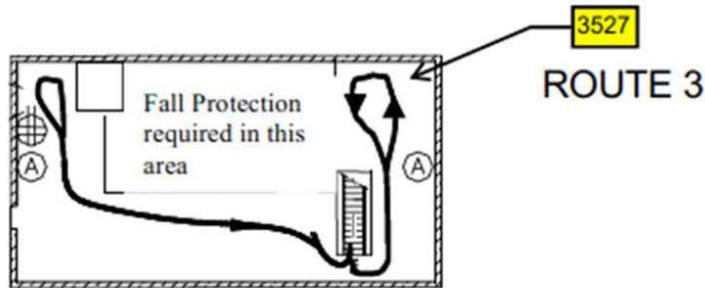


3526 Same explanation as 3525—all cracks within a few feet of each other.

C-25

C-57

C-6 – Elevation 80' Areas Map



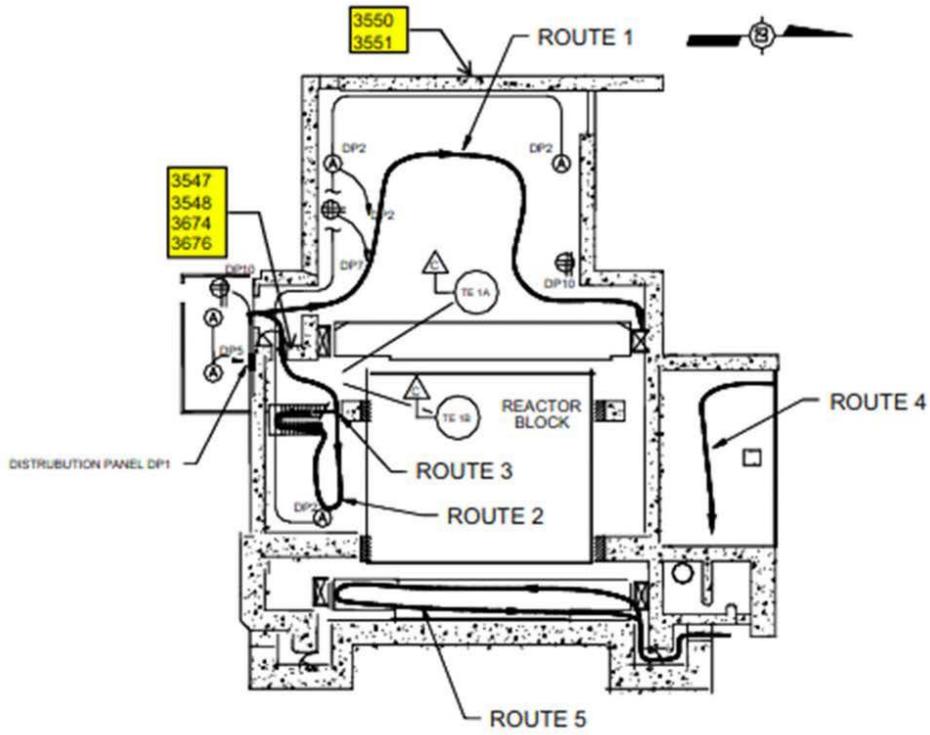
C-6 – Summary Table & Photos Elevation 80'

Item #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3527	Fluid dripping Winch	Elev. 80'-5 1/4"	Recommend continuing observation



3527 Winch located above the reactor above 80' elevation is leaking oil/grease. Oil/grease is dripping down chain/hook and floor below chain/hook which can be seen while standing in northwest portion of 56' elevation looking up

C-7 – Exterior Area Map



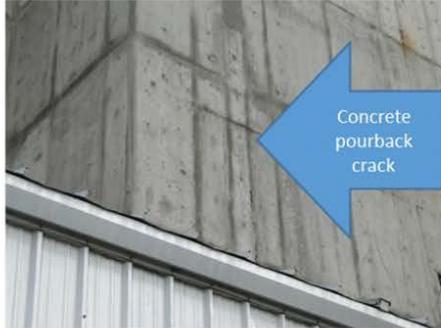


Section C-7 – Summary Table & Photos 105-D SSE Exterior

Item #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3547, 3548	Pourback above vestibule	Exterior Elev. 0'	Pourback appears to have begun to crack. No notations or pictures to show previous condition Recommend continuing observation
	3550, 3551	Metal roofline	Exterior Elev. 0'	Missing foam insert (both pics same location) West side of front face Recommend continuing observation
	3674	Pourback wall crack	Exterior Elev. 0'	See evaluation in Attachment A
	3676	Pourback wall crack	Exterior Elev. 0'	See evaluation in Attachment A



3547 outside above vestibule concrete pourback leading to crack in vestibule wall



3548 outside above vestibule concrete pourback leading to crack in pourback



3550 Missing foam insert on west side of front face



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3551 Same spot as pic 3550 Missing foam insert on east side of front face



3674 Upper portion of cracked wall at pourback location

C-30

C-62



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June 5, 2015



3676 Wall crack on exterior wall above vestibule

C-31

C-63



Attachment D – 105-D SSE INSPECTION RESULTS – Historic record

This section presents the Surveillance photos for the D Reactor ISS building. Photos from both the inspection documented in WCH469 from 2010 and the April 2015 inspection are included. These photos are organized by building elevation and a map of each elevation and a table of itemized description is included. Attachment D contains photos which do not require continued monitoring and are provided for information only. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

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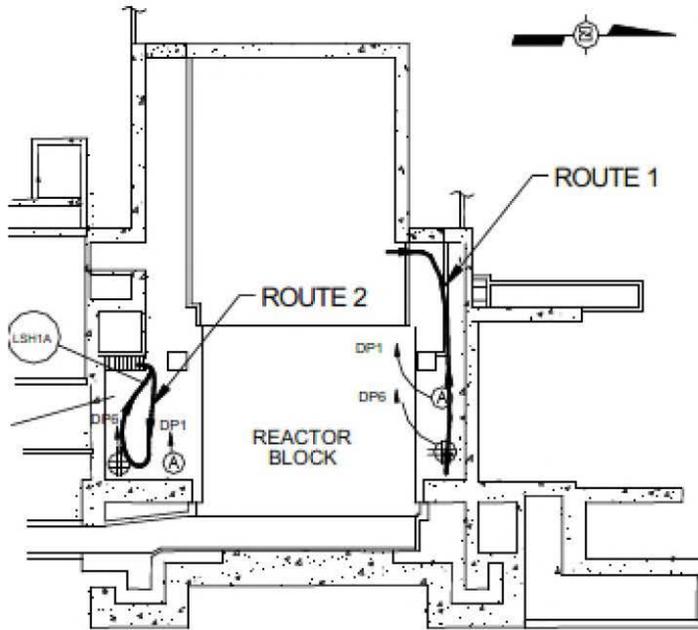
 D-8 – Exterior Areas Map 37

 D-8 – Summary Table & Photos 105-D SSE Exterior 38



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D-1 -- 15' Elevation Map



D-2

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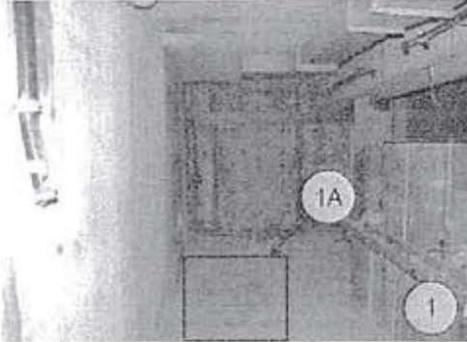


D1 – Summary Table & Photos -15' Elevation

Item #	New Photo #	Description
1, 1A	3499	Floor, Discolored Concrete
2, 2A	No new picture	Floor, Discolored Concrete
3A, 3B	No new picture	Floor
4, 4A	No new picture	Floor
11	3503	Wall and Floor
	3500	Concrete ceiling and wall
	3501	Concrete ceiling and wall
	3502	Abandoned equipment on oil stained floor
	3504	Concrete walls and floor



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1A — 2009 Details Interior – Elcv (-) 15'43", Floor, Discolored Concrete, superficial corrosion



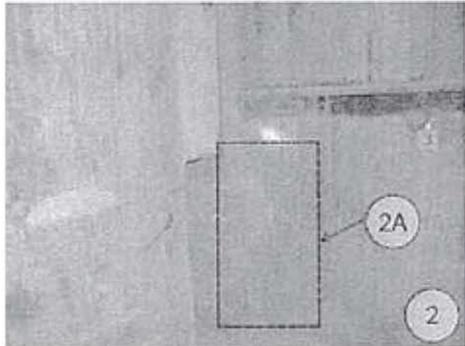
3499 2015

D-4

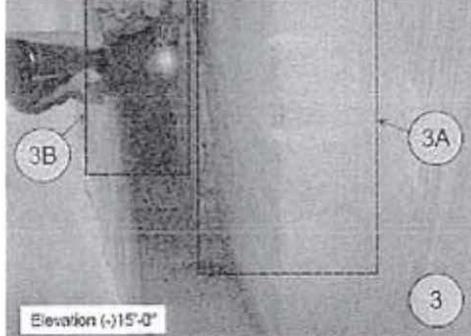
C-67



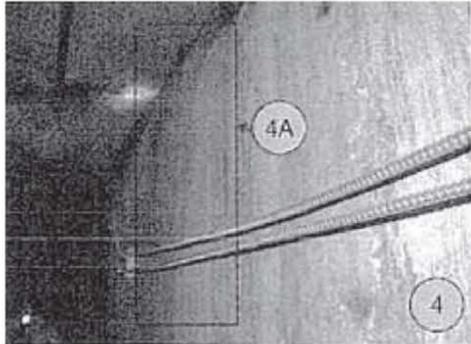
15-MRM-008
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2A 2009 Details— Interior— Elev. (-) 15'-0", Floor, Discolored Concrete, superficial corrosion.



3A —2009 Detail Interior – Elev. (-) 15t0", Floor, Masonry, no visible issues
3B — 2009 Detail Interior – Elev. (-) 15'40", Floor, Existing Spalled concrete.



4A —2009 Detail Interior – Elev. (-) 15'0", Floor, Discolored Concrete, superficial corrosion



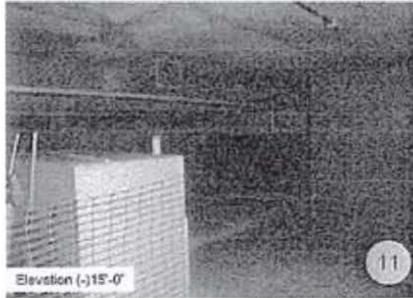
3500 General area condition. No visible issue



3501 General area condition. No visible issue



3502 General area condition. No visible issue



11 2009 Detail- Interior – Elev. (-) 15'-0", Wall & Floor, No Visible Issues



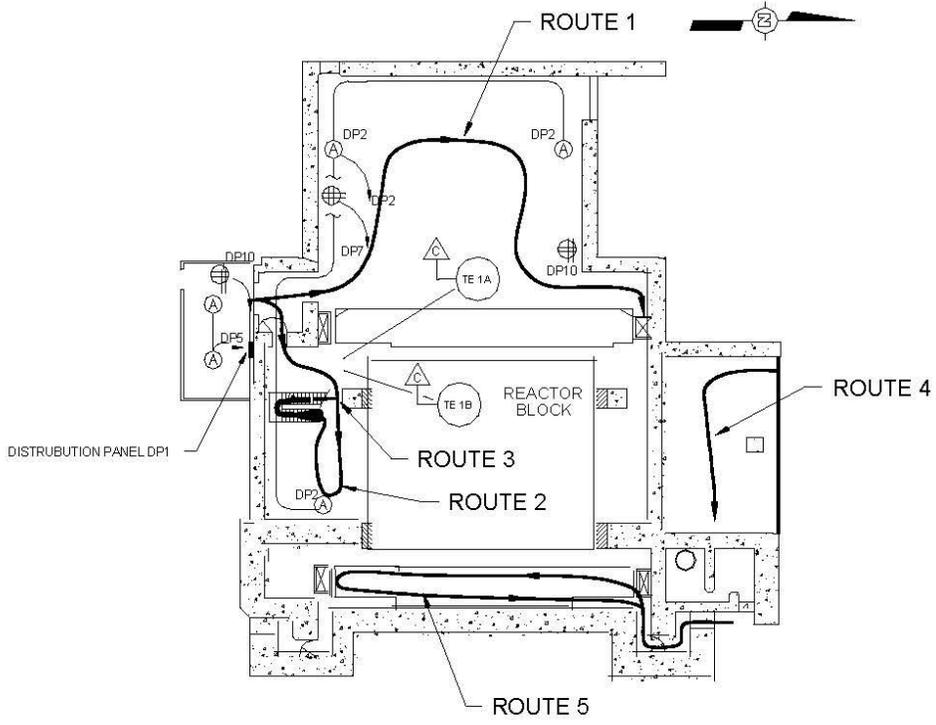
3503 2nd section of -15 elevation.. thru 0' elevation floor and down "2nd" set of stairs General area condition. No visible issues



3504 General area condition.. Good

D-7

C-70



105 D
GRADE LEVEL
(ELEVATION 0'-0")

LEGEND

- ⊕ RECEPTACLE, QUADRUPLEX 120V, 20A
- ⊙ LIGHTING 120V, 175W
- △ TE 1B, TE 1A TEMPERATURE SENSORS

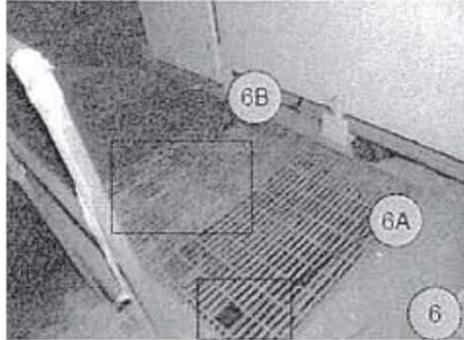


D-2—Summary Table & Photos Elevation 0'0"

Item #	New Photo #	Description
5, 5A	No new picture	Stair Handrail,
6, 6A, 6B	No new picture	Broken & Discolored Grating
7, 7A	No New picture	Floor
8, 8A	No new picture	Pourback
9, 9A	No new picture	Pourback
10, 10A	No new picture	Pourback
13, 13A	No new picture	Stair Step

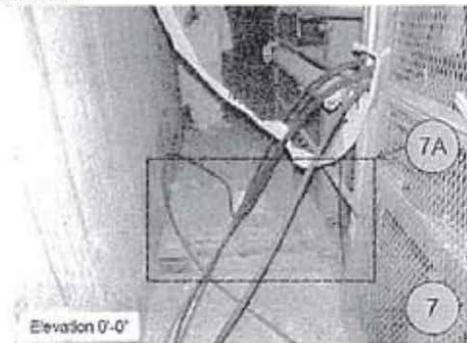


5A 2009 Detail - Interior Elev 0'-0" to Elev (-) 15'-0", Stair Handrail, No midrail, Fall Protection Hazard.



6A – 2009 Detail -Elev 01-0", Broken Grating

6B – 2009 Detail - Elev 01-0", Discolored Grating, Minor Corrosion . No change to condition. General area good condition.



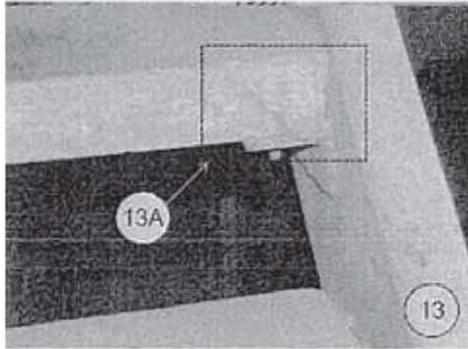
7A – 2009 Detail Interior- Elev 0'-0", Floor, Tripping Hazard No change to condition. General area condition good.

D-10

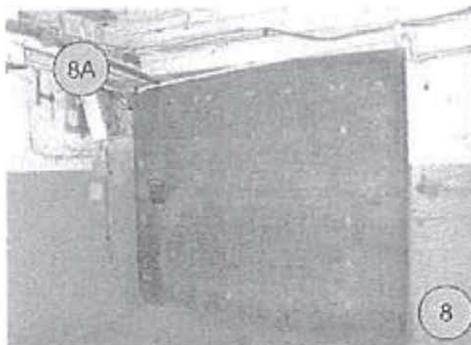
C-73



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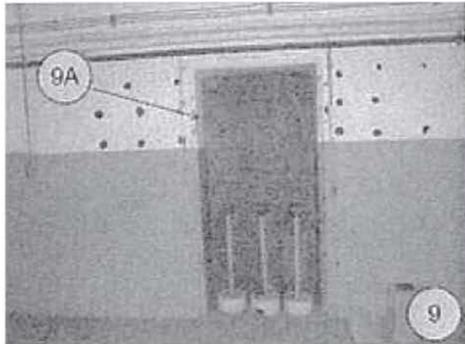
13A -2009 Detail - Elev 01'-0" to Elev 13'-0", Stair Step, Minor Corrosion, Concrete Spalling No change to condition. General area condition good.



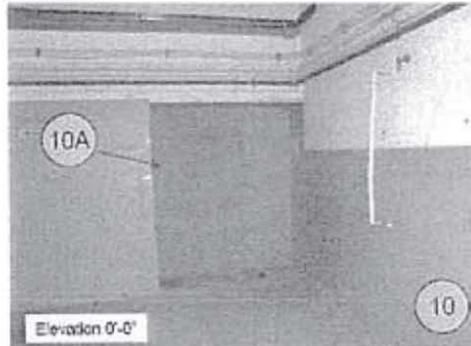
8A - 2009 Detail - Elev. 0" Pourback, No visibly evident structural degradation No change to condition.

D-11

C-74



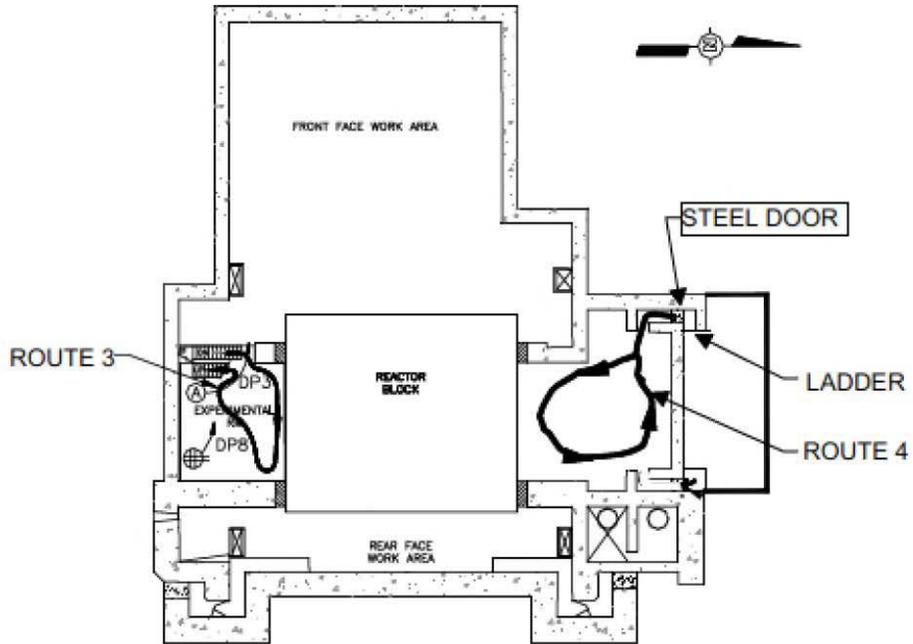
9A – 2009 Detail - Elev 0'-0" Pourback, No visibly evident structural degradation. No change to condition.



10A 2009 Detail - Elev 01'-0" Pourback. No visibly evident structural degradation. No change to condition. General area good.



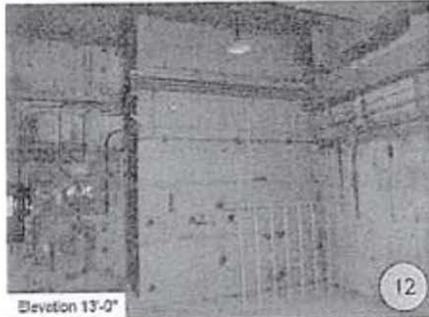
D-3 – Elevation 13' Map



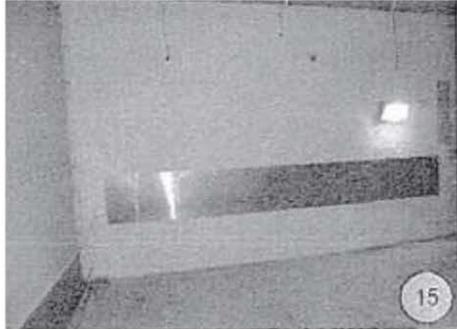


D-3 – Summary Table & Photos Elevation 13'

Item #	New Photo #	Description
12	No new picture	Wall & Floor
15	No new picture	Floor & Wall,
16, 16A	No new picture	Reactor Wall
17, 17A, 17B	No new picture	Concrete Column, Steel Beam



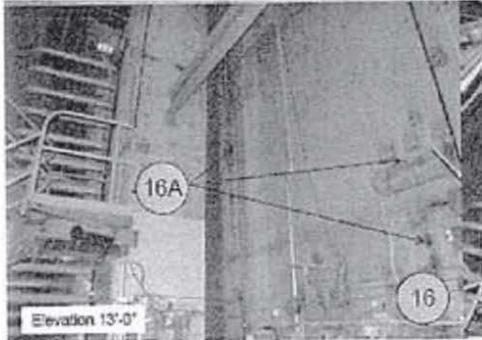
12 2009 Detail - Elev 13'-0", Wall & Floor, No change to condition No Visible Issues. Area in good condition



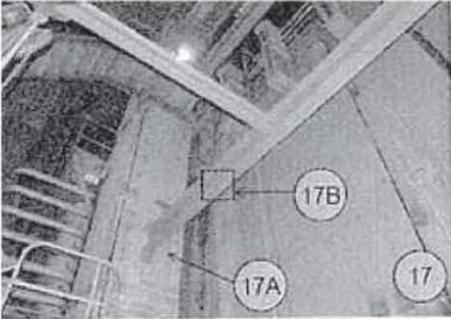
15 2009 Detail Elev 13'-0", Floor & Wall, General area conditions good.No Visible Issues



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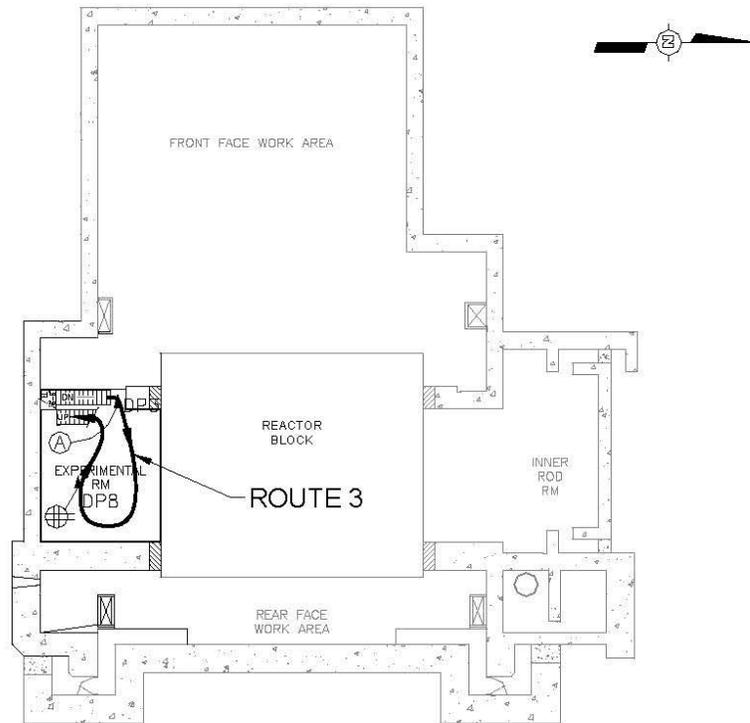


16A 2009 Detail - Elev 13'-0", Reactor Wall, Minor Corrosion No change to area condition



17A 2009 Detail - Elev 13'-0" - Concrete Column, No Visible Issues

17B 2009 Detail - Elev 13'-0" - Steel Beam, minor corrosion No changes to condition.



105 D
ABOVE GRADE 2
(ELEVATION 20'-9")

LEGEND

- ⊕ RECEPTACLE, QUADRUPLEX 120V, 20A
- Ⓐ LIGHTING 120V, 175W

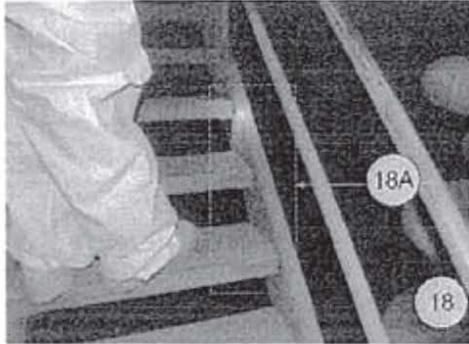


D-4—Summary Table & Photos Elevation 20'9"

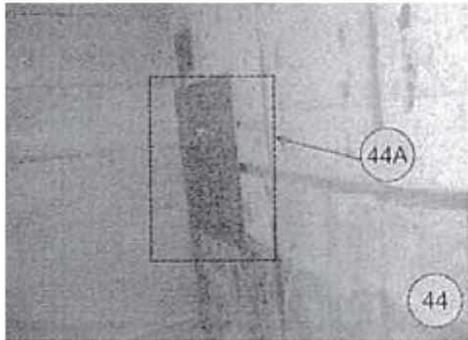
Item #	New Photo #	Description
18, 18A	No new photo	Stair beam
44, 44A	No new photo	Steel cover plate



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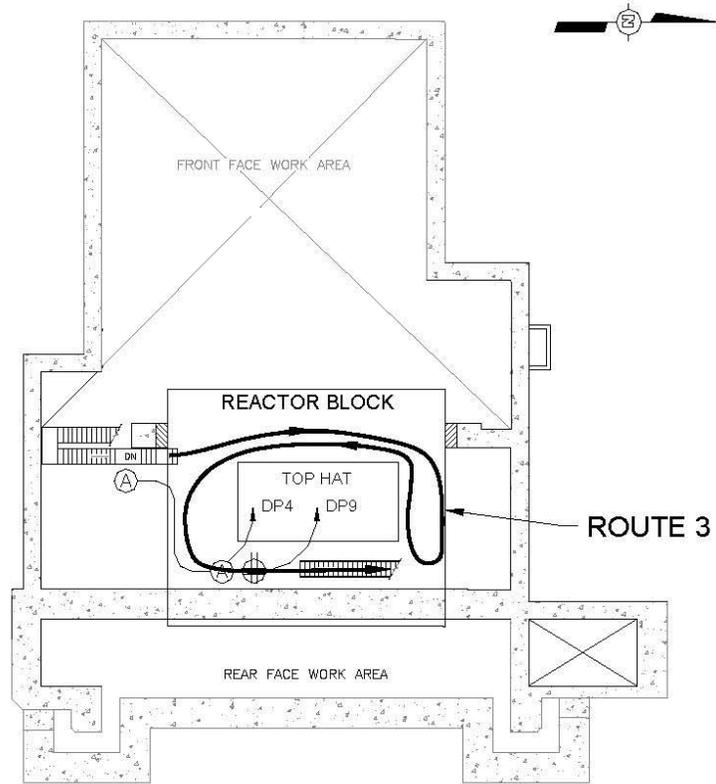
Item 18A 2009 Detail – Elev. 13'0" to Elev. 20'-9", Stair Beam, Minor Corrosion



Item 44A – 2009 Detail - 20'-9", Steel Cover Plate, No Visible Issues change in condition

D-18

C-81



105 D
ABOVE GRADE 4
(ELEVATION 42'-4 5/8")

LEGEND

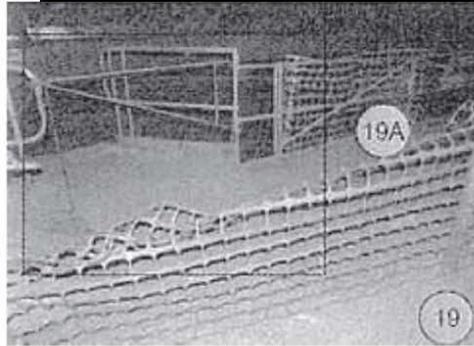
- ⊕ RECEPTACLE, QUADRUPLEX 120V, 20A
- Ⓐ LIGHTING 120V, 175W



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D-5 – Summary Table & Photos Elevation 42'

Item #	New Photo #	Description
19, 19A	3513	Guard Rails
20, 20A, 20B	No new picture	Guard Rails, Floor & Floor Beams
21, 21A	No new picture	Stair Step



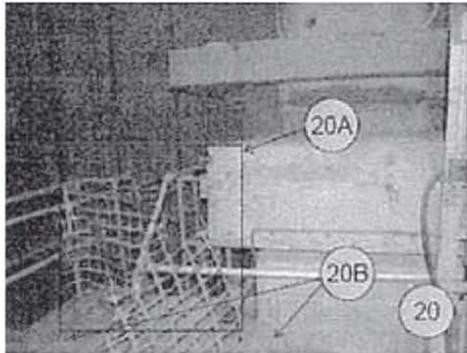
Item # 19 2009 Detail Guard Rails, Fall Hazard



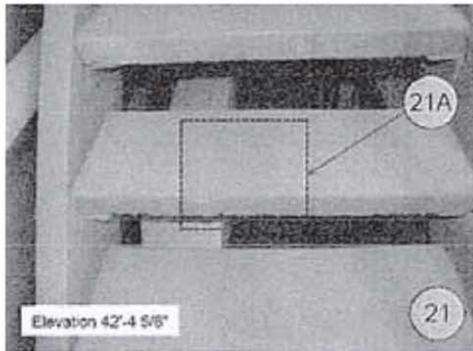
3513

D-20

C-83



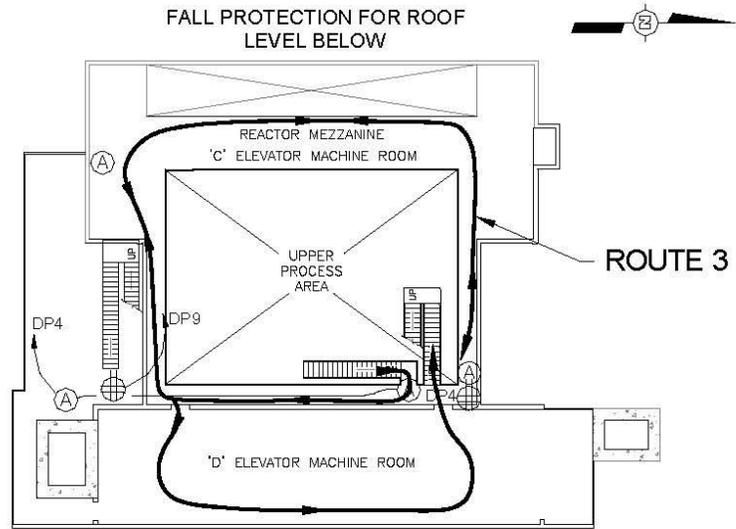
20A & 20B 2009 Detail Guard Rails and Floor/Floor Beam. minor discoloration. General area condition the same. No visible issues



21 & 21A 2009 Detail Stair Step Discoloration/spalled concrete. Area condition the same.

D-21

C-84



105 D
ABOVE GRADE LEVEL 5
(ELEVATION 56'-4")

LEGEND

- ⊕ RECEPTACLE, QUADRUPLEX 120V, 20A
- Ⓐ LIGHTING 120V, 175W

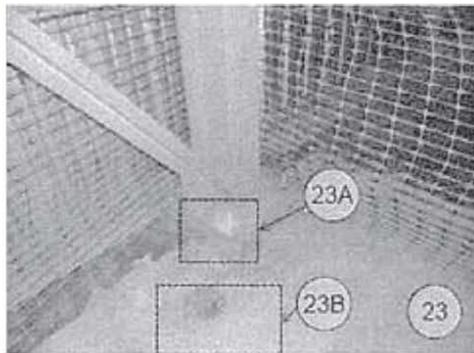


D-6 – Summary Table & Photos Elevation 56'4"

Item #	New Photo #	Description
22	No new photo	ISS Steel Beams, Gins. Braces & Columns
23, 23A, 23B	No new photo	ISS Steel Base Plate Connection & Concrete Floor
24	No new photo	ISS Steel Beams, Gins, Braces & Columns,
25	No new photo	ISS Steel Beams, Gins, Braces & Columns,
26, 26A, 26B	No new photo	ISS Steel Wall Seams, ISS Steel Column Base Plate
27	No new photo	ISS Steel Beams, Girts, Braces & Columns
28, 28A	3517 3518	ISS Roof
29, 29A	No new photo	Steel Column
30, 30A, 30B	No new photo	ISS Steel Purins Truss Beams
31, 31A , 31B	No new photo	ISS Steel Cross Brace and Steel Girt
32, 32A	No new photo	ISS Steel Column



22 2009 Detail - Elev 56'-4", ISS Steel Beams, Gins. Braces & Columns, No Visible Issues No change to condition.



23A – 2009 Detail - Elev 56'-4", ISS Steel Base Plate Connection, Missing Nut No Change to condition.
No visible issue

D-24

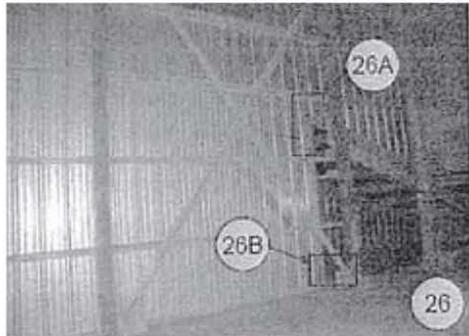
C-87



24 – 2009 Detail - Elev 56'-4", ISS Steel Beams, Girts, Braces & Columns, No Visible Issues



25 2009 Detail - Elev 56'-4", ISS Steel Beams, Girts, Braces & Columns, No Visible Issues



26A — 2009 Detail - Elev 56'-4", ISS Steel Wall Seams, Possible Moisture Path Inside Building

26B 2009 Detail- Elev 56'-4", ISS Steel Column Base Plate, Tripping Hazard No change to condition



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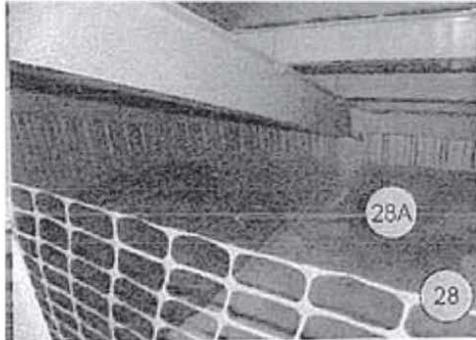
27 2009 Detail - Elev 56'-4", ISS Steel Beams, Girts, Braces & Columns, No Visible Issues No change to condition

D-26

C-89



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28A -2009 Detail- Elev 56'-4",155 Roof, No Visible Issues



3517 Possible old roofing area with residual adhesive from previous roofing material (asphalt)???



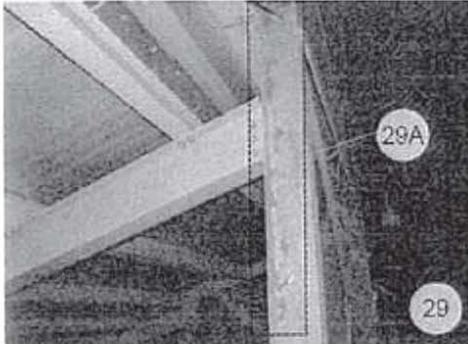
3518 same detail as 3517

D-27

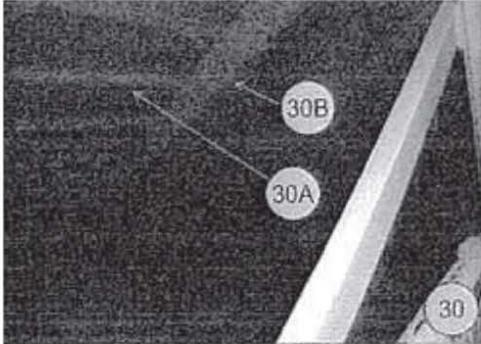
C-90



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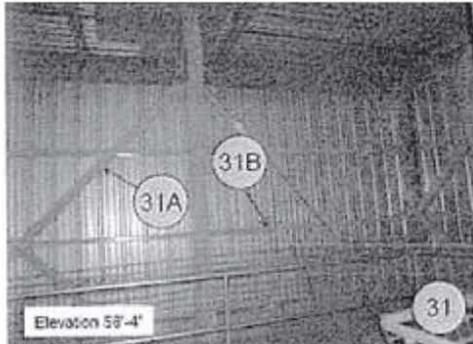


29A — 2009 Detail - Elev 56'4", Steel Column, Discolored No change to condition.



30A 2009 Detail - Elev 56'4", ISS Steel Purlins, No Visible Issues

30B 2009 Detail Elev 56'4", ISS Steel Truss Beams, No Visible issues No change to condition.

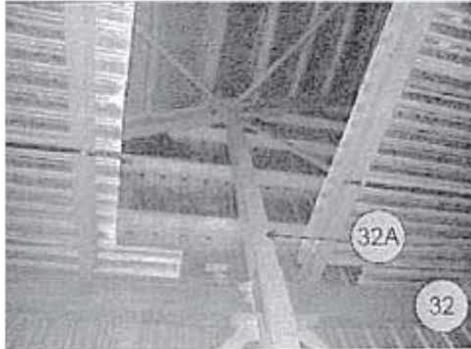


31A— 2009 Detail - Elev 56'4", ISS Steel Cross Brace, No Visible Issues

31B 2009 Detail - Elev 56'-4", ISS Steel Girt, No Visible issues No change in condition.



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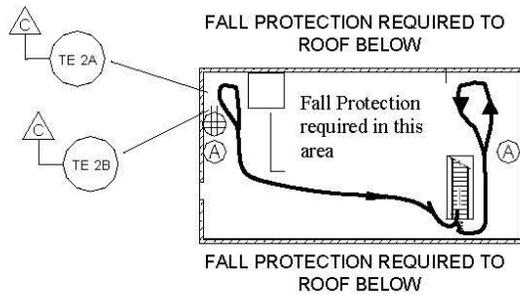
32A 2009 Detail Interior - Elev 56'-4", ISS Steel Column, No Visible Issues No change in condition.

D-29

C-92



15-MRM-008
June 5, 2015



ROUTE 3

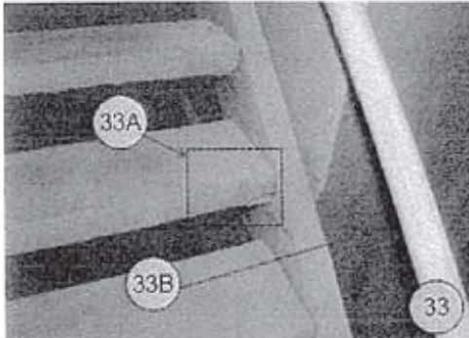
105 D
ABOVE GRADE LEVEL 7
(ELEVATION 80'-5 1/4")

- LEGEND
- ⊕ RECEPTACLE, QUADRUPLEX 120V, 20A
 - Ⓐ LIGHTING 120V, 175W
 - △ TET2, TE2B TEMPERATURE SENSORS

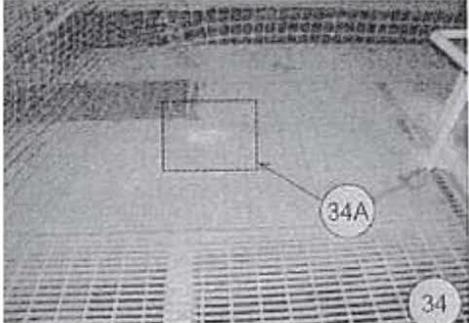


D-7 – Summary Table & Photos Elevation 80'

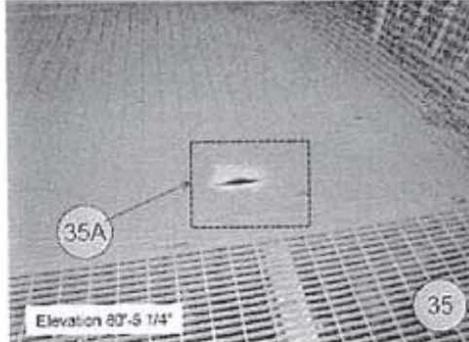
Item #	New Photo #	Description
30, 33A, 33B	No new picture	Stair Step , Handrail,
34, 34A	No new picture	grating
35, 35A	No new picture	grating
36, 36A	No new picture	grating
37	No new picture	ISS Beams, Purlins & Cross Braces
38	No new picture	ISS Beams, Purlins & Cross Braces
39	No new picture	ISS Beams, Purlins & Cross Braces
40, 40A & 40B	No new picture	Column, ISS Cross Brace
41, 41A, 42, 42A, 42B, 42C	3528, 3529	Column bolt hole, Beam bolt hole, Beam
43, 43A, 43B	No new picture	Beam, Column bolt hole



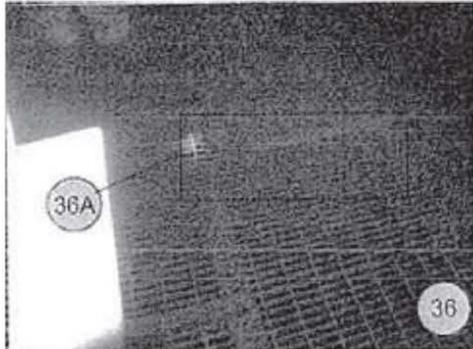
33A 2009 Detail - Elev 56'-4" to Elev 80'-5 1/4", Corrosion and Spall of Stair Step
33B 2009 Detail - Elev 56'-4" to Elev 80'-5 1/4", Handrail, no midrail No change in area condition



34A 2009 Detail - Elev 80'-5 1/4", Locally damaged grating No change to area condition



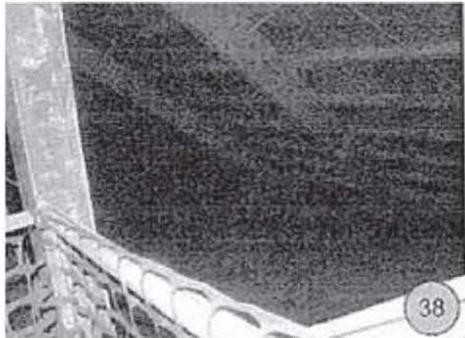
35A 2009 Detail - Elev 80'-5 1/4", Locally damaged grating No change to condition.



36A 2009 Detail - Elev 80'-5 1/4", Locally damaged grating No change to area condition



37 2009 Detail - Elev 80'-5 1/4", ISS Beams, Purlins & Cross Braces, No Visible Issues No change to area condition.



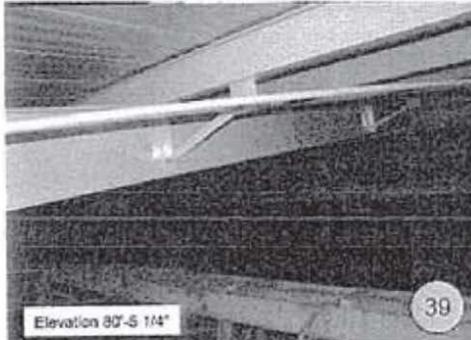
38 — 2009 Detail - Elev 80'-5 1/4", ISS Beams, Purlins & Cross Braces, No Visible Issues No change to area condition

D-33

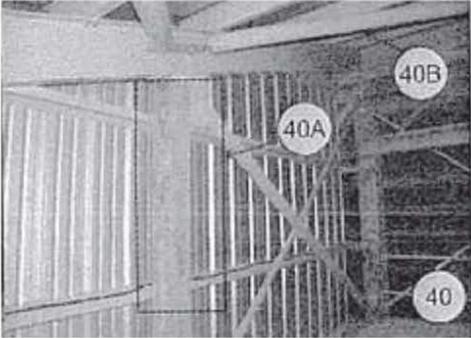
C-96



15-MRM-008
June 5, 2015

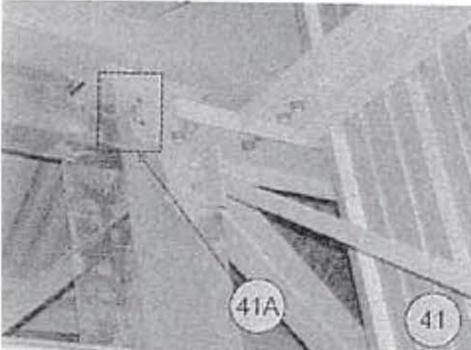


39 2009 Detail Elev 1/4", ISS Beams, Purlins & Cross Braces, No Visible Issues. No change to area condition



40A 2009 Detail - Elev 801-5 1/4", Column, Discoloration

40B 2009 Detail - Elev 80'-5 1/4", ISS Cross Brace, No Visible Issues No change to area condition



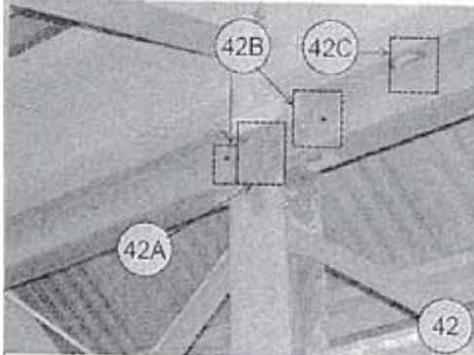
41A - 2009 Detail- Elev 801-5 1/4", Column Bolt Hole, Missing Bolt,



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3528 Old pics 41, 41A, 42a 42b 42c Series of beams missing bolts.. appear to be unused structurally. Have been replaced with larger beam above and taken out of service



42A 2009 Detail - Elev 80'-5 1/4", Column Bolt Hole, Missing Bolt, Existing
42B 2009 Detail - Interior - Elev 80'-5 1/4", Beam Bolt Hole, Missing Bolt, Existing
42C 2009 Detail - Elev 80'-5 1/4", Beam, Minor Corrosion



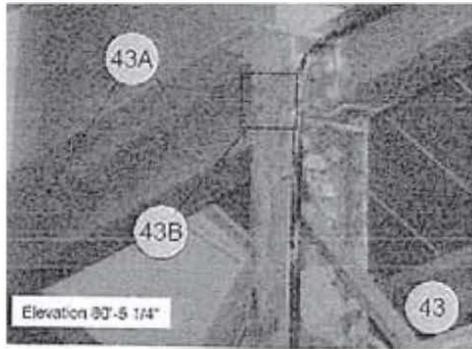
3529 Series of beams missing bolts.. appear to be unused structurally. Have been replaced with larger beam above and taken out of service 41 2015 Detail

D-35

C-98



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June 5, 2015

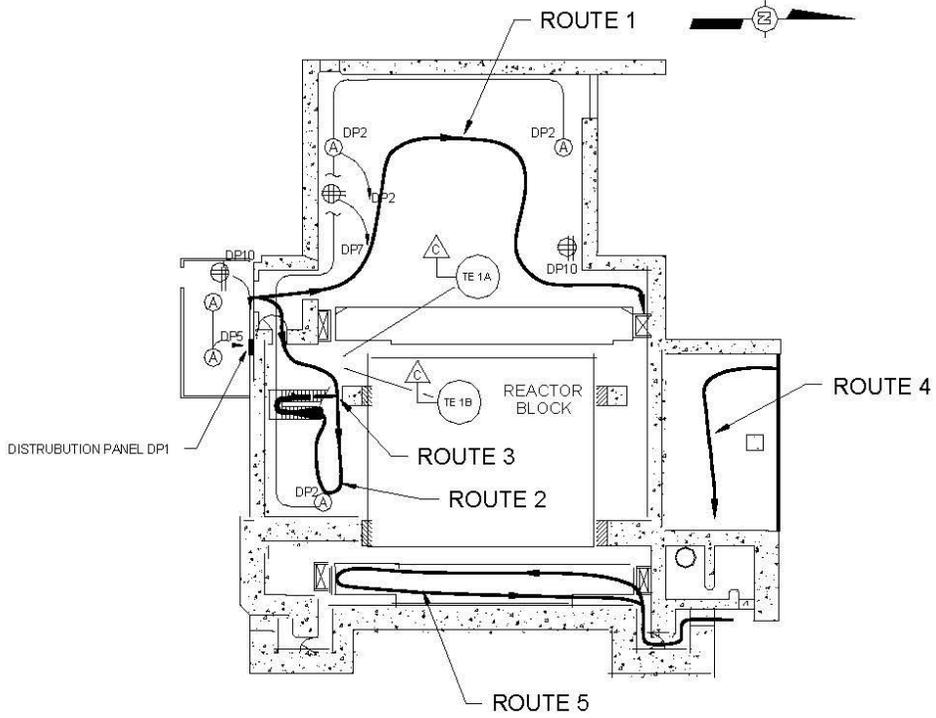


43A 2009 Detail - Elev 80'-5 1/4", Beam , Minor Corrosion

43B 2009 Detail - Elev 80'4 1/4", Column Bolt Hole, Missing Bolt, Existing No change to area condition

D-36

C-99



LEGEND

- ⊕ RECEPTACLE, QUADRUPLEX 120V, 20A
- ⊙ LIGHTING 120V, 175W
- △ TE 1B, TE 1A TEMPERATURE SENSORS

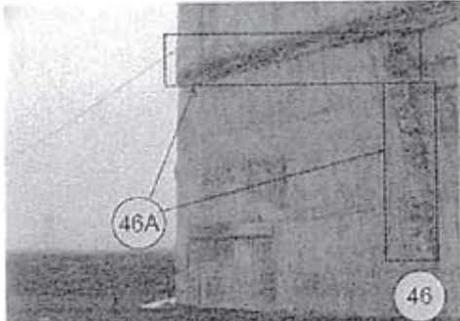


D-8 – Summary Table & Photos 105-D SSE Exterior

Item #	New Photo #	Description
46, 46A	No new picture	Concrete Wall,
47, 47A	No new picture	Concrete Wall,
48, 48A	3555 3556 3557	Exposed Rebar, Tumbleweed accumulation and exposed rebar at dirt level on east side of SSE
49, 49A & 49B 49C & 49D	No new picture	Concrete Wall, Steel Cover Plate,
50, 50A	No new picture	Concrete Wall
51, 51A	3560	Concrete Wall, Existing Exposed aggregate
52, 52A	No new picture	Concrete Wall
53, 53A	No new picture	Steel Cover Plate for Carbon Rods
54	No new picture	Exterior, Concrete Wall
55, 55A, 55B, 55C	No new picture	Concrete wall Steel Cover Plate
56, 56A, 56B	No new picture	Steel Cover Plate, Concrete Wall
57, 57A	No new picture	Steel Cover Plate
58, 58A, 58B	No new picture	Concrete Wall, Steel Cover Plate



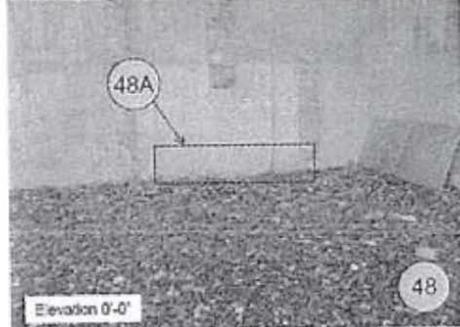
59, 59A, 59B	No new picture	Concrete Pourback, Concrete Wall
	3497, 3498	Swallow nests on building
	3552	Concrete wall Bird nests
	3553	Concrete wall Bird nests
	3554	Concrete wall Bird nests
	3558	Concrete wall Bird nests
	3559	Concrete wall Bird nests



46A – 2009 Detail - Elev 0'0", Concrete Wall, Existing Exposed Aggregate, No existing change to area.



47A 2009 Detail - Elev 0'-1", Concrete Wall, Existing Exposed Aggregate. No change to area condition



48A -2009 Detail Exterior - Elev 0'-0", Exposed Rebar, Minor Corrosion . No change to condition

D-40



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June 5, 2015



3555 tumbleweed accumulation and exposed rebar at dirt level on east side of SSE Old pic 48



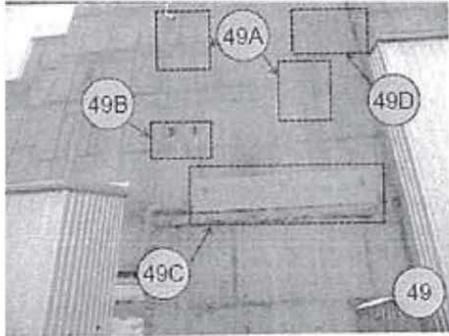
3556 same rebar as pic 3555 on east side of facility.



3557 same rebar as pic 3555 on east side of facility

D-41

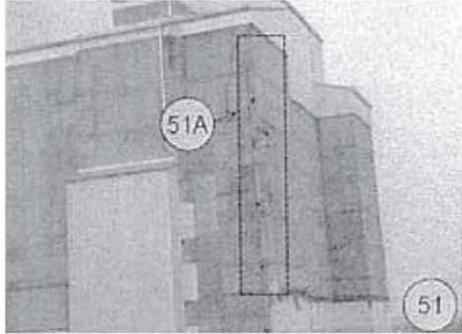
C-104



49A – 2009 Detail - Exterior, Concrete Wall, Minor Corrosion
49B - 2009 Detail - Exterior, Concrete Wall, Discoloration, Concrete Spall
49C - 2009 Detail - Exterior, Steel Cover Plate, No Visible Issues
49D - 2009 Detail - Exterior, Steel Cover Plate, No Visible Issues No change to these conditions. No change to these specific areas. See pics 3547 and 3548 for area of apparent change



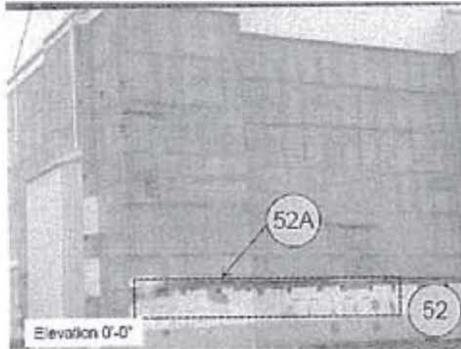
50A – 2009 Detail Exterior, Concrete Wall, Minor Corrosion No change to condition See pics 3547 3548 for vicinity area of concern...



51 A – 2009 Detail Concrete Wall, Existing Exposed Aggregate No change in area condition.

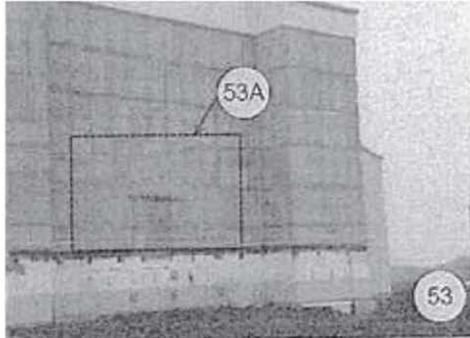


3560 Rust discoloration on south side of SSE

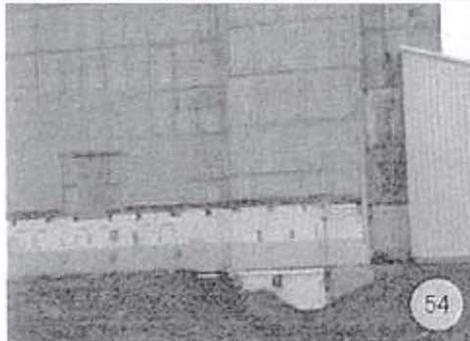


52 A. 2009 Detail Concrete Wall, Concrete Spall No new picture. No change to area condition

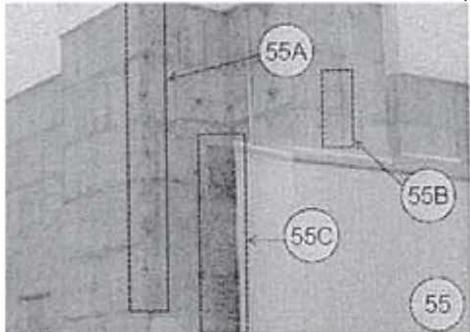
D-43



53A – 2009 Detail, Steel Cover Plate for Carbon Rods, No Visible Issues No change to area condition



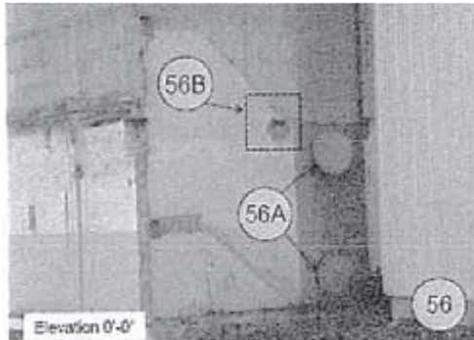
54 – 2009 Detail Exterior, Concrete Wall No new picture. No change to area condition



55A – 2009 Detail - Exterior, Concrete Wall, Exposed Aggregate

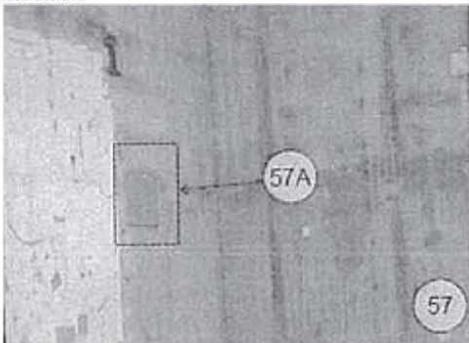
55B – 2009 Detail - Exterior, Concrete Wall, Minor corrosion

55C – 2009 Detail - Exterior, Steel Cover Plate, No Visible Issues change to general area condition.

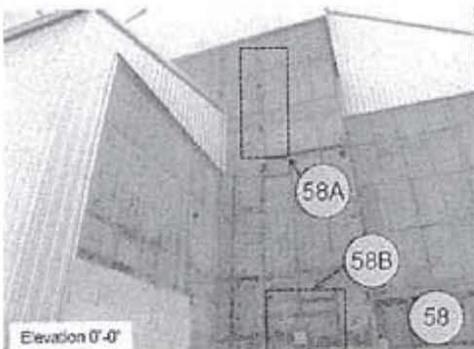


Item 56A — 2009 Detail Exterior, Steel Cover Plate, No Visible Issues

Item 56B — 2009 Detail Item # 56 Exterior, Concrete Wall, Existing Spall. No new picture. No change to area condition.

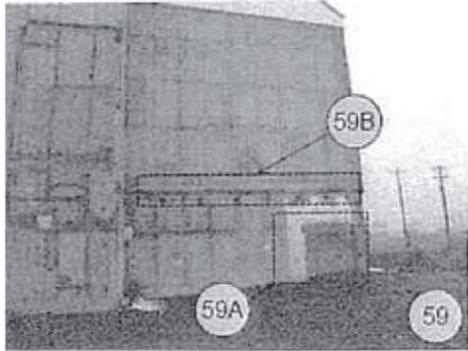


Item 57A — 2009 Detail Exterior, Steel Cover Plate, No Visible Issues No new pictures. No change to area condition.



Item 58A — 2009 Detail Exterior, Concrete Wall, Existing Exposed Aggregate

Item 58B — 2009 Detail Exterior. Steel Cover Plate, No Visible Issues No changes to area condition



Item 59A —2009Detail Exterior, Concrete Pourback, No Visible Issues

Item 59B — 2009 Detail Exterior. Concrete Wall, Existing Exposed Aggregate & Concrete Spall No change to area condition



3497 Swallow nest inside beam cavit. On west side of front face wall.



3549



15-MRM-008
June 5, 2015



3552 bird nests



3553 bird nests



3554 bird nests

D-47

C-110



3558 bird nests



3559 bird nests

D-48

C-111

APPENDIX D
S&M ACTIVITIES REPORTS FOR 105-F SSE ASSESSMENT

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APPENDIX D
S&M ACTIVITIES REPORTS FOR 105-F SSE ASSESSMENT

This appendix presents reports associated with surveillance and maintenance activities. The appendix is arranged so that each activity is listed separately, followed by the applicable documents.

The activities inside the 105-F SSE were conducted along the structural routes identified in DOE/RL-2003-45, *Surveillance and Maintenance Plan for the 105-F Reactor Safe Storage Enclosure*, Rev. 0. These surveillance routes also are included in Work Package 2M-73252/C.

External Radiological Survey

Radiological control technicians performed external surveys along the outside walls.

COPY

MSA RADIOLOGICAL SURVEY REPORT

Job Description
Baseline Survey of F-Reactor exterior walls. F-Reactor recently transferred from WCH to MSA.

Purpose of Survey
 Job Coverage
 Verification
 Work/Job Control Pkg./ISAM
 Required Task #
 RAM Shipment #
 Material Release Released to:
 Sample Counter Number:
 Contamination Incident
 Skin Clothing Spill
 Alarm Response CAM ARM APM
 Exposure Incident HRA/HRA Work
 RPR No.
 Other: MSA-11F-2014-0577
 Air sample taken - see attached log
 Emergency Response - see attached forms
 Check appropriate box(es) above

Item(s) #
 Static Survey β/γ α
 • Number of static measurements
 • Distance from the item (inches)
 • Count time (seconds)
 • Percentage of the item surveyed
 No observable/audible counts above background (i.e., <D)

Item(s) #
 Large area wipe (LAW) β/γ α
 or
 • Count time (seconds)
 • Survey speed (inches/second)
 • Distance from the LAW (inches)
 • Percentage of item wiped
 • Area wiped for each LAW
 No observable/audible counts above background (i.e., <D/LAW), or Observed activity above background (i.e., dpm/LAW)

Item(s) #
 Scanning Survey β/γ α
 • Survey speed (in./sec)
 • Distance from the item (inches)
 • Percentage of the item surveyed
 No observable/audible counts above background (i.e., <D)

Map/Sketch
N/A

Map Legend
 Smear LAW * Contact Reading
 Air Sample Neutron
 --- (designation inside) --- Radiological Area Boundary
 Dose Rates in mrem/h unless otherwise noted

RCT Name(s) (Print) Joe Wiley
Signature(s) *Joe Wiley*
Supervisor or Designee (Print) MSA
Signature *[Signature]*
 Page 1 of 17 Survey Report No. N-14-0492
 Payroll # 80302 Date 09/11/2014
 Payroll # 57377 Date 9/11/14

Instrument	RO-3B	GM Model	PAM	GM	Incl. use 2360
Serial No.	Micro Rem	Probe	Probe	Probe	Probe
Efficiency	10%	10%	10%	10%	10%

OFFICIAL USE ONLY - EXEMPTION 6

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Name/Org: *Chet Driscoll / MSA* Date: 10-7-15

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



* Contact Reading

Page 3 of 17 FC N

Survey Report No. N-14-0492

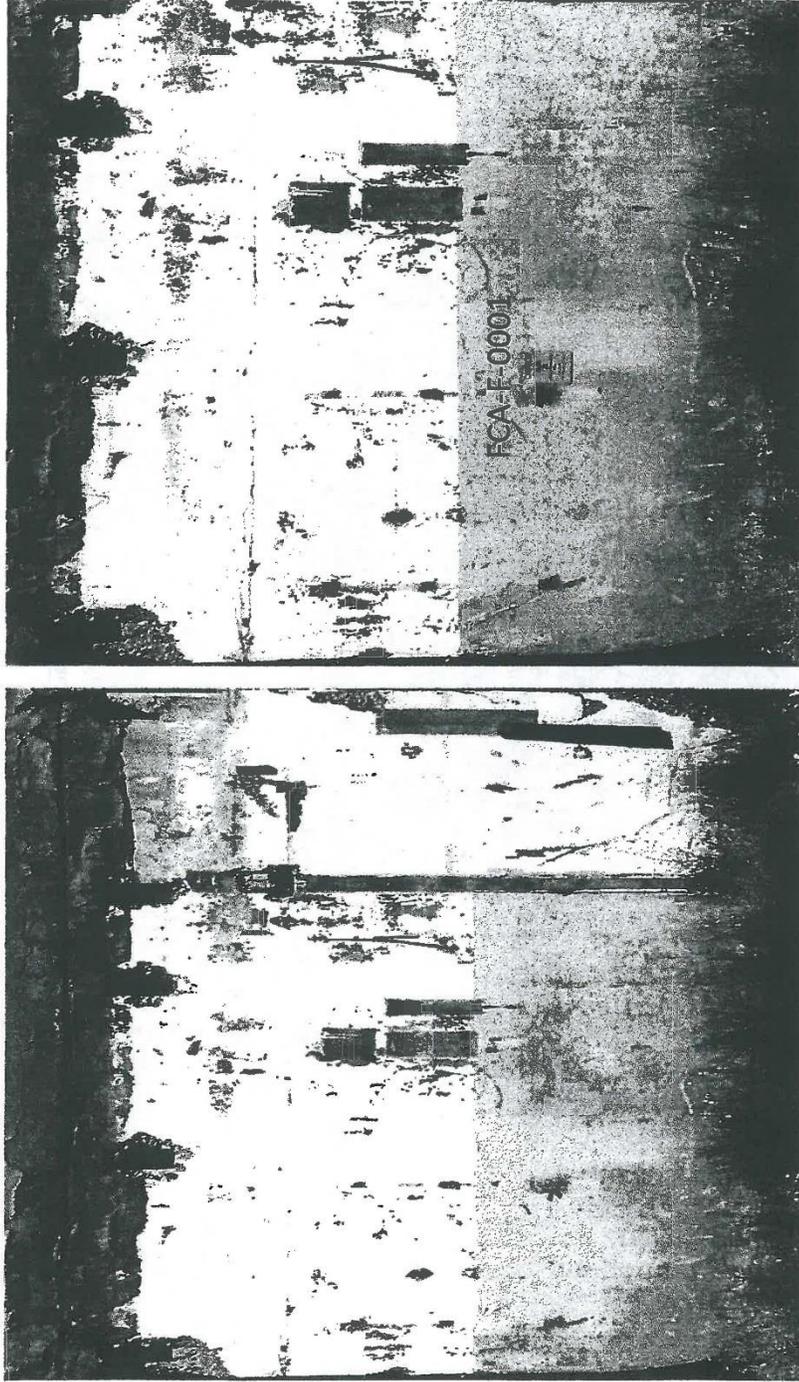
A-6002-696.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 6

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Form/Org: C-107 Driscoll S&S Date: 10-7-15

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear
 Air Sample
 LAW
 Neutron
 (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

Page 4 of 17 FC N Survey Report No. N-14-0492

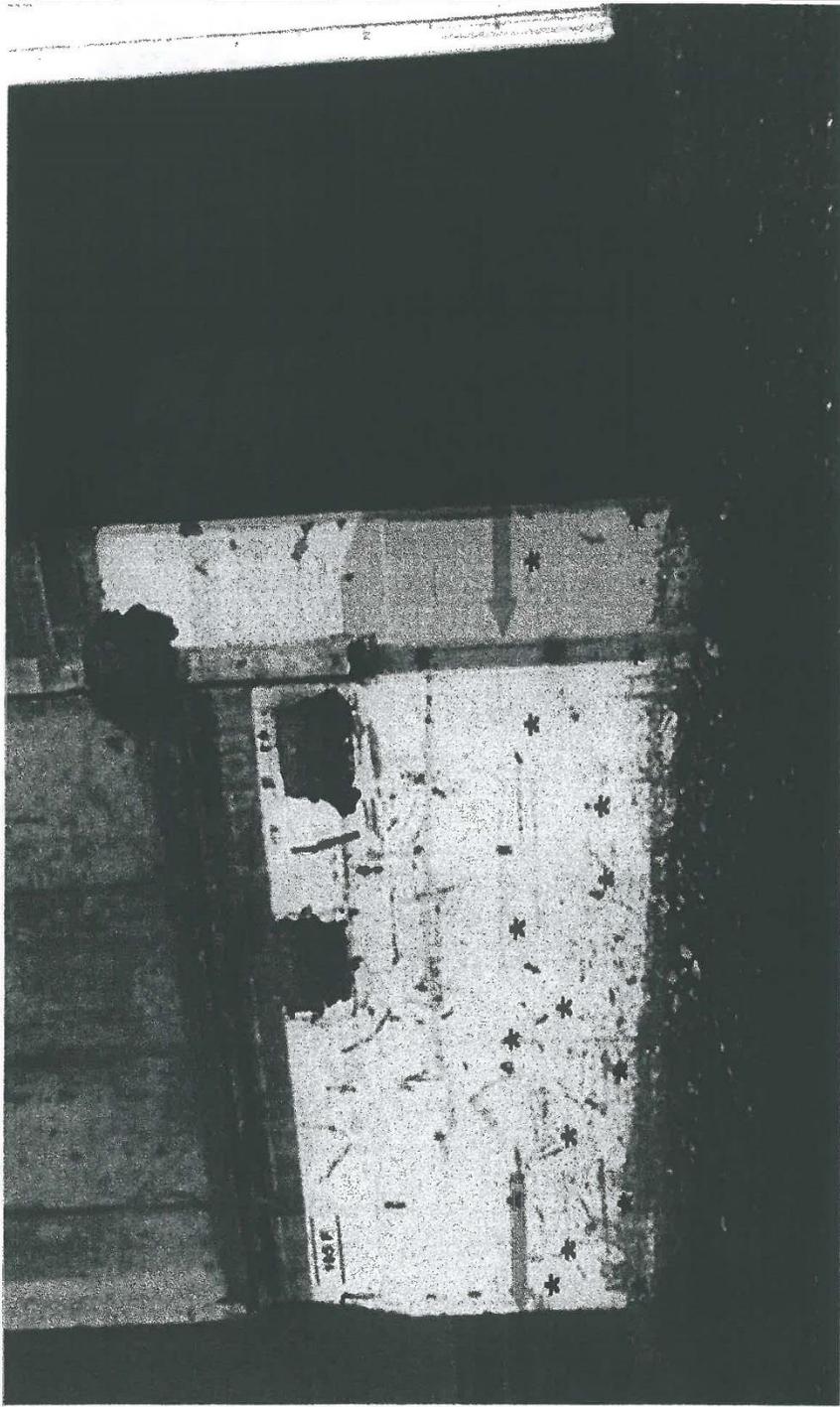
A-6002-686.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 6

**DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION**

Name/Org: *Chet Braswell* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear Air Sample LAW Neutron
 (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

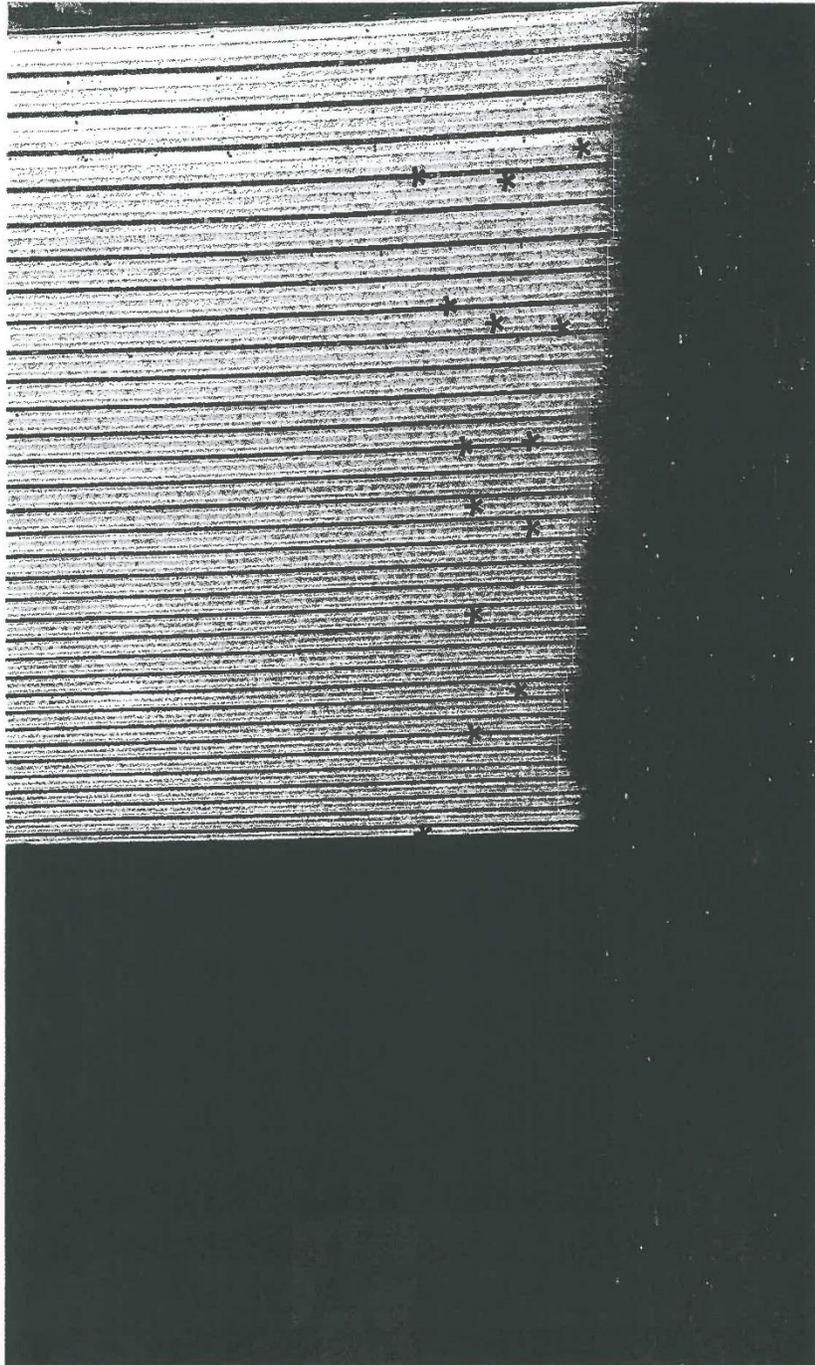
* Contact Reading

Page 5 of 17 FC N Survey Report No. N-14-0492 A-6002-686.2 (REV 4)

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DOES NOT CONTAIN
 OFFICIAL USE ONLY INFORMATION
 Name/Orig: *Chet Draggell* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear Air Sample LAW Neutron
 (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

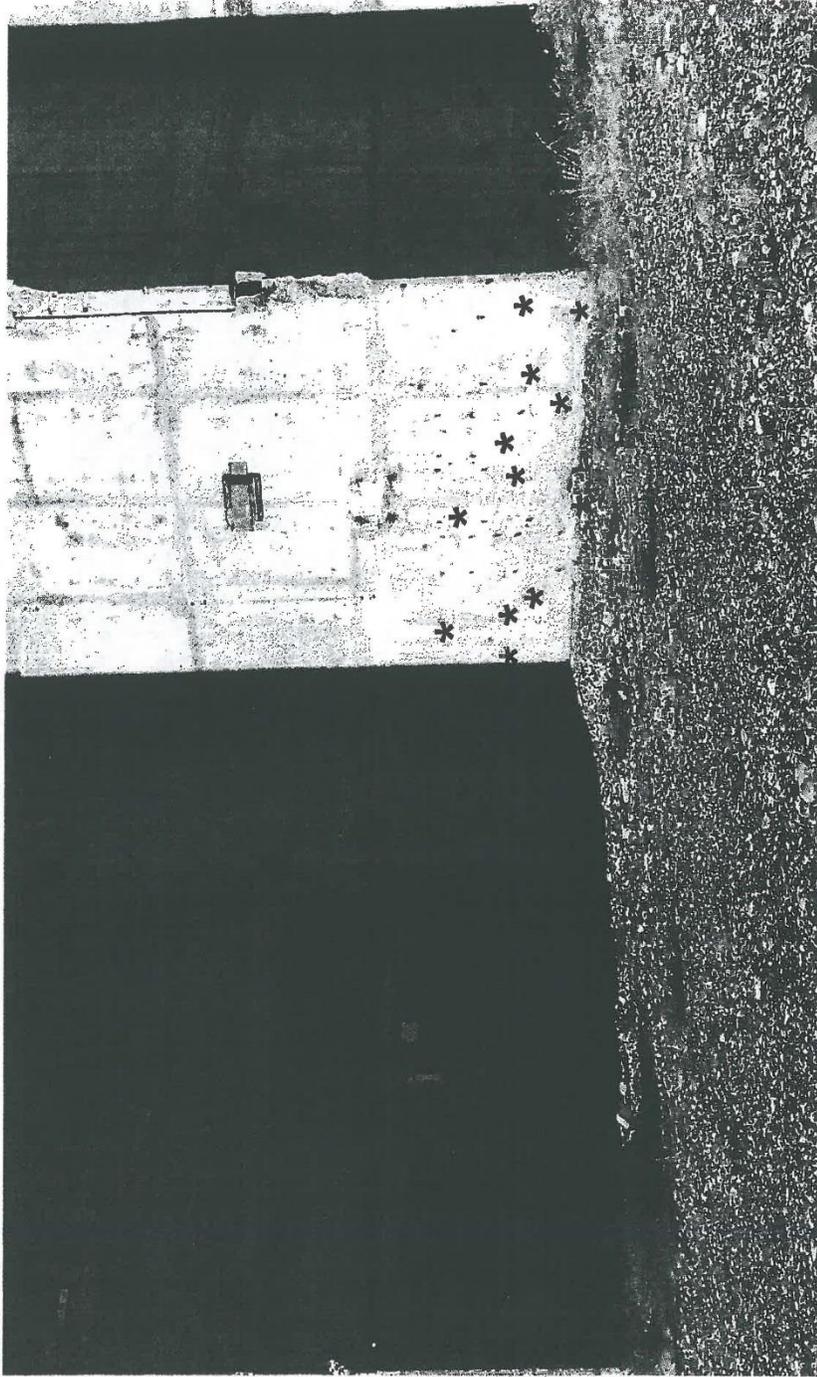
Page 6	of 17	FC N	Survey Report No. N-14-0492
			A-6002-696.2 (REV 4)

OFFICIAL-USE ONLY - EXEMPTION 6

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Date: 10-7-15

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear Air Sample LAW Neutron
 ----- (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

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FC N

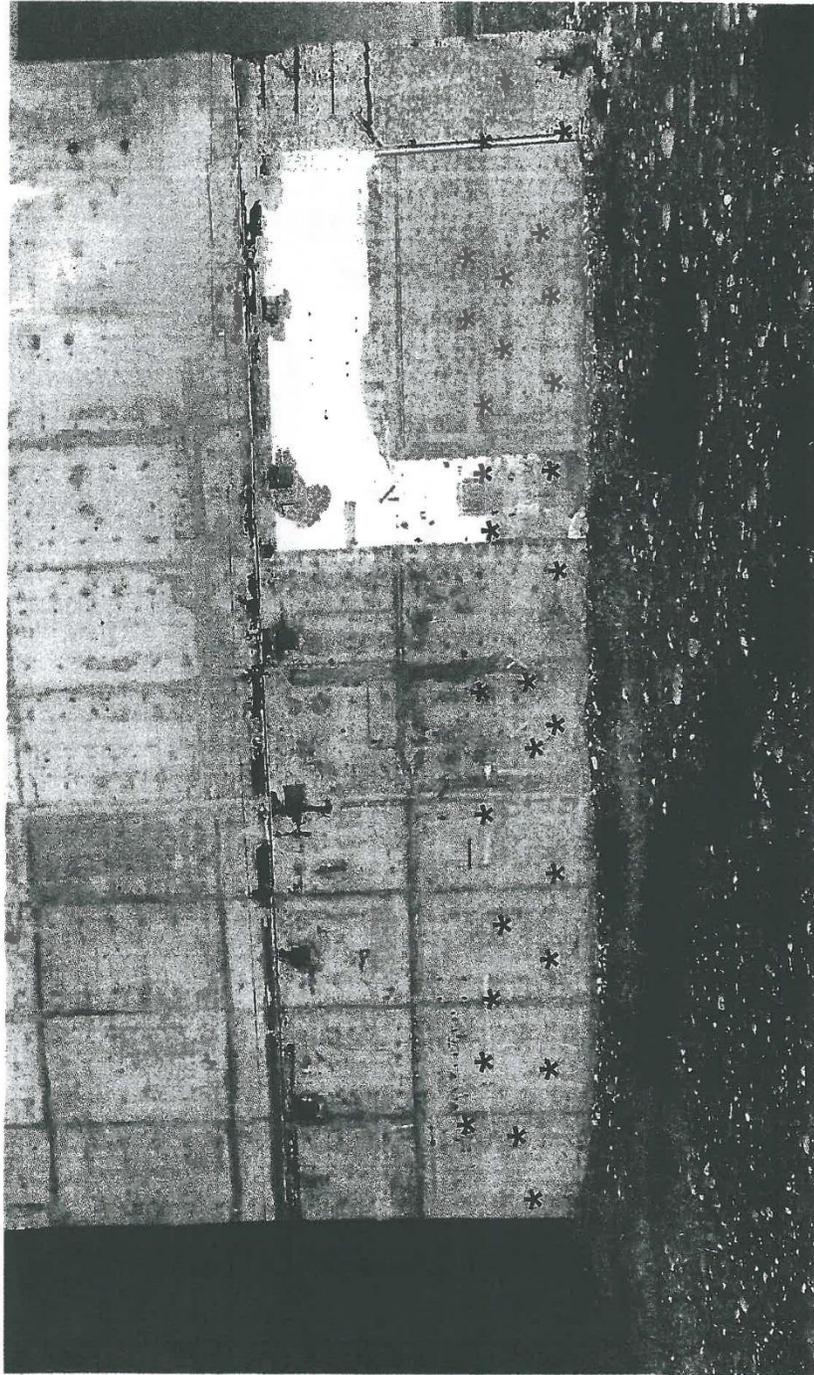
Survey Report No. N-14-0492

A-8002-886.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 5

DOES NOT CONTAIN
 OFFICIAL USE ONLY INFORMATION
 Name/Orig: *Chet Brownell* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear Air Sample LAW Neutron
..... (designation inside) Radiological Area Boundary
All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

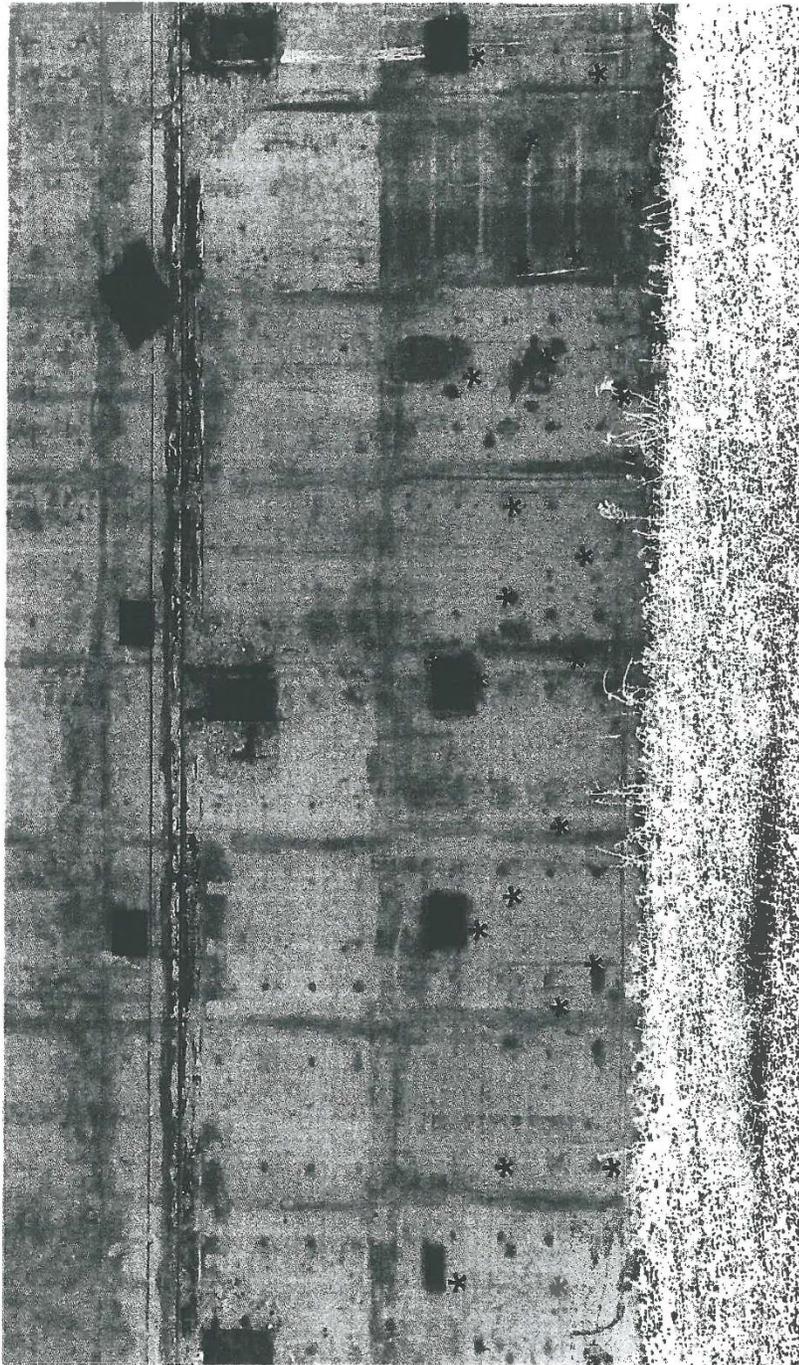
Page 8 of 17 FC N Survey Report No. N-14-0492 A-6002-686.2 (REV 4)

OFFICIAL-USE ONLY - EXEMPTION 6

DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION

Name/Org: *Chet Bragwell/S&S* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear Air Sample LAW Neutron
 ----- (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

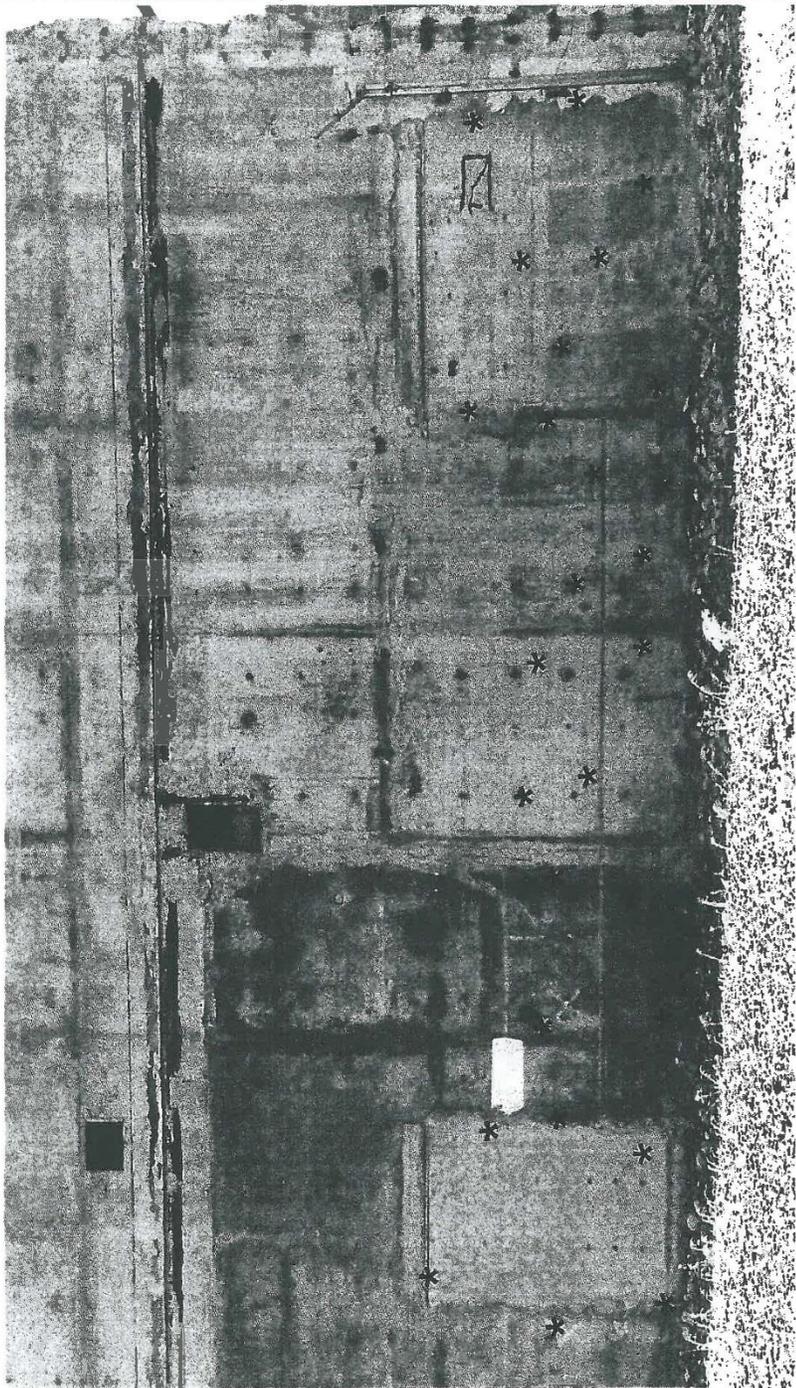
* Contact Reading

Page 9	of 17	FC N	Survey Report No. N-14-0492
			A-6002-668.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 6

**DOES NOT CONTAIN
 OFFICIAL USE ONLY INFORMATION**
 Name/Org: *Chet Braswell* Date: *12-7-15*

MSA RADIOLOGICAL SURVEY REPORT – CONTINUATION SHEET – Map/Sketch



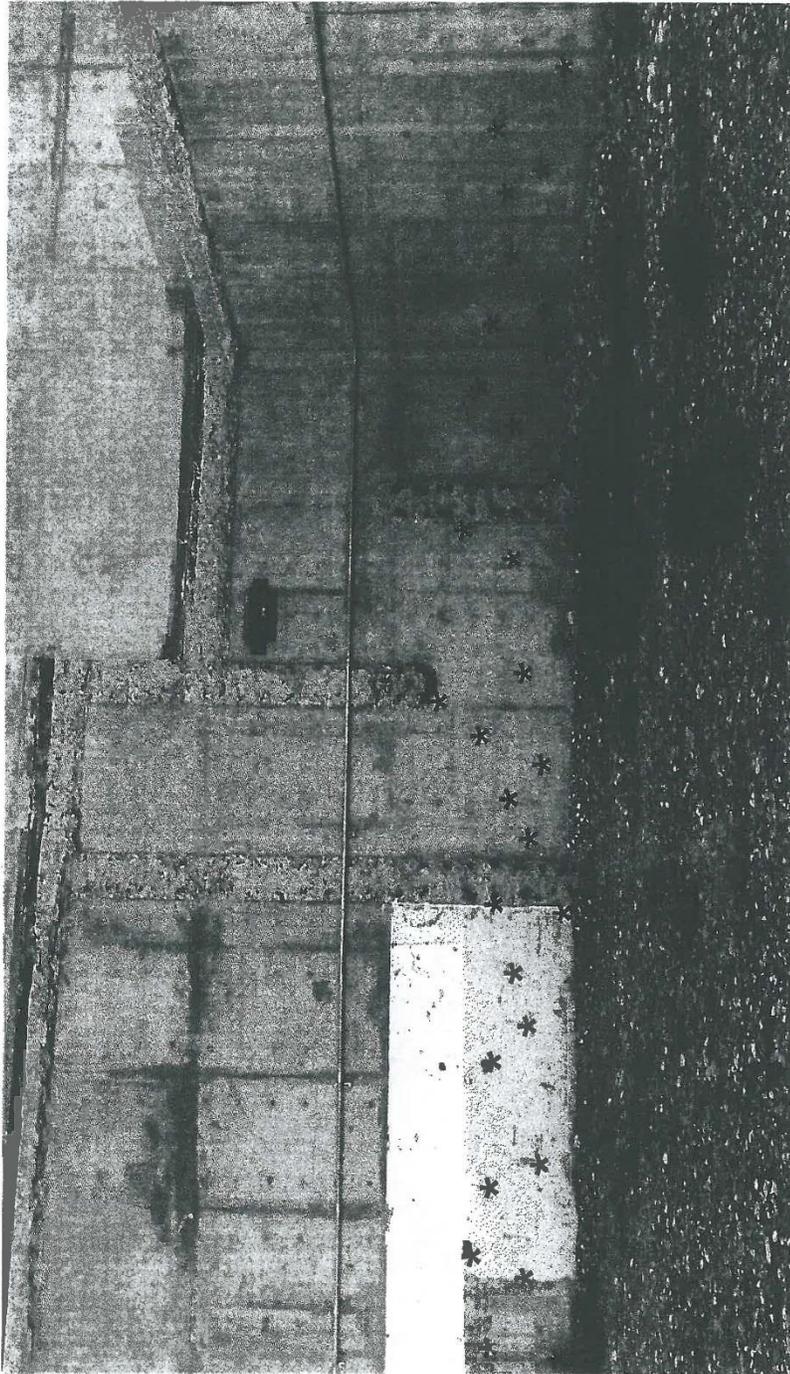
<input checked="" type="checkbox"/> Smear	<input checked="" type="checkbox"/> Air Sample (designation inside)	<input checked="" type="checkbox"/> LAW	<input checked="" type="checkbox"/> Neutron	* Contact Reading	
----- (designation inside) ----- Radiological Area Boundary			Page 10 of 17		
All dose rates are in mrem/hr, unless otherwise noted.			FC	N	Survey Report No. N-14-0492
					A-6002-686.2 (REV 4)

OFFICIAL USE ONLY – EXEMPTION 6-2

DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION

Name/Orig: *Chet Brown/SRB* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear
 Air Sample
 LAW
 Neutron
 (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

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FC N

Survey Report No. N-14-0492

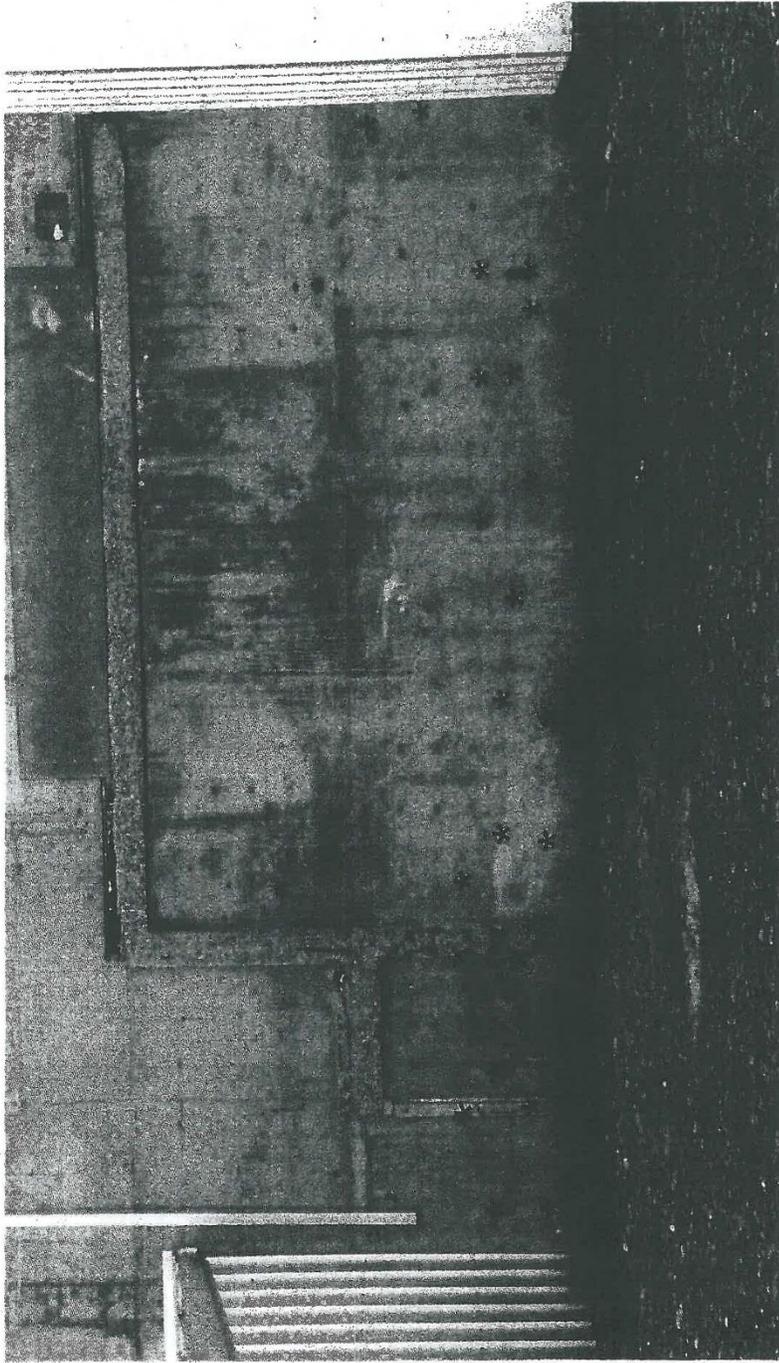
A-6002-696.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 6

DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION

Name/Org: *Chet Braswell* #11-7-15

MSA RADIOLOGICAL SURVEY REPORT -- CONTINUATION SHEET -- Map/Sketch



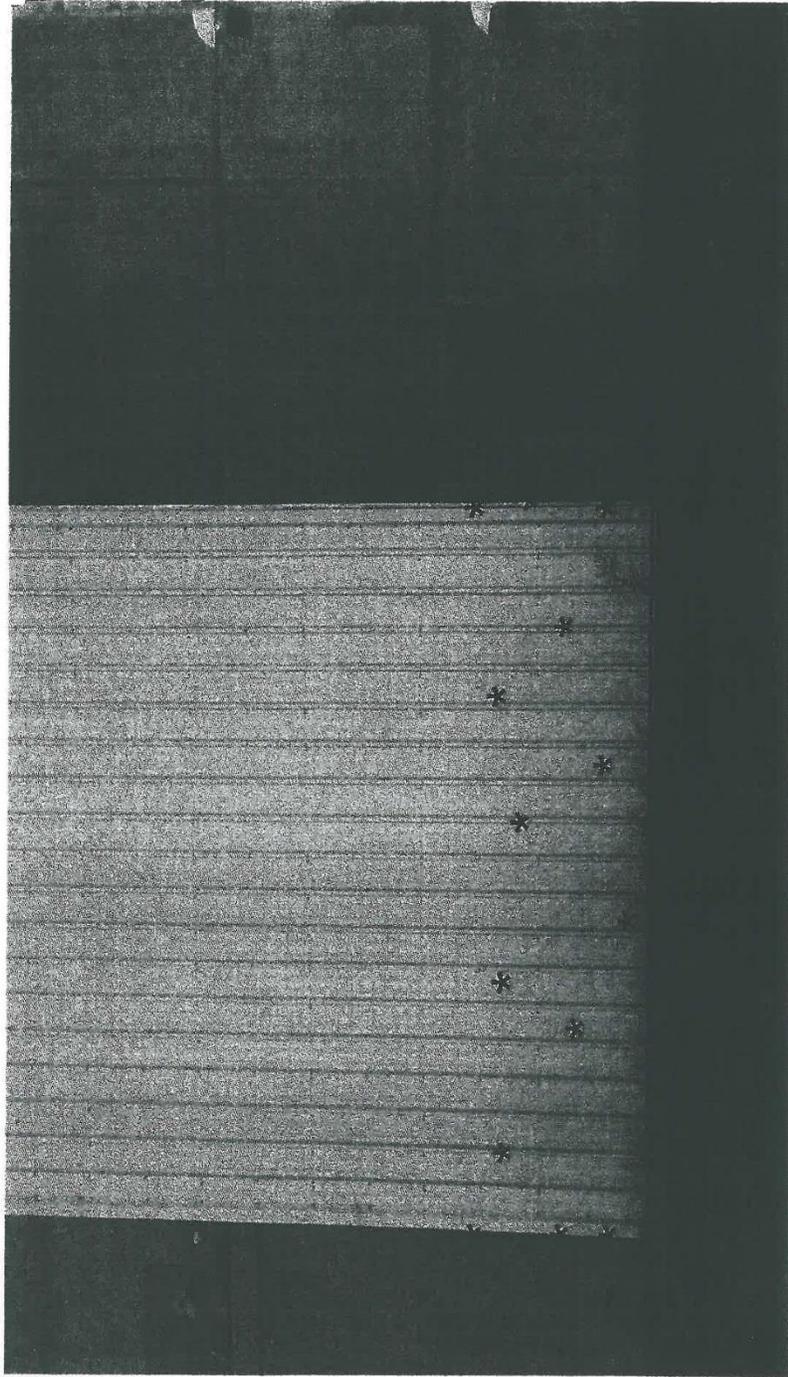
<input checked="" type="checkbox"/> Smear	<input checked="" type="checkbox"/> Air Sample (designation inside)	<input checked="" type="checkbox"/> LAW Radiological Area Boundary	<input checked="" type="checkbox"/> Neutron	* Contact Reading	
----- All dose rates are in mrem/hr, unless otherwise noted.				Page 1.2 of 1.7	FC N
				Survey Report No. N-14-0492	A-8002-686.2 (REV 4)

OFFICIAL USE ONLY -- EXEMPTION

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Name/Org: *Chet Orswell* Date: *11-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



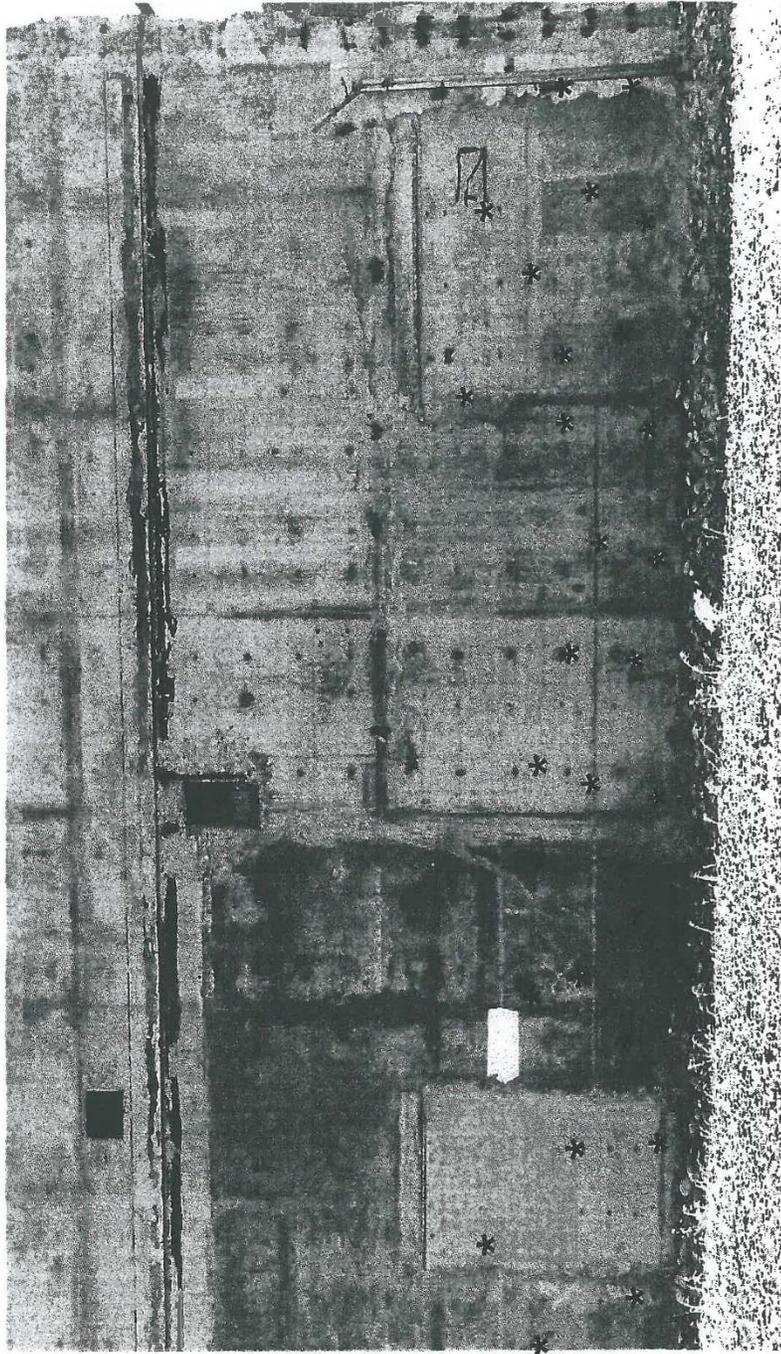
Smear
 Air Sample
 LAW
 Neutron
 (designation inside)
 ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading
 Page 1.3 of 1.7 FC N Survey Report No. N-14-0492 A-6002-686.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTION 2

**DOES NOT CONTAIN
 OFFICIAL USE ONLY INFORMATION**
 Name/Org: Chet Brownell / SRS Date: 10-7-15

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear
 Air Sample
 LAW
 Neutron
 ----- (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

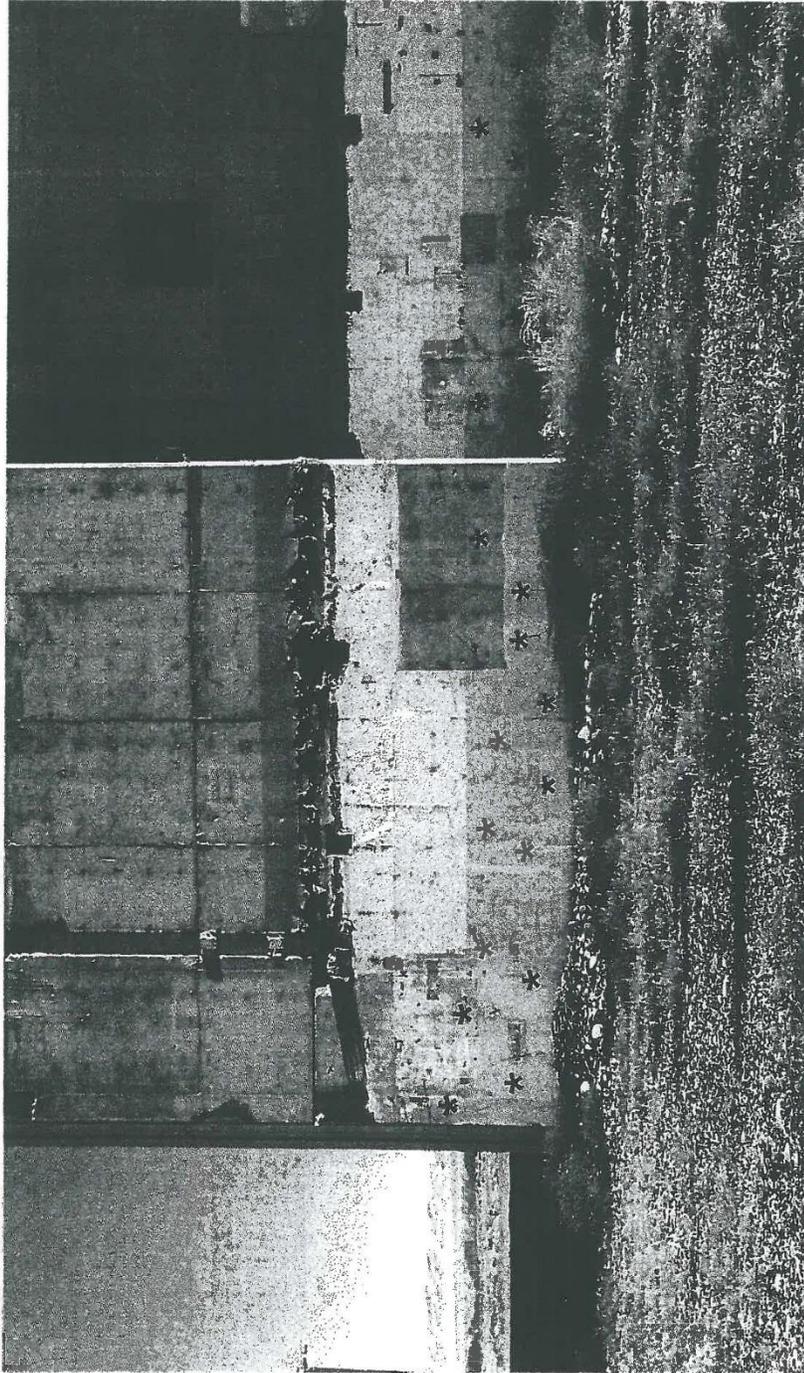
Page 14 of 17 FC N Survey Report No. N-14-0492 A-6002-686.2 (REV 4)

OFFICIAL USE ONLY - EXEMPTIONS

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Name/Org: *Chet Braswell/SA* Date: *11-7-15*

MSA RADIOLOGICAL SURVEY REPORT – CONTINUATION SHEET – Map/Sketch



Smear Air Sample LAW Neutron
 (designation inside) Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading
 Page 15 of 17 FC N

A-6002-686.2 (REV 4)

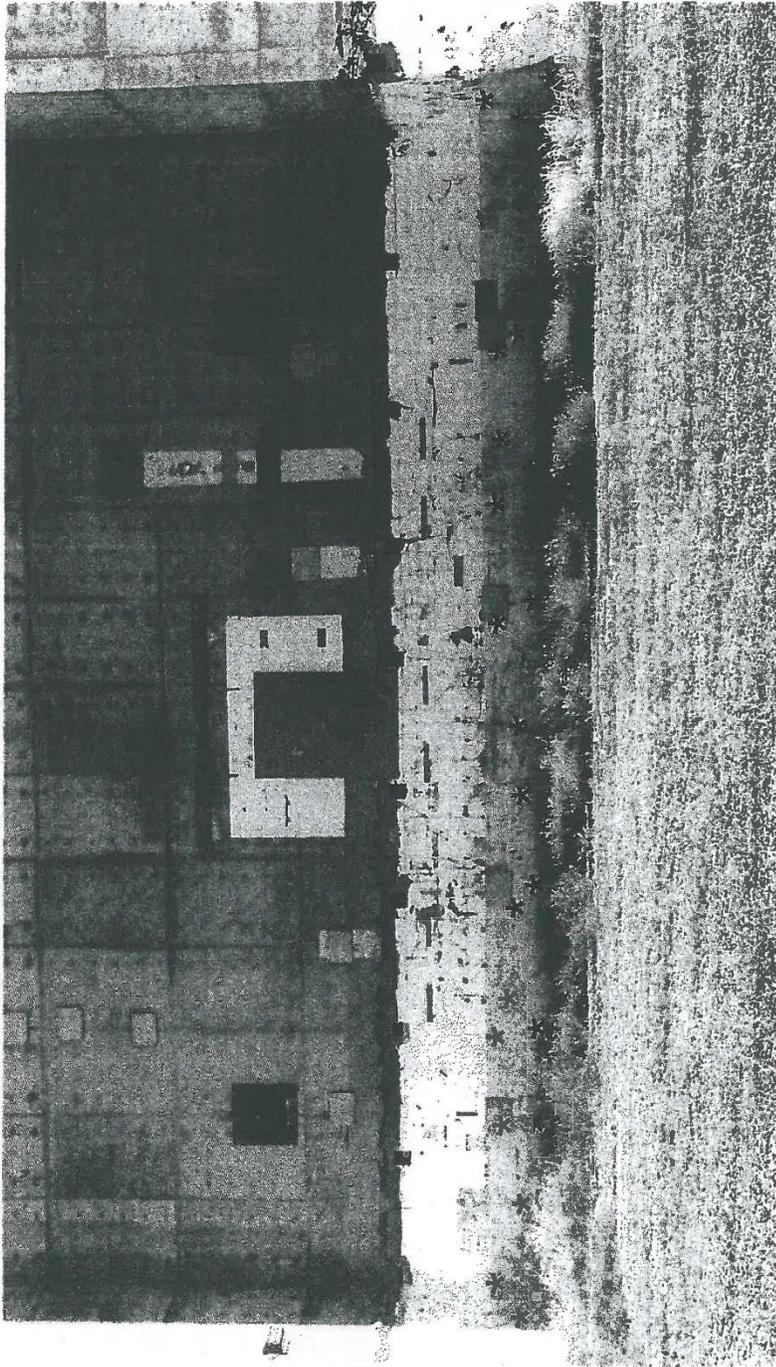
Survey Report No. N-14-0492

OFFICIAL USE ONLY – EXEMPTION B

**DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION**

Prepared By: *Chief Braswell/SBS* Date: *10-7-15*

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch



Smear
 Air Sample
 LAW
 Neutron
 ----- (designation inside) ----- Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

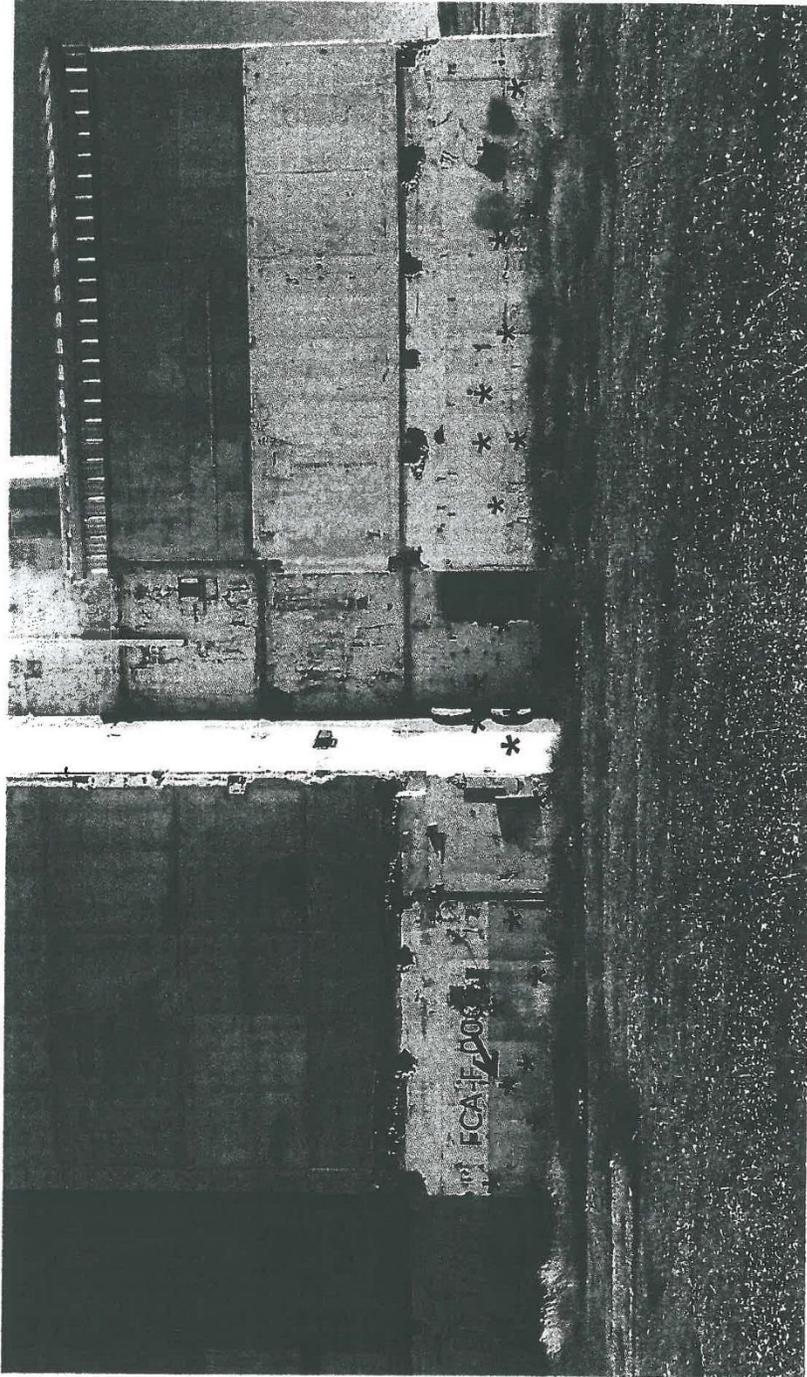
* Contact Reading

Page 1.6	of 1.7	FC N	Survey Report No. N-14-0492	A-6002-686.2 (REV 4)
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DOES NOT CONTAIN OFFICIAL USE ONLY - EXEMPTION 6
OFFICIAL USE ONLY INFORMATION

Name: C. Braswell/SRS Date: 10-7-15

MSA RADIOLOGICAL SURVEY REPORT -- CONTINUATION SHEET -- Map/Sketch



Ⓜ Smear
----- (designation inside) -----
All dose rates are in mrem/hr, unless otherwise noted.

Ⓛ LAW
----- Radiological Area Boundary -----

Ⓝ Neutron

* Contact Reading

Page 17 of 17 FC N

Survey Report No. N-14-0492
A-6002-666.2 (REV 4)

**DOES NOT CONTAIN
OFFICIAL USE ONLY INFORMATION**

OFFICIAL-USE-ONLY -- EXEMPTION 6

Name/Org: *C. Braswell / SAS* Date: *10-7-15*

Internal Radiological Survey

Radiological control technicians performed surveys along the surveillance routes.

MSA RADIOLOGICAL SURVEY REPORT

Job Description
 Performed radiological survey of the 105F inspection route in preparation for engineering inspections, animal intrusion inspections, media filming and tours. JW

Purpose of Survey
 Job Coverage
 Verification
 Work/Job Control Pkg./ISA# 2M-6A026/C
 Required Task # N/A
 RAM Shipment # N/A
 Material Release Released to: N/A

Item(s) # N/A
 Static Survey β/γ α
 • Number of static measurements N/A / N/A
 • Distance from the item (inches) N/A / N/A
 • Count time (seconds) N/A / N/A
 • Percentages of the item surveyed N/A / N/A
 No observable/audible counts above background (i.e., <D)

Item(s) # 3B
 Large area wipe (LAW) β/γ α
 • Count time (seconds) 1.0 / 60
 • Survey speed (inches/seconds) 1 / 1
 • Distance from the LAW (inches) 1/4
 • Percentage of item wiped 75
 • Area wiped for each LAW <1M
 No observable/audible counts above background (i.e., <D/LAW), or Observed activity above background (i.e., dpm/LAW)

Item(s) # N/A
 Scanning Survey β/γ α
 • Survey speed (ft./sec) N/A / N/A
 • Distance from the item (inches) N/A / N/A
 • Percentage of the item surveyed N/A / N/A
 No observable/audible counts above background (i.e., <D)

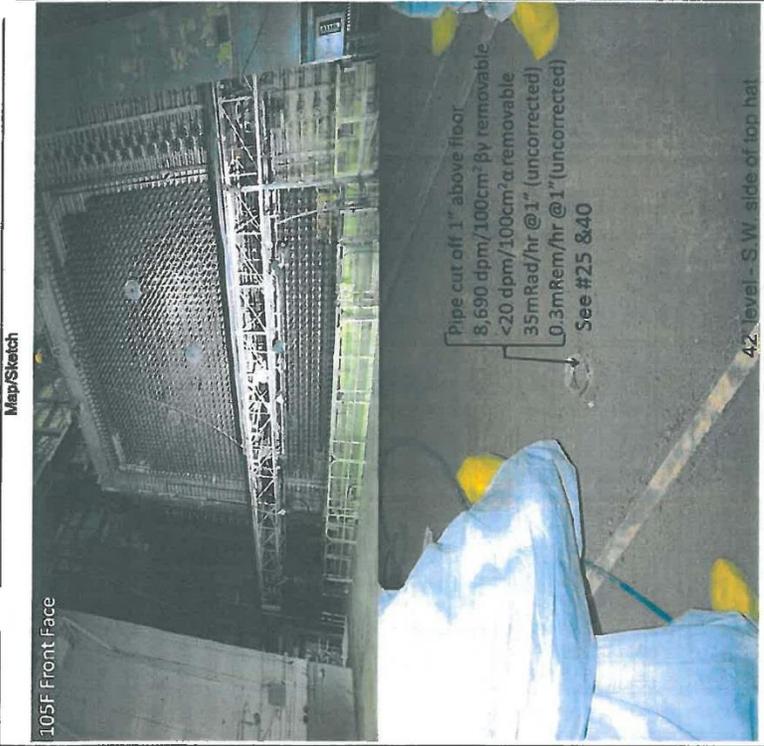
Sample Analysis Reference
 Sample Counter Log Number: N/A
 Contamination Incident
 Skin Clothing Spill ARM APM
 Alarm Response CAM HRA/MHRA Work
 Exposure Incident IIF No. N/A
 Other N/A
 Air sample taken - see attached log
 Emergency Response - see attached forms
 Check appropriate box(es) above

Map Legend
 Smear LAW * Contact Reading
 Air Sample Neutron
 --- (designation inside) --- Radiological Area Boundary
 Dose Rates in mrem/h unless otherwise noted

RCT Name(s) (Print) Joe Willey
Signature(s) *Joe Willey*
Supervisor or Designee (Print) J. A. Sublette
Signature *J. A. Sublette*
 Page 1 of 18 Survey Report No. N-14-0569 A-6002-686 (REV 9)

Instrument	RO-3B	GM Model	PAM	PAM	2360
Micro Rem		Probe	Probe	PROBE	Probe
Serial No.	ICEB3-0277	CMEBB-0022	ACBC1-0239	ACBC1-0087	SCILB-0947
Efficiency	N/A	DTEB9-0170	DTEB3-0964	DTEB3-0437	DTLLP-1076
		10%	16%	16%	10%

NOTE: If personal information is added to this survey that might cause distress, embarrassment, or risk identify theft, e.g., exposure data, medical data, payroll, or SSN, the RCT must add the words "OFFICIAL USE ONLY" on the bottom of each page and/or attachments. Ref. MSC-PRO-64603.



MSA RADIOLOGICAL SURVEY REPORT			DATE (MM/DD/YYYY)		TIME (START/STOP)		DOSE RATE MEASUREMENTS											
			10/13/2014		1230 / 1500		NOTE 1 F = Field (>30 cm) C = Contact (<1 cm)											
No.	Description	CONTAMINATION MEASUREMENTS						DOSE RATE MEASUREMENTS										
		Bkg cpm	Gross Direct cpm/PA	Total dpm/100 cm ²	Removable dpm/100 cm ²	Dist. Note cm	WC mR/hr	CF β	CF γ	Neutron Dose mrem/hr	Equiva- lent Dose to Skin mrem/hr	Equiva- lent Dose to Whole Body mrem/hr	Micro Rem µrem/hr					
		α	βγ	α	βγ	α	βγ	α	βγ	α	βγ	α	βγ	α	βγ	α	βγ	
1	Removable contamination survey and exposure survey. (see attachments)#1	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
2	Removable contamination survey and exposure survey. (see attachments)#2	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
3	Removable contamination survey and exposure survey. (see attachments)#3	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
4	Removable contamination survey and exposure survey. (see attachments)#4	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
5	Removable contamination survey and exposure survey. (see attachments)#5	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
6	Removable contamination survey and exposure survey. (see attachments)#6	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
7	Removable contamination survey and exposure survey. (see attachments)#7	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
8	Removable contamination survey and exposure survey. (see attachments)#8	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
9	Removable contamination survey and exposure survey. (see attachments)#9	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
10	Removable contamination survey and exposure survey. (see attachments)#10	168	1	N/A	N/A	N/A	N/A	<20	1,530	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
11	Removable contamination survey and exposure survey. (see attachments)#11	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
12	Removable contamination survey and exposure survey. (see attachments)#12	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
13	Removable contamination survey and exposure survey. (see attachments)#13	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
14	Removable contamination survey and exposure survey. (see attachments)#14	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
15	Removable contamination survey and exposure survey. (see attachments)#15	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
16	Removable contamination survey and exposure survey. (see attachments)#16	168	1	N/A	N/A	N/A	N/A	<20	<1,000	<20	<1,000	<0.1	3	1	<0.1	<0.1	<0.1	N/A
16	Comments (Additional information as necessary to interpret results)																	

Entry was made into the 105F Reactor building to perform radiological condition surveys and exposure surveys for future engineering inspections, animal intrusion inspection, media filming and tours. Inspection routes that had been previously established were followed and those were the only areas surveyed. No abnormalities were discovered, no High Radiation Area were discovered, one High Contamination Area was discovered posted on the ball washer on the 42' level (this believed to be behind the doors of the cabinet, this area is not on the inspection path). Three areas of removable contamination were discovered (see attached maps-#9, #25 & #36). Surveys were completed on 10/13/2014, delay in completion of survey approved by RCT Supervisor, JW

RWP No. N-261	Area/Bldg./Room/Location 105F/Reactor building	Facility Code N	Page 2 of 18	Survey Report No. N-14-0569	A-6002-696R (REV 9)
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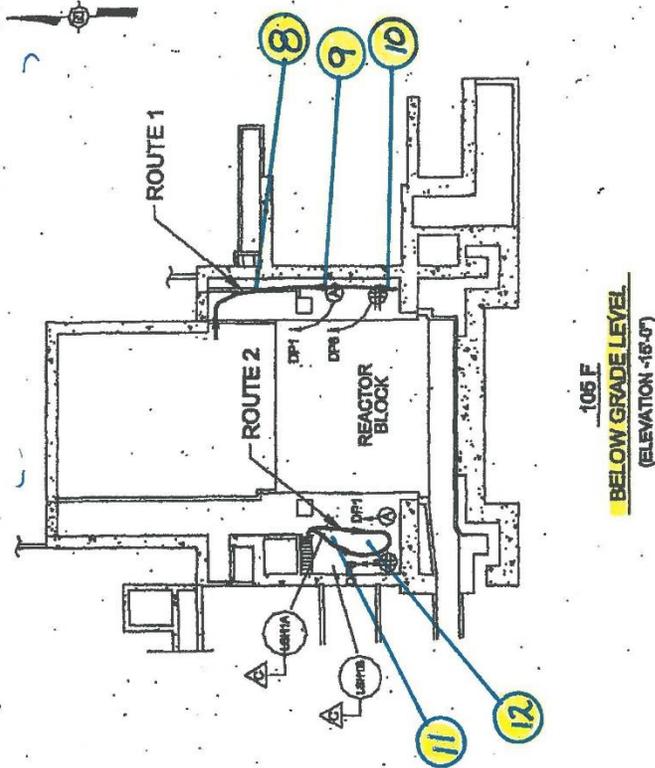
MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET		DATE (MM/DD/YYYY)	10/13/2014	TIME (START/STOP)	1230	/	1500										
No.	Description	CONTAMINATION MEASUREMENTS						DOSE RATE MEASUREMENTS									
		Bkg cpm	Gross Direct cpm/PA		Total dpm/100 cm ²		Removable dpm/100 cm ²	Dirt Note	WO mR/hr	WC mR/hr	CF β	CF γ	Neutron Dose mrem/hr	Equivalent Dose to Skin mrem/hr	Equivalent Dose to Whole Body mrem/hr	Micro Rem μrem/hr	
		α	βγ	α	βγ	α	βγ	α									
17	Removable contamination survey and exposure survey. (see attachments) #17	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
18	Removable contamination survey and exposure survey. (see attachments) #18	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
19	Removable contamination survey and exposure survey. (see attachments) #19	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
20	Removable contamination survey and exposure survey. (see attachments) #20	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
21	Removable contamination survey and exposure survey. (see attachments) #21	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
22	Removable contamination survey and exposure survey. (see attachments) #22	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
23	Removable contamination survey and exposure survey. (see attachments) #23	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
24	Removable contamination survey and exposure survey. (see attachments) #24	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
25	Removable contamination survey and exposure survey. (see attachments) #25	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
26	Removable contamination survey and exposure survey. (see attachments) #26	168	1	N/A	N/A	N/A	8,690	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
27	Removable contamination survey and exposure survey. (see attachments) #27	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
28	Removable contamination survey and exposure survey. (see attachments) #28	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
29	Removable contamination survey and exposure survey. (see attachments) #29	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
30	Removable contamination survey and exposure survey. (see attachments) #30	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
31	Removable contamination survey and exposure survey. (see attachments) #31	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
32	Removable contamination survey and exposure survey. (see attachments) #32	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
33	Removable contamination survey and exposure survey. (see attachments) #33	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
34	Removable contamination survey and exposure survey. (see attachments) #34	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A
35	Removable contamination survey and exposure survey. (see attachments) #35	168	1	N/A	N/A	N/A	<1,000	<20	F	<0.1	<0.1	3	1	N/A	<0.1	<0.1	N/A

Air Sample Measurements (dCi/m ³)				Sample Counter Log Number or Sample ID Number			
BZ	GA	Initial	Decay	BZ	GA	Initial	Decay
α ¹	X	9.8E-12	1.31E-13	β ¹	X	1.75E-11	2.99E-13
α ²	X	9.24E-12	4.58E-13	β ²	X	1.55E-11	7.71E-13

Page 3 of 18	FC	N	Survey Report No.	N-14-0569	A-6002-886.1 (REV 6)
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MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch

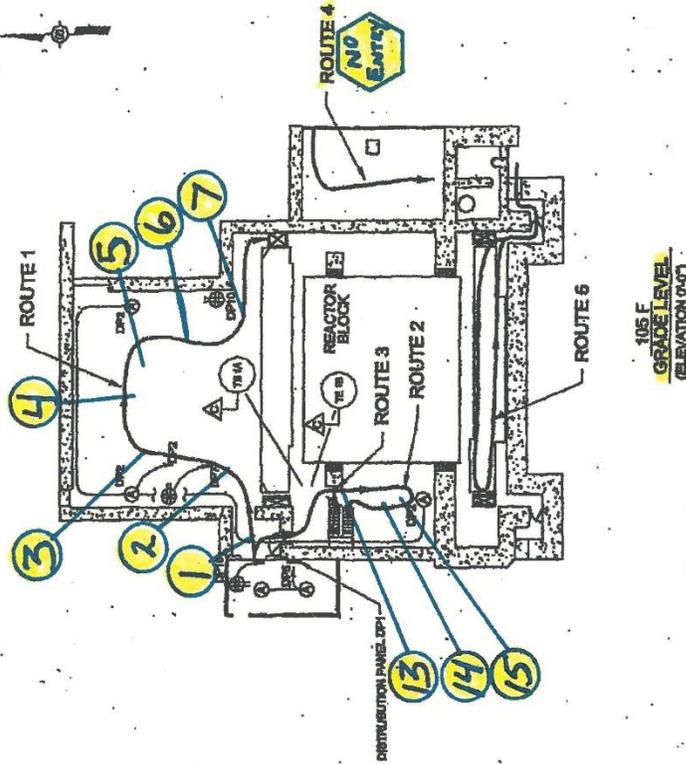
Figure 2-2. Surveillance and Inspection Routes (Elevation -15'-0"*)



<p>⊕ Smear</p> <p>△ Air Sample</p> <p>Ⓢ (designation inside)</p> <p>----- Radiological Area Boundary</p> <p>All dose rates are in mrem/hr, unless otherwise noted.</p>	<p>Ⓢ LAW</p> <p>Ⓢ Neutron</p>	<p>* Contact Reading</p>	<p>Page 5 of 18</p>	<p>FC N</p>	<p>Survey Report No. N-14-0569</p>	<p>A-6002-886.2 (REV 5)</p>
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MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch

Figure 2-1. Surveillance and Inspection Route (Elevation 0'-0").



- ④ Smear
- △ Air Sample (designation inside)
- ④ LAW
- ④ Neutron
- Radiological Area Boundary

* Contact Reading

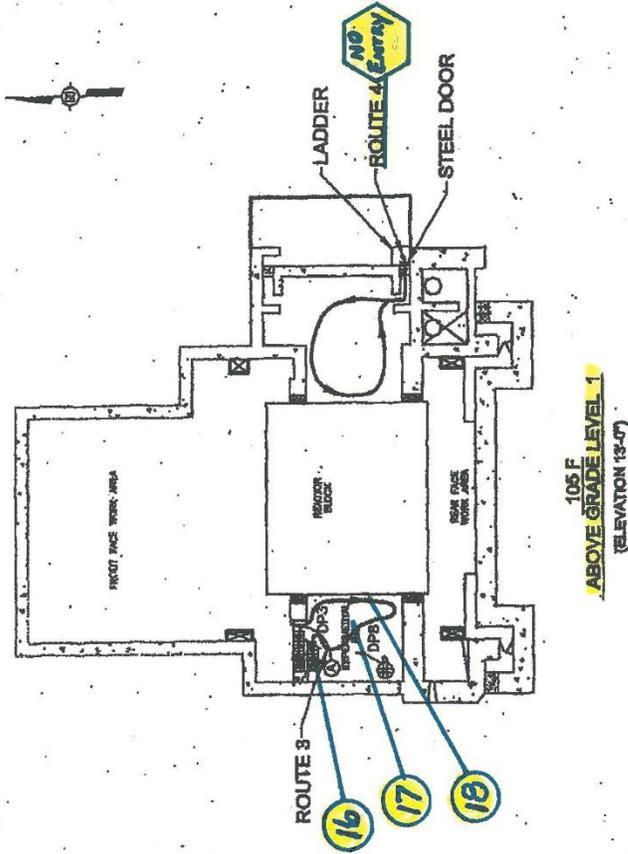
Page 6 of 18 FC N

Survey Report No. N-14-0569

A-6002-696.2 (REV 5)

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch

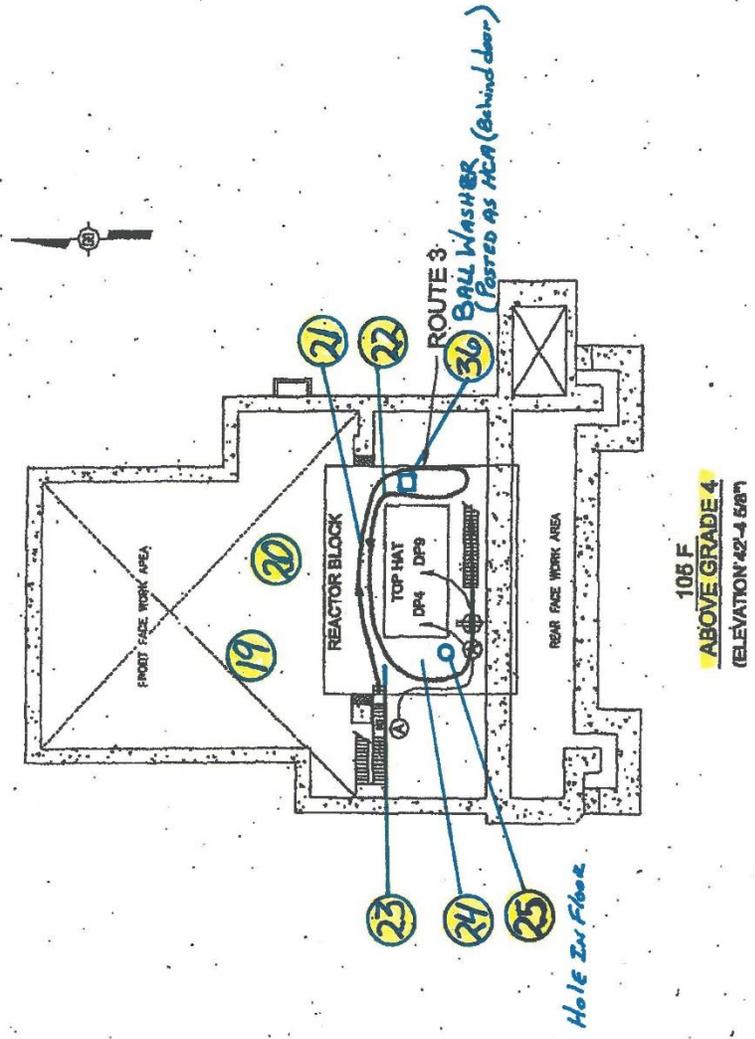
Figure 2-3. Surveillance and Inspection Routes (Elevation 13'-0").



<input checked="" type="checkbox"/> Smear <input checked="" type="checkbox"/> Air Sample (designation inside)	<input type="checkbox"/> LAW <input checked="" type="checkbox"/> Neutron	* Contact Reading	Page 7 of 18	Survey Report No. N-14-0569	A-6002-696.2 (REV 5)
----- Radiological Area Boundary All dose rates are in mrem/hr, unless otherwise noted.			FC N		

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch

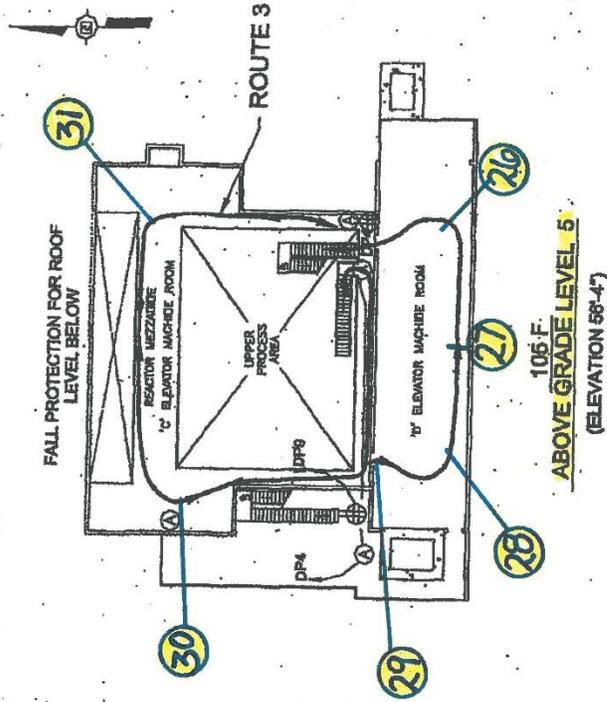
Figure 2-5: Surveillance and Inspection Route (Elevation 42'-4 1/2"').



<p> <input type="checkbox"/> Smear <input type="checkbox"/> (designation inside) All dose rates are in mrem/hr, unless otherwise noted. </p>	<p> <input type="checkbox"/> Air-Sample <input type="checkbox"/> LAW <input type="checkbox"/> Neutron </p>	<p> <input type="checkbox"/> Radiological Area Boundary </p>	<p> * Contact Reading </p>	<p> Page 8 of 18 FC N </p>	<p> Survey Report No. N-14-0569 </p>	<p> A-6002-898.2 (REV 5) </p>
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MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch

Figure 2-6. Surveillance and Inspection Route (Elevation 56'-4").



Smear Air Sample LAW Neutron
 (designation inside) (designated inside) Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

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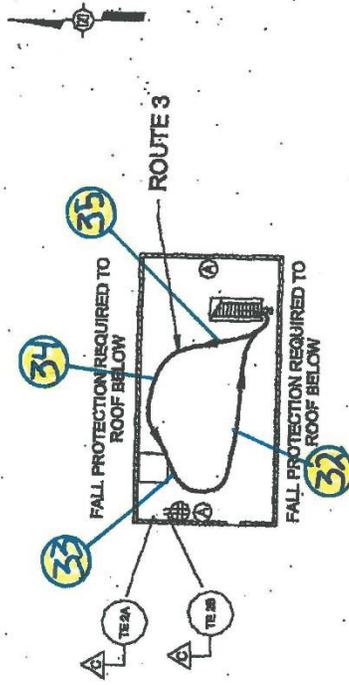
Survey Report No.

N-14-0569

A-6002-686.2 (REV 5)

MSA RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET - Map/Sketch

Figure 2-7. Surveillance and Inspection Route at Above Grade Level 7 (Elevation 80'-5 1/4").



Smear Air Sample LAW Neutron
 (designation inside) Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

* Contact Reading

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FC N

Survey Report No.

N-14-0569

A-8002-686.2 (REV 5)

MSA RADIOLOGICAL CONTROL ROUTINE AIR SAMPLE ANALYSIS RECORD

Counter Information: Alpha: SCLLA-0008/29282-18-2015 DTLIC-0005 0.37 / 2.974 0 / 10 MC408M/warehouse
 Instrument ID No./Model/Cal Expiration Detector ID No. E_c / CF N_g (counts)/T_g (min) R_g (cpm) Counter Location (i.e., Area/Facility/Room)
 Beta: SCLLA-0008/29282-18-2015 DTLIC-0005 0.40 / 2.481 448 / 10 MC408M/warehouse
 Instrument ID No./Model/Cal Expiration Detector ID No. E_c / CF N_g (counts)/T_g (min) R_g (cpm) Counter Location (i.e., Area/Facility/Room)

No.	Sampling Location or EHP Code, Instrument ID No., Sample Purpose	Sample Collected (Y/N/LP)	Fractional Collection Efficiency (FE)	ON: Date/Time/Flow Rate OFF: Date/Time/Flow Rate	DL (cpm)	T _g (min)	MDC (μCi/ml)	N _g (counts)	R _g (cpm)	Sample Conc. (μCi/ml)	α (μCi/ml)	DAC Fraction	RCT Signature & HID No.	Additional Sample ID
1	100F Vestibule initial count	V	0.9594	10/08/14 9:15 2.00 10/08/14 11:16 1.90	0.000 4.913	10	5.09E-14 1.76E-12	2.882 5.352	288.2 490.8	5.00E-11 8.95E-11	8.79E-13 1.33E-12	10.008 0.009	Joe Wiley H0009879 Joe Wiley H0009879	N/A
2	100F Vestibule decay count 1hr	V	0.9584	10/08/14 9:15 2.00 10/08/14 11:16 1.90	0.000 4.913	10	5.09E-14 1.76E-12	1.001 2.187	100.1 174.1	1.88E-11 3.04E-11	5.95E-13 8.95E-13	3.283 0.003	Joe Wiley H0009879 Joe Wiley H0009879	N/A
3	100F Vestibule decay count 2hr	V	0.9584	10/08/14 9:15 2.00 10/08/14 11:16 1.90	0.000 4.913	10	5.09E-14 1.76E-12	350 1.102	35.0 65.8	6.89E-12 1.14E-11	3.52E-13 8.86E-13	3.318 0.001	Joe Wiley H0009879 Joe Wiley H0009879	N/A
4	100F Vestibule decay count 3hr	V	0.9584	10/08/14 9:15 2.00 10/08/14 11:16 1.90	0.000 4.913	10	5.09E-14 1.76E-12	885 224	43.9 22.4	7.86E-12 4.21E-12	6.38E-13 2.87E-13	0.001 0.001	Joe Wiley H0009879 Joe Wiley H0009879	N/A
5	100F Vestibule decay count 4hr	V	0.9594	10/08/14 8:15 2.00 10/08/14 11:16 1.90	0.000 4.913	10	5.09E-14 1.76E-12	212 866	21.2 42.0	3.99E-12 7.33E-12	2.74E-13 6.32E-13	0.782 0.001	Joe Wiley H0009879 Joe Wiley H0009879	N/A
6	N/A													N/A
7														
8	DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION													
9	Name/Org: C. Grassom for Date: 10-7-15													
10	N/A													N/A

* If Recount, specify recount time. ** F = Fluoropon V = Vespene L-15 821

Definition:
 E_c = Fractional Collection Efficiency
 T_g = background counting interval
 N_g = Number of background counts recorded during background counting interval (T_g)
 R_g = Background counting rate (Nb/Tg)
 DL = Decision Level
 T_g = Sample Counting Time
 N_g = Gross Counts measured during sample counting time (T_g)
 MDC = Minimum Detectable Concentration

Air Sample pulled in vestibule prior to Reactor door being opened

α = Counting Error
 E_c = Instrument Counting efficiency (cpm/gpm)
 CF = Instrument correction factor (1/E_c)

DAC (μCi/ml) Value Used: α = 5.E-12 (Default = 5E-12) β = 1.E-08 (Default = 1E-8)

DAC Action Level = 0.1 (Default = 0.1)

Radiological Survey Report # N-14-0569 Page 11 of 18

Log Reviewed By (Print/Sign): P. Salas Date: 10/15/14

MSA Form JAL-AIR-001 (08/30)

MSA RADIOLOGICAL CONTROL ROUTINE AIR SAMPLE ANALYSIS RECORD

Counter Information: Alpha: SCLL4-0008/29292-18-2015 DTLLC-0005 0.37 / 2.674 1 / 10 1 of 1
 Instrument ID No./Model/Cal Expiration Detector ID No. R₀ (cpm) Counter Location (i.e., Area/Facility/Room)
 SCLL4-0008/29292-18-2015 DTLLC-0005 0.40 / 2.481 458 / 10 MCO406/Warehouse
 Instrument ID No./Model/Cal Expiration Detector ID No. R₀ (cpm) Counter Location (i.e., Area/Facility/Room)
 MCO406/Warehouse

No.	Sampling Location or EDP Code and Sample Purpose	Fractional Collection Efficiency (FVLEP)	Fractional Collection Efficiency (F)	ON: Date/Time/Flow Rate	OFF: Date/Time/Flow Rate	DL (cpm)	T ₀ (min)	MDC (μCi/m)	N ₀ (counts)	R ₀ (cpm)	Sample Conc. (μCi/m)	σ (μCi/m)	DAC Fraction	RCT Signature & HID No.	Additional Sample ID
1	100F Vestibule decay count (approx. 18hr)	V	0.9584	10/08/14 9:15	2.00	α 0.233	10	1.38E-13	82	8.1	1.52E-12	1.71E-13	0.802	Joe Wiley H0009979	N/A
2	100F Vestibule decay count 20hrs	V	0.9584	10/08/14 11:16	1.90	β 4.982	10	1.78E-12	635	16.0	3.14E-12	5.78E-13	0.000	Joe Wiley H0009979	N/A
3	100F Vestibule decay count 24hrs	V	0.9584	10/08/14 9:15	2.00	α 0.233	10	1.38E-13	71	7.0	1.32E-12	1.80E-13	0.283	Joe Wiley H0009979	N/A
4	100F Vestibule decay count	V	0.9584	10/08/14 11:16	1.90	β 4.982	10	1.78E-12	584	13.9	2.42E-12	5.68E-13	0.000	Joe Wiley H0009979	N/A
5	N/A			10/08/14 9:15	2.00	α 0.233	10	1.38E-13	48	4.7	8.04E-13	1.32E-13	0.177	Joe Wiley H0009979	N/A
6				10/08/14 11:16	1.90	β 4.982	10	1.78E-12	589	11.4	1.99E-12	5.59E-13	0.000	Joe Wiley H0009979	N/A
7				10/08/14 9:15	2.00	α 0.233	10	1.38E-13	39	3.8	7.14E-13	1.19E-13	0.448	Joe Wiley H0009979	N/A
8				10/08/14 11:16	1.90	β 4.982	10	1.78E-12	526	7.1	1.24E-12	5.48E-13	0.000	Joe Wiley H0009979	N/A
9															
10	N/A														N/A

10/8/14 - Air Sample pulled in vestibule prior to Reactor door being opened.

α = Counting Error (Default = 5E-12)
 E_c = Instrument Counting efficiency (cpm/cpm)
 CF = Instrument correction factor (1/E_c) (Default = 1E-9)

See MSC-13538 Section 6.2.7 for explanation of formulae used.

DOES NOT CONTAIN ²³⁵U, ²³⁸U, ²³⁹Pu, ²⁴⁰Pu
 OFFICIAL USE ONLY INFORMATION
 Name: Org: C. Braswell / SAS Date: 10-7-15

Log Reviewed By: (Print/Sign) _____ Date: _____

MSA-RC-SAL-AIR-001 (06/30)

MSA RADIOLOGICAL CONTROL ROUTINE AIR SAMPLE ANALYSIS RECORD

Counter Information: Air Sample Log No. (use room no.) Alt-N-101314 Page 1 of 1

Alpha: SCLL4-0008/29292-18-2015 DTLLC-0005 0.37 / 2.874 / 1 / 10 MCA086/Warehouse
 Instrument ID No./Model/Cal Expiration Detector ID No. DTLLC-0005 0.40 / 2.481 / 443 / 10 Counter Location (i.e., Area/Facility/Room)
 Beta: SCLL4-0008/29292-18-2015 DTLLC-0005 0.40 / 2.481 / 443 / 10 Counter Location (i.e., Area/Facility/Room)

No.	Sampling Location or EDP Code, Sample Purpose	Fractional Collection Efficiency (E _f)	DL (cpm)	T _b (min)	MDC (μCi/ml)	N _b (counts)	R _b (cpm)	Sample Conc. (μCi/ml)	α	DAC Fraction	RCT Signature & HID No.	Additional Sample ID
1	100F Vestibule with Reactor door open decay count	0.8884	α 0.223 β 4.898	α 10 β 10	α 8.82E-15 β 8.40E-14	α 147 β 801	α 14.6 β 35.8	α 1.31E-13 β 2.88E-13	α 1.09E-14 β 2.94E-14	α 0.028 β 0.000	<i>Joe Willey</i> Joe Willey 10009979	N/A
2	N/A											N/A
3												
4												
5												
6												
7												
8												
9												
10	N/A											N/A

* If Recount, specify recount time. ** F - Fluorine V - Vapor L - LB 821

Definition:
 E_f = Fractional Collection Efficiency
 T_b = background counting interval
 N_b = Number of background counts recorded during background counting interval (T_b)
 R_b = Background counting rate (NB/Tb)
 DL = Decision Level
 T_g = Sample Counting Time
 N_g = Gross Counts measured during sample counting time (T_g)
 MDC = Minimum Detectable Concentration

See MSC-13039 Section 6.2.7 for explanation of formulae used.

DAC (μCi/ml) Value Used:
 α = 5.E-12 (Default = 5E-12)
 β = 1.E-08 (Default = 1E-8)

α = Counting Error
 E_f = Instrument Counting efficiency (percent/cm)
 CF = Instrument correction factor (1/%)

DAC Action Level = 0.1 (Default = 0.1)
Radionuclide Survey
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Does Not Contain Information
 OFFICIAL USE ONLY INFORMATION

Name/Org: C. Braswell/bps Date: 10-7-15
 Log Reviewed By (Print/Sign): DA Shattler/DA Shattler Date: 10/15/15
 MSA-H... JAL-AIR-001 (06/30)

MSA RADIOLOGICAL CONTROL ROUTINE AIR SAMPLE ANALYSIS RECORD

Counter Information: Air Sample Log No. (MS-CAL-000000) ALP-N-101314 Page 1 of 1

Alpha: SCLLA-0008/2620/2-18-2015 DTLLC-0005 0.37 / 2.674 1 / 10 100F Support trailer
 Instrument ID No./Model/Cal Expiration Detector ID No. DTLLC-0005 0.10 0.10
 Beta: SCLLA-0008/2620/2-18-2015 DTLLC-0005 0.40 / 2.481 828 / 10 100F Support trailer
 Instrument ID No./Model/Cal Expiration Detector ID No. DTLLC-0005 52.80 52.80

No.	Sampling Location or EDP Code/Instrument ID No./Sample Package	Fractional Collection Efficiency (F _f)	ON: Date/Time/Flow Rate OFF: Date/Time/Flow Rate	DL (cpm)	T _g (min)	MDC (μCi/ml)	N _g (counts)	R _n (cpm)	Sample Conc. (μCi/ml)	σ (μCi/ml)	DAC Fraction	RCT Signature & HID No.	Additional Sample ID
1	100F Vestibule with Reactor door open Initial count	0.9584	10/11/14 7:00 2.00 10/13/14 10:10 2.00	α 0.233 β 5.346	10 5.32E-15 10 7.39E-14	12.797 23.884	1.279.8 2,315.6	8.24E-12 1.05E-11	8.17E-14 1.04E-13	1.668 0.002		<i>Joe Wiley</i> Joe Wiley/0009979	N/A
2	100F Vestibule with Reactor door open decay count	0.9584	10/11/14 7:00 2.00 10/13/14 10:10 2.00	α 0.233 β 5.346	10 5.32E-15 10 7.39E-14	1.338 3.086	133.7 257.0	9.66E-13 1.72E-12	2.64E-14 4.04E-14	0.183 0.000		<i>Joe Wiley</i> Joe Wiley/0009979	N/A
3	N/A			α β									N/A
4				α β									
5				α β									
6				α β									
7				α β									
8				α β									
9				α β									
10	N/A			α β									N/A

Definition: F_f = Fractional Collection Efficiency
 T_g = background counting interval
 N_g = Number of background counts recorded during background counting interval (T_g)
 R_n = Background counting rate (N_g/T_g)
 DL = Decision Level
 T_g = Sample Counting Time
 N_g = Gross Counts measured during sample counting time (T_g)
 MDC = Minimum Detectable Concentration

See ASC-13358 Section 5.2.7 for explanation of formulae used.

Log Reviewed By (Print/Sign): C. Braswell/SBS Date: 10-7-15

Log Reviewed By (Print/Sign): PA Schickel Date: 10/14/14

σ = Counting Error (Default = 5E-12)
 E_a = Instrument Counting efficiency (cpm/cpm)
 CF = Instrument correction factor (1/E_a)

DAC (μCi/ml) Value Used:
 α = 5.E-12 (Default = 5E-12)
 β = 1.E-08 (Default = 1E-9)

DAC Action Level = 0.1 (Default = 0.1)

MSA-RU-JAL-AIR-001 (08/30)

Radiochemical Survey
 Report # N-14-05169
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**DOES NOT CONTAIN
 OFFICIAL USE ONLY INFORMATION**

OFFICIAL USE ONLY - EXEMPTION 6

MSA RADIOLOGICAL CONTROL ROUTINE AIR SAMPLE ANALYSIS RECORD														
Counter Information:														
Alpha: SCLL4-0009/29292-18-2015 DTLLC-0005 0.37 / 2.874 1 / 10 0.10														
Instrument ID No./Model/Cal Expiration: MO-406/Warehouse Counter Location (i.e., Area/Facility/Room)														
Beta: SCLL4-0009/29292-18-2015 DTLLC-0005 0.40 / 2.481 480 / 10 48.00														
Instrument ID No./Model/Cal Expiration: MO-406/Warehouse Counter Location (i.e., Area/Facility/Room)														
No.	Sampling Location or EDP Code/Instrument ID No./Sample Purpose	Fractional Collection Efficiency (E _f)	ON: Date/Time/Flow Rate	OFF: Date/Time/Flow Rate	DL (cpm)	T _b (min)	MDC (μCi/ml)	N _b (counts)	R _n (cpm)	Sample Conc. (μCi/ml)	R _p (cpm)	DAC Fraction	RCT Signature & HID No.	Additional Sample ID
1	10SF Vestibule with Reactor door open decay count	0.9884	10/13/14 10:10 2.00	10/14/14 8:35 2.00	0.233	10	1.21E-14	378	37.7	6.22E-13	3.21E-14	0.128	Joe Wiley H0008979	N/A
2	10SF Vestibule with Reactor door open Initial count	0.9884	10/14/14 8:35 2.00	10/14/14 12:54 2.00	0.233	10	1.57E-13	1,312	65.2	1.30E-12	6.44E-14	0.006	Joe Wiley H0008979	N/A
3	10SF Vestibule with Reactor door open decay count	0.9884	10/13/14 10:10 2.00	10/14/14 8:35 2.00	0.233	10	1.21E-14	279	27.8	4.58E-13	2.78E-14	0.092	Joe Wiley H0008979	N/A
4	N/A													N/A
5														
6														
7														
8														
9														
10	N/A													N/A

DEFINITION:
 E_f = Fractional Collection Efficiency
 T_b = background counting interval
 N_b = Number of background counts recorded during background counting interval (T_b)
 R_n = Background counting rate (NB/T_b)
 DL = Decision Level
 T_g = Sample Counting Time
 N_g = Gross Counts measured during sample counting time (T_g)
 MDC = Minimum Detectable Concentration
 See MSC-13539 Section 6.2.7, for explanation of formulae used.

DAC (μCi/ml) Value Used:
 α = 5.E-12 (Default = 5E-12)
 β = 1.E-08 (Default = 1E-9)

σ = Counting Error
 E_c = Instrument Counting efficiency (cpm/cpm)
 CF = Instrument correction factor (1/E_c)

DAC (μCi/ml) Value Used: **17 of 18**
Radiological Survey
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Date: 10-7-15
 Log Reviewed By (Print/Sign): C. Braswell / gbt
 Date: 10/15/15

OFFICIAL USE ONLY - EXEMPTIONS

MSA-RC-SAL-AIR-001 (06/930)

MSA RADIOLOGICAL CONTROL LAPEL AIR SAMPLE (LAS) ANALYSIS RECORD

Counter Information: Sample Log No. (Lapel-PC-MMDPV) Lapel-N-101414 Page 1 of 1

Altor: SCLL8-094723802-13-15 DTLLP-1078 0.15 / 8.849 0 / 10 0.00 MO409Warehouse
 Instrument ID No./Model/Cal Expiration Detector ID No. DTLLP-1078 1107 / 10 110.70 Counter Location (i.e., Area/Facility/Room)
 Beta: SCLL8-094723802-13-15 DTLLP-1078 0.30 / 3.333 10 / 10 110.70 Counter Location (i.e., Area/Facility/Room)

No.	LAS ID No./Purpose	DATE/TIME LAS WORKY	WORKER NAME (Print)	WORKER HID No.	Sample Media* (V,F)	DN: Flow Rate (L/min) OFF: Flow Rate	PF	DL (ppm)	Sample T _g (min)	MD DAC-h	N _g (counts) / T _g (min)	DAC-h	Total DAC-h	Survey No.	RCT Signature #	HID
1	LAPEL 4145F-Rx entry	10/13/14 13:00	Joe Wiley	h0009979	V	4.0	1	α 0.000 β 7.740	10.0	0.73	0.0	0.00	0.00	N-14-0669	<i>Joe Wiley</i> Joe Wiley h0009979	
2	LAPEL 3659F-Rx entry	10/13/14 13:00	Tim Schwiesow	h7529538	V	4.0	1	α 0.000 β 7.740	10.0	0.73	0.0	0.00	0.00	N-14-0669	<i>Joe Wiley</i> Joe Wiley h0009979	
3	N/A															N/A
4																
5																
6																
7																
8																
9																
10	N/A															N/A

** If a record, specify account collection. ** V - Vapor F - Fluorine
 E_a = Instrument counting efficiency (cpm/dpm)
 CF = Inverse of counting efficiency (dpm/cpm)
 N_g = Number of background counts recorded during background counting interval (T_g)
 T_g = Background counting interval (min)
 T_s = Total time the lapel air sampler was run (min)
 T_e = Lapel air sample count time (min)
 N_g = Gross number of counts measured (sample + background)
 Flow rate = Start and ending flow rates of the lapel air sample (L/min)
 PF = Assigned protection factor for respiratory protection
 DAC = Derived Air Concentration (uCi/mL) from 10CFR855
 See MSC-13358 Section 6. for explanation of formulae used.*

DEFINITION:
 * If a record, specify account collection.
 ** V - Vapor F - Fluorine
 E_a = Instrument counting efficiency (cpm/dpm)
 CF = Inverse of counting efficiency (dpm/cpm)
 N_g = Number of background counts recorded during background counting interval (T_g)
 T_g = Background counting interval (min)
 T_s = Total time the lapel air sampler was run (min)
 T_e = Lapel air sample count time (min)
 N_g = Gross number of counts measured (sample + background)
 Flow rate = Start and ending flow rates of the lapel air sample (L/min)
 PF = Assigned protection factor for respiratory protection
 DAC = Derived Air Concentration (uCi/mL) from 10CFR855
 See MSC-13358 Section 6. for explanation of formulae used.

Two personnel wore lapel air samples notes argument, but do prove no airborne activity.

Official Use Only Information:
 Name/Org: C. Braswell fbs Date: 10-7-15
 Flowmeter ID No.: FR917 Cal Due: 11-27-14
 Date: 10-15-14 MSA-RC LAPEL-001 (06/30)

Radiochemical Survey
 Report # N-14-0529 Page 18 of 18
 DAC (uCi/mL) Value Used: α = 5.E-12 β = 1.E-08
 (Default = 5E-12)
 Bold underlined text is ≥ DAC-hour

OFFICIAL USE ONLY INFORMATION
 Log Reviewed By: PA Schuster / 10 Schup

Industrial Hygiene Report

The industrial hygienist conducted general-area, direct-reading instrument monitoring of the surveillance routes before additional personnel entered to complete surveillance activities. The monitoring was for carbon monoxide, flammable gas, oxygen, and volatile organic compounds.

**Mission Support Alliance, LLC
IH DRI Monitoring Survey**

Date: 05/28/2015, 02:45 PM

Survey ID: 14-60914 - air monitoring during reactor entry

Survey Date: 10/13/2014

Survey ID: 14-60914	Survey Date: 10/13/2014	Survey Status: Complete
Survey Title:	air monitoring during reactor entry	
Sample Plan:	IHSP-14-00165 - 100 areas Reactor entry DRI monitoring	
WO/Procedure:	n/a	
BHA:		
Requestor:	Land & Facilities Management	Project IH: Hurlbert, Chuck S
Surveyor:	Hokanson, Eric J	
Job Contact:	Yount, Jeremiah L	
Contact Phone:	(509)373-4778	Contact Cell Phone: (509)222-9136
Engineering Cntls:		Administrative Cntls:

Meteorology Data			
Standard Conditions:	Yes	Weather Date: 10/14/2014	Time:
Pressure:		Humidity:	Wind Speed:
Wind Direction:		Temperature:	

Comments
<p>The post survey was performed the following day due to equipment not being released from a rad zone.</p> <p>The readings were collected on each level as the initial assessment team performed a walk down of the F-reactor for the first time in 7 years.</p> <p>action limits / sampling plan VOC - 2PPM CO - 12.5 PPM O2 - <19.5 or >23 LEL - >10%</p>

Mission Support Alliance, LLC

Date: 05/28/2015, 02:45 PM

Survey ID: 14-60914 - air monitoring during reactor entry

Survey Date: 10/13/2014

Calibration

Instrument		Pre Use Function Test	Post Use Function Test
ID:	3978	Date: 10/13/2014	Date: 10/14/2014
Type:	MiniRAE 3000 RAE	Time: 0900	Time: 1300
Last Cal Date:	09/18/2014	Leak Check: Yes	By: Hurlbert, Chuck S
Next Due Cal Date:	10/18/2014	Battery Check: Yes	Location: Office
Lamp:	11.7 eV	By: Hurlbert, Chuck S	
Serial Number:	592-903129	Location: Office	
Sensor(s)		Pre Use Function Test	Post Use Function Test
Sensor:	MiniRAE 3000 RAE 11.7	As Found: 103.4	As Left: 108.0
Calibration Source:	Isobutylene	Adjusted To: N/A	
Lot Number:	1-244-65		
Manufacture Date:	10/24/2011		
Expiration Date:	10/31/2014		
Cal Source Value:	100 ppm		

Mission Support Alliance, LLC

Date: 05/28/2015, 02:45 PM

Survey ID: 14-60914 - air monitoring during reactor entry

Survey Date: 10/13/2014

Calibration

Instrument		Pre Use Function Test	Post Use Function Test
ID:	1521	Date: 10/13/2014	Date: 10/14/2014
Type:	TMX-412 ISC	Time: 0900	Time: 1300
Last Cal Date:	09/23/2014	Leak Check: Yes	By: Hurlbert, Chuck S
Next Due Cal Date:	10/23/2014	Battery Check: Yes	Location: Office
Lamp:	N/A	By: Hurlbert, Chuck S	
Serial Number:	0004057-154	Location: Office	
Sensor(s)		Pre Use Function Test	Post Use Function Test
Sensor:	TMX-412 ISC CO	As Found: 71	As Left: 70
Calibration Source:	Tri-Gas (CO)	Adjusted To: N/A	
Lot Number:	3-329-64		
Manufacture Date:	12/16/2013		
Expiration Date:	12/31/2016		
Cal Source Value:	70.0 ppm		
Sensor:	TMX-412 ISC H2S NA		
Sensor:	TMX-412 ISC LEL	As Found: 26	As Left: 26
Calibration Source:	Tri-Gas (Isopentane)	Adjusted To: N/A	
Lot Number:			
Manufacture Date:			
Expiration Date:			
Cal Source Value:			
Sensor:	TMX-412 ISC O2	As Found: 19.1	As Left: 19.1
Calibration Source:	Tri-Gas (O2)	Adjusted To: N/A	
Lot Number:			
Manufacture Date:			
Expiration Date:			
Cal Source Value:			

Mission Support Alliance, LLC

Date: 05/28/2015, 02:45 PM

Survey ID: 14-60914 - air monitoring during reactor entry

Survey Date: 10/13/2014

Readings

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	upon entering zone
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1300

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	In the middle of the main room on ground level
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1305

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	sub floor, east side of building
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1310

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	sub floor, west end of building
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1320

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	2nd floor on west end of building. 13ft level
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1325

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	3rd floor, 42 foot level
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1335

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	4th floor, 58 foot level
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed
Date/Time:	10/13/2014 1345

Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm

Reading Details:

Type:	Area
Zone - Location:	100F BLDG - 105F
Specific Location:	5th floor, 80 foot level
Status:	N/A
Activity:	Performed during initial entry of F-reactor, no work being performed

Date/Time:		10/13/2014 1355		
Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide		0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas		0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3978 - 11.7	Volatile Organic Compound		0.000 ppm	2 ppm
Reading Details:				

Field Information Verified By: Hokanson, Eric J

Date: October 20, 2014

Approved By: Hurlbert, Chuck S

Date: October 21, 2014

(The electronic approval indicated above acts as the authentication of this record on the above date)

Industrial Safety Report

The industrial safety professional conducted a safety inspection of the surveillance routes before additional personnel entered to complete surveillance activities.

105 F Reactor Initial Safety Inspection

On 13 Oct. 2014 MSA Safety team made initial entry into the 105 F for a safety inspection prior to any work to be completed for the 5 year reactor surveillance. This safety team consisted of 2 Radcon personnel, an Industrial Hygienist, and an Industrial Safety Professional. This report only covers the Industrial Safety Evaluation, and each item will be in a bullet for ease of understanding the issue and the location.

Below Grade Level:

- **North Vestibule-** Lamp burnt out. As a team we determined that based on the portable lights being used at the time of surveillance entries, there is plenty of light in this area and it was not worth the risk of putting an electrician in to re-lamp one light. There is concrete spawling on the steps leading into this basement area. (Photo 1)

Ground Level:

- The ground level was found to be clear. There are 4 holes along the vestibule side wall which are large enough for a foot. They are off of the walk path but worth noting. (Photo 2)

13' Elevation:

- Opening to floor below, delineated with danger tape far away from actual fall hazard.
- 6 to 8 inch lip that is just off of the grating, identified with yellow paint.

42' Elevation ("Top Hat"):

- Rise on top steps of bridge are taller than normal making this small stair case ununiformed.
- Speed rail extends out past bridge when crossing onto the "top hat" area. Rail padded and covered in Red "Danger" tape. (Photo 3)
- "Top hat" floor has approx. 1" rib at seam posing a tripping hazard (Painted Orange). (Photo 4)

56' Elevation:

- Concrete spawling on stairs leading up to this level from the 42' elevation. Step is still sturdy and identified with green paint.

80' Elevation:

- Low hanging beam at top of the stairs posing a struck against hazard. Roof is very low in several areas on this level as well.

In summary, this reactor is very dusty (dirty) in certain areas especially in basement areas of Route 1, Route 2, and 42 Ft. (Top Hat) level. Hand rails are very dirty as well with areas of Bat feces. There are areas throughout the building with spots of Bat feces, but the entire building is not covered. Lighting is adequate, but not ideal for a detailed inspection, it is recommended to use head lamps and flashlights.

Photo 1



Photo 2



Photo 3



Photo 4



Structural Inspection Report

A team of engineers performed an inspection to determine the SSE conditions and structural adequacy. The rear face/discharge elevator was entered for the inspection.



Mr. Rick Moren
Director of Long-Term Stewardship
Mission Support Alliance, LLC
P.O. Box 650
Richland, WA 99352

Dear Mr. Moren,

SUBJECT: Contract 54024; 105-F Reactor Structural Engineering Inspection Report

References:

- 1) DOE/RL-2003-45 Rev 0, Surveillance and Maintenance Plan for the 105-F Reactor Safe Storage Enclosure
- 2) MSA Work Package 2M-64026/C - F Reactor - Perform 5 Year Surveillance and Maintenance
- 3) WCH-308 Rev 0., 105-F Safe Storage Enclosure, Five Year Surveillance in August 2008
- 4) WCH Work Package SMU-07-12-17-001 from August 2008 Inspection

This letter and report package is provided as deliverable #5 of the subject contract as part of the 105-F Interim Safe Storage (ISS) Building Surveillance / Inspections that was performed on Oct 14 through Oct 23, 2014. In accordance with references 1 and 2, an inspection was performed to determine the Safe Storage Enclosure (SSE) conditions and structural adequacy under ISS. An exterior and interior visual inspection of the SSE was performed. The surveillance routes used were as noted in Reference 1 with some limitations and the same routes as were used in the prior inspection. Polestar's evaluation the significant items from the inspection data is described in Attachment A.

The inspections, assessment and any evaluations were performed by a team consisting of: Jaimie Ryan, Field Engineer; Tom Rodovsky, PE; Mike Custer, PE; and Mark Morton, PE. Not every person participated in each activity, but this team was engaged / available for each SSE inspection.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects. There is one section of the west SSE concrete wall that will be quantitatively monitored / measured based on this inspection to assure that no future changes are observed or, if observed, can be evaluated on a quantitative basis.

Recommendations from the 2014 105-F SSE inspection fall into four categories:

1. SSE Structure – There are a few specific inspections noted in Attachment A and C that are recommended to continue to demonstrate the continued stability of the SSE. To summarize:



- Attachment A, item number A.1 includes a recommendation for the continued inspection of the North-South concrete beam in the ceiling of the west side -15ft elevation room shown on Attachment C-1 photo 3028.
 - Attachment A, Item number A.2 considers small openings in the siding / flashing - Consideration should be given to instituting a corrective maintenance program to close small openings at the siding / roofing junction points, exterior and interior siding vertical corners, siding to concrete flashing junctions and the end of roof ridges that are currently suspected access points for bats and small birds.
 - Attachment A, Item number A.3 includes a recommendation to monitor the SSE wall cracks with every internal entry (i.e., take measurements on crack monitoring gauges F-1 and F-2).
 - Attachment A, item number B.1 includes a recommendation that the SSE closure patch at the fixed contamination point on the south side of the SSE be inspected from the outside with each SSE 5 year inspection for any change in physical or radiological conditions.
2. Future inspection of surveillance routes – Conditional recommendations for access to Routes 4 and 5 are as follow;
- i. Access for Route 4 is recommended:
 - a) Prior to moving to significantly longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started, or
 - b) If there is evidence of a large bat or other biota roosting issue in the other parts of the structure which may indicate that the Route 4 spaces may be vulnerable to that same condition.
 - ii. Access for Route 5 is recommended:
 - a) If the contamination spot noted at the south facing side of the building changes (higher counts or indication of plug failure), or
 - b) If the downspout landing drainage below the 3 down spouts on the south side of the building show evidence of subsidence indicating some underground movement, possibly into the below grade areas of the rear face area, or
 - c) Prior to moving to significantly longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started.
3. S&M Plan (Ref. 1) – Based on conflicts between the conditions in the field and the information in Ref 1, it is recommended that S&M Plan be revised – in the near term to capture current accessible conditions and rationale for inspecting the various inspection routes. Specifically:
- i. Add a requirement to record data from the F-1 and F-2 crack monitors every time the SSE is opened for access.
 - ii. The +20 ft. elevation on West side of graphite block does not exist but is indicated as part of Route 3. This map should be removed from the S&M Plan (Ref. 1).



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- iii. The S&M Plan should be modified to reflect actual physical conditions for Route 4 and 5 and to call out when the routes would be expected to be inspected.
- iv. When these modifications are undertaken, consideration should be given to updating all of the maps and SSE footprint to match field observations for the 105-F SSE. The recommended modifications would not necessarily change the main surveillance routes, but would more accurately show the physical layout.

ATTACHMENTS – Attachment A is an assessment of the data collected and results of the SSE inspections completed in October 2014. Attachment B condenses the Attachment A information into a high level synopsis and a format suitable for direct inclusion into the MSA 2014 105-F SSE Inspection document.

Available photos from the earlier inspection in 2008 and similar view, new photos are contained in Attachments C and D. The outcome from the October 2014 inspection, as detailed in Attachment C and D, fall into three categories that are recommended to form the basis for the next 105-F SSE inspection.

- (a) Attachment C includes Reference 3 items that were re-inspected in October 2014 and recommended to continue on the inspection / recommended maintenance list for future action;
- (b) Attachment C also includes newly identified items from October 2014 that require future inspection or maintenance action.
- (c) Attachment D includes new photos and Reference 3 items that were observed either specifically or generally in October 2014 and are not required for future inspections but are preserved herein for possible comparisons in future 105-F SSE inspections.

We are pleased to provide these inspection and reporting services to MSA and request that you contact me at 509-946-8279 if you have any questions concerning this report letter and attachments.

Kind regards,

A handwritten signature in black ink, appearing to read "Mark R Morton".

Mark R Morton PE
ISS Support Project Manager



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May 29, 2015

cc: Finney, S – MSA Procurement
Bailey, P
Miller, K
Morton, M
File / LB

Enclosure(s)

Attachment A – ASSESSMENT OF INSPECTION DATA
Attachment B - 105-F BUILDING INSPECTION REPORT INSERT FOR MSA
Attachment C – 105-F SSE INSPECTION RESULTS – Future Inspections
Attachment D – 105-F SSE INSPECTION RESULTS – Historic Record

601 Williams Blvd,
Suite 4
Richland, WA 99354

www.polestartechnicalservices.com

Office: 509-946-8279

Page 4



Attachment A – ASSESSMENT OF INSPECTION DATA

- A. **Interior Conditions** – three items are noteworthy from the interior SSE inspection and are discussed below. Items 1 and 3 are of a structural nature and results in recommendations for continued monitoring with each SSE entry.
1. The North -South Concrete Horizontal Beam visible from the -15 ft. room - This beam was noted in the 2008 inspection report as having a surface crack at the bottom edge. While the exact crack from the 2008 report was not positively located, a number of surface cracks were seen with this inspection as well as a patched piece of the bottom of the beam, part of which is spalling off. This could have been evidence that the beam was sagging, but further investigation and photo evidence showed that no cracking at the poured in place beam / bottom side of the 0 foot elevation floor slab can be seen. And there was no evidence or cracking or separation of the beam from the vertical columns at either the North or South ends of this beam. Based on this further investigation, the beam is determined to be sound but should be kept on the structural inspection list for future inspections. This area is shown on Attachment C-1, Item 1 and photo 3028.
 2. Observation of SSE metal sheathing at the 56' and 80' levels showed multiple openings at junction points where outside light could be seen – evidence of a possible access point for small birds, bats, insects, spiders, etc. While not every pinpoint of outside light is big enough for bird or bat access, there is ample evidence of some bats being in the structure. If any closure of these openings is considered, timing is an issue with the biological team, but a program of maintenance may be recommended to close off the identifiable openings with a wire mesh or metal fabric from the outside. Adhesive or self-tapping screws with a non-corrosive metal mesh or metal fabric would seem to provide an effective and fast way to inhibit further entries, this approach would presumably use an articulated man-lift of significant size. Additionally, consideration for galvanic corrosion with the galvalum roof / siding materials must be accounted for when selecting a material for closure. The area shown in Attachment C-5, Items 31-34 and photo 3087 are typical instances. Scheduling of any maintenance program should be considered based on the Ref 4 input, and is recommended to be completed prior to extending the SSE surveillance periodicity.
 3. West wall exterior wall patch:
 CONDITION - Through and above the South end of the vestibule structure is what appears to be a full penetration patch (visible inside and outside) in the SSE wall that is cracking away from the base concrete material of the shield wall. This patch is approximate 18 inches wide and at least 35 feet in length (high). This area is shown in Attachment C-2, Item 20A and in Attachment C-6 Item 57.
 INVESTIGATION – This area was identified as a “Clean SSE detail” in the Ref 2 and the quality of the available photos is not good enough to determine if there was a crack at this location or not. Exactly why the crack appears now or was not identified earlier is unknown. Follow up re-inspection of the area on 10/20/14 noted that there is a very



small crack in the base SSE concrete wall starting at each of the lower corners of the infill at approximately 45 degree angles as shown below.

May 2015 update - Similar infills and cracks have been identified at both 105-D and 105-B (i.e., all of the original construction (1943) reactor buildings), along and below this infill. This confirms that this is not a demolition related or SSE construction issue.



Figure 1 – Crack Locations at top of stairs (after affixing Crack Monitors on 10/23/14)

ASSESSMENT / ACTION – The fact similar infills / patches appear at all three original production reactor buildings indicates a common purpose (unknown) and design of the infill at some previous point in the facilities life span. This fact also eliminates any concern these cracks were caused by demolition of portions of the reactor building and or construction loading from the SSE.

To confirm that no significant movement is still occurring (or to quantify any future movement) a crack monitoring gauge was affixed on each crack as part of this inspection effort. Initial readings on both gauges (F-1 on the north side and F-2 on the south as shown in Figure 1 above and Attachment C-2 photos 3119, 3124, 3125) was 0-0 as shown. These readings are documented on the close-up photos of F-1 and F-2 shown in Figure 2 following affixing the crack monitors to the concrete wall with epoxy. Photos of the exterior area above the vestibule (similar to Attachment C-6, item 57 and photo 3015) are recommended on the annual inspection and it is strongly recommended that on every subsequent interior surveillance inspection collect and record the readings on these monitors to ensure that this is a stable situation or to quantify any current movement.



Figure 2 – Affixed Crack Monitors F-2 and F-1 (some parallax is evident in the photos, but straight on flash photos are unusable because of the glare of the flash on smooth plastic surfaces)

- B. Exterior Conditions** – Several areas of spalled concrete showed evidence of being patched after the 2008 inspection. Most noticeable was the Northeast corner of the building and the end of the wall that makes up the North wall of the vestibule. Most of this patching covered some exposed rebar and now appears sound, a few areas of the patch near the vestibule are already separated or fallen away. These are only cosmetic items, i.e., of no structural concern. In addition, there are three other items of note were observed and investigated;
1. Fixed Contamination Area (FCA-F-0001) outside of rear face / D elevator area is covered in detail in the Radiological discussion. The concern from an SSE perspective is the potential degradation or failure of the patch causing a potential release path to the environment. The contamination is at a concrete patch, may be in a pipe – but the presence of a pipe is not confirmed. The patch appears to tightly adhere to the base concrete material in the area. This area is shown in Attachment C-6, Item 60-A.
 - i. Annual external radiological surveys will monitor FCA-F-0001, if any increase is noted in the annual survey, recommend that the patch be inspected for degradation at that time and corrective action be considered if changes are noted.
 - ii. This area is recommended to be added to the structural inspection list for future inspection.
 2. In 2008 various exterior locations were noted to have exposed re-bar. In every observed case, this rebar has been painted black since the 2008 pictures were taken. In a few locations (just North of the vestibule on the exterior front face wall), rebar was cut off and the bare ends painted as above. Exposed (and now painted) rebar was observed at a number of locations (outside corners) damaged in the demolition process – each observation showed the rebar to be in good to very good condition.
- C. Surveillance Routes**
1. Route 3 – The +20 ft. elevation on West side of graphite block does not exist but is indicated as part of Route 3. This map should be removed from the S&M Plan (Ref. 1). The +13 foot elevation floor plan should show Route 3 on the west side of the block, Route 4 on the East side of the block. This was confirmed in the field, and very close inspection of the +20 foot map in the S&M Plan show rooms having exactly the same



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- names and electrical equipment noted on both the +13 and +20 foot floor plans on the east side of the block.
2. Routes 4 and 5 – No entry and Route 4 and 5 were not accessed nor were these areas entered in the 2008 inspection since there is no reasonable door / personnel access into these spaces.
 - i. For Route 4 - The area of the “man door knock out” shown on H-1-87254 SHT01 was inspected, but no evidence was noted that this area is any different from the rest of the surrounding East elevation siding. Exterior inspection of the roof, siding and flashings in this area and the part of Route 1 (below grade east of the block under part of the former control room) showed no signs for concern.
 - ii. For Route 5 – Inspections of the exterior wall of the rear face space (south side of the SSE) and Route 3 at elevation 56’ showed no signs for concern with the integrity of the concrete envelope of the rear face / D elevator area.
 - iii. Two potential changes in the SSE or S&M Program could support a future recommendation to install a door or opening for access to Route 4: (a) Moving to longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started, (b) Evidence of a large bat or other biota roosting issue in the other parts of the structure would indicate that these spaces may be vulnerable to that same condition.
 - iv. Three potential changes could support a future recommendation for inspection of Route 5: (a) The contamination spot noted in Item B.1 above changes (higher counts or indication of plug failure), or (b) The downspout landing drainage below the 3 down spouts on the South side of the building show evidence of subsidence indicating some underground movement, possibly into the below grade areas of the rear face area. (c) Moving to longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started.
 3. Since the conditions noted in 2.i and 2.ii above are similar to other areas of the SSE that were inspected inside and out without significant issues, it is reasonable to reach a conclusion that the interiors of these spaces is acceptable at this point in time.
 4. S&M Plan revision should also include a revision of building and surveillance route maps to match the “as found” conditions of the building. One particular item of note is shown in Figure 2-6 from Ref 1 below.



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Attachment B - 105-F BUILDING INSPECTION REPORT INSERT FOR MSA

2.3.1 STRUCTURAL INTEGRITY – Appendix X and Appendix X+1 provides the record of the inspection, discussion, pictures, and checklist of the structural inspection of the interior and exterior of the structure.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects. There is one section of the west SSE concrete wall that will be quantitatively monitored / measured based on this inspection to assure that no future changes are observed, or if observed can be evaluated on a quantitative basis.

Recommendations - Recommendations from the 2014 105-F SSE inspection are in four categories:

1. SSE Structure – address numerous small openings in the steel siding prior to extending the time between inspections.
2. SSE Structure – annually visually monitor the crack above the vestibule and compare to earlier photos.
3. SSE Structure – record crack monitor quantitative information with each SSE entry in the future and evaluate building movement if any reading other than 0 – 0 is observed.
4. Include annual visual monitoring and quantitative record crack monitor readings (items 2 and 3 above) in the S&M Plan requirements when revised.
5. Future use of surveillance routes and S&M Plan revision should be considered to reflect actual conditions / maps in the SSE and to provide guidance when and how Routes 4 and 5 shown in the S&M Plan should be used.



C 105 F SSE Inspection Results – For Further Consideration

This section presents the Surveillance photos for areas which require continued monitoring as identified in the April 2015 inspection and the inspection documented in WCH-308 from 2008.

Each elevation of the building with concerns is a separate section of this attachment and includes

1. a map showing the photo locations
2. a portion of the inspection table that applies to that elevation and
3. comparison photos from 2008 to 2015 (when available)

When a new area of concern is identified within the area covered in a particular section, the new area will be listed in the location table and photo(s) will be provided. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

If there is no particular area/item for concern on any given elevation, no map or table will be included in this section.

Contents

C 105 F SSE Inspection Results – For Further Consideration 1

 C-1 – 15ft Elevation Map 2

 C-1 - Summary Table & Photos -15' 3

 C-2 – At Grade Interior Map 4

 C-2 – Summary Table & Photos Elevation 0’ – Interior..... 5

 C-3 – Elevation 20ft Map 11

 C-3 –Summary Table Elevation 20’ 11

 C-4– Elevation 42’ Map 12

 C-4 – Summary Table & Photos Elevation 42’ 13

 C-5 – Elevation 56’ Map 14

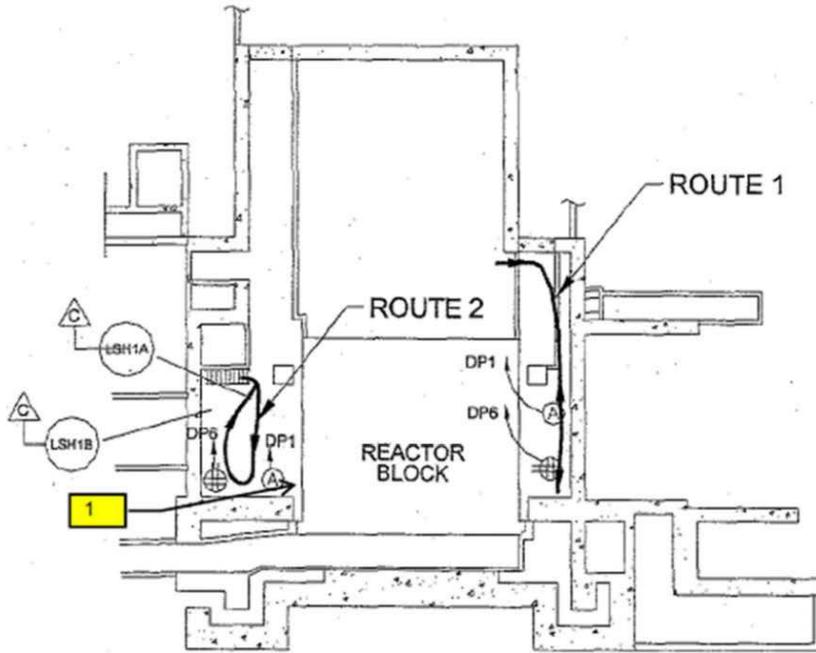
 C-5 – Summary Table & Photos Elevation 56’ 15

 C-6 – Exterior Map 19

 C-6 – Summary Table & Photos Elevation 0’ - Exterior..... 20



C-1 – 15ft Elevation Map

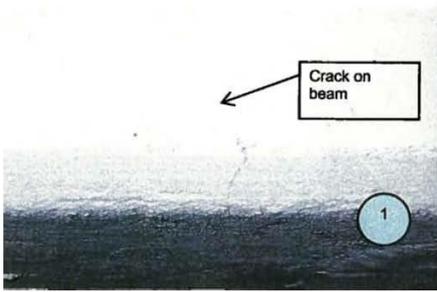


105 F
BELOW GRADE LEVEL
(ELEVATION -15'-0")



C-1 - Summary Table & Photos -15'

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
1	3020 3028 3093	Cracked Concrete Beam	-15' west wall	Beam has been painted since last surveillance. Originally pictured crack in beam unverifiable. Evidence of spalling on underside of beam. Beam to ceiling joint intact. No indication of sagging of beam Recommend continuing observation



2008



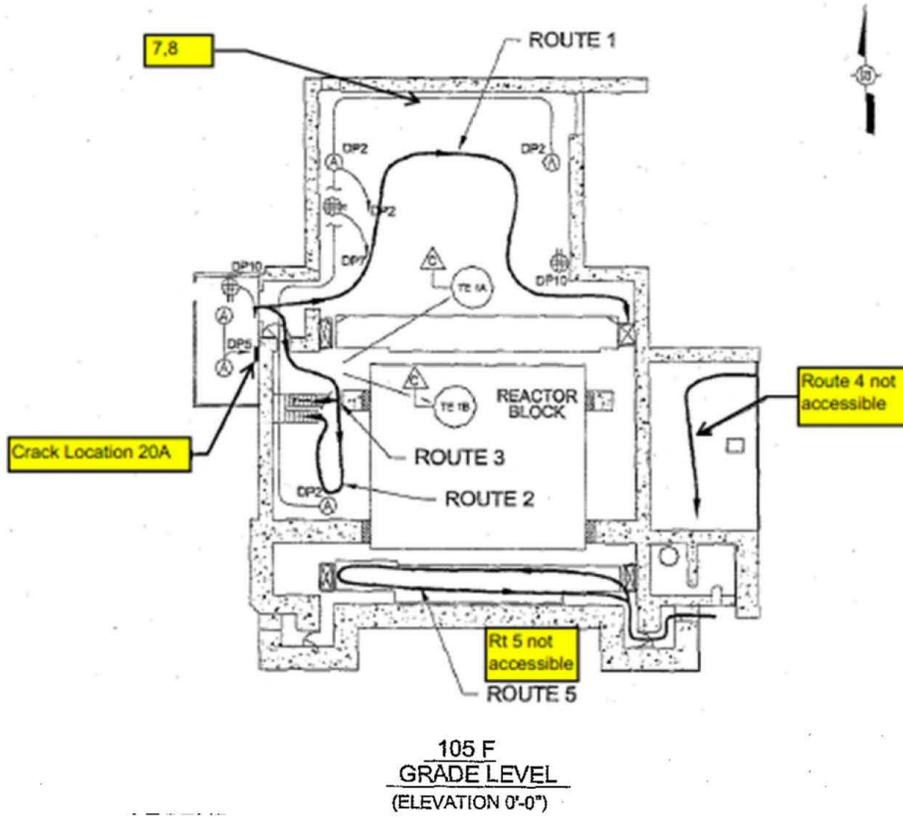
3020 Originally pictured crack in beam unverifiable. Evidence of spalling on underside of beam. Beam to ceiling joint intact. No indication of sagging of beam



3028 Underside of Beam



C-2 – At Grade Interior Map





C-2 – Summary Table & Photos Elevation 0' – Interior

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
7 8	3030* 3031 3032 3033	Cracked concrete floor	0' west wall	No significant change since 2008 Recommend continuing observation
20A	2981 2982 2983 2984 3104 3119 3124 3125	Interior building details	0' west wall	See location #57. Interior view of concrete pourback that shows crack on exterior. The evidence found (interior components bolted to infill concrete, chemical deposits around interior cracks) indicates that this is an old issue that is just being investigated. A crack movement gauge was installed on each crack as part of this inspection effort. This area should remain on the annual exterior inspection and 5 year surveillance inspection to ensure that it is in fact a stable situation and water in-leakage to the SSE or just above the power panel in the vestibule does not become an issue.



3032 No significant change since 2008



3033



3031 No significant change since 2008.



2014 Photo # 3107



2981 Crack about 5 ft off floor



2982 Crack about 8 ft off floor



2983 Wide shot for perspective



C-8

D-68



2014 Photo # 2984 Crack about 12 ft off floor



2014 Photos # 3124, 3125, 3119 As installed Crack Monitors at interior bottom corners of the infill



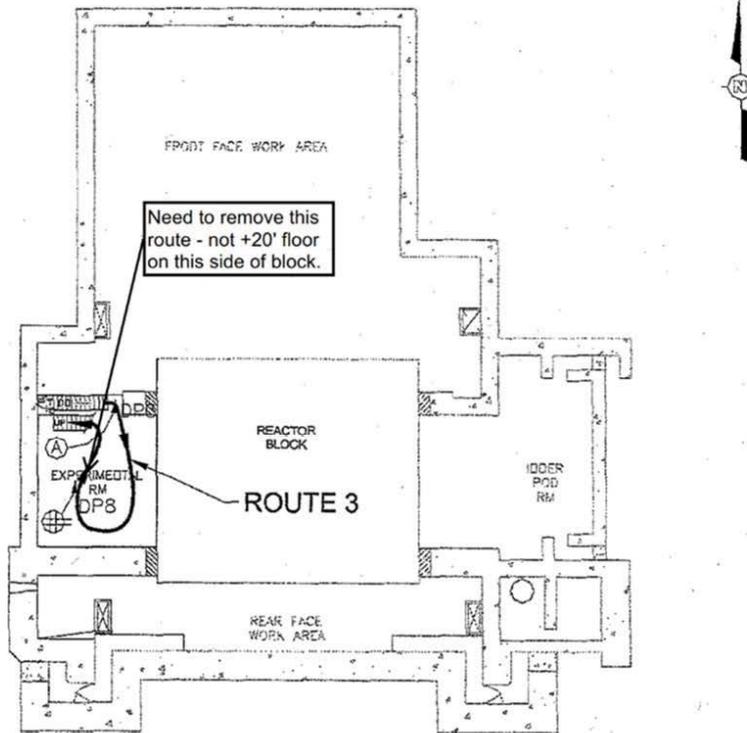
2014 Photo # 3104 Above electrical panel in vestibule

C-10

D-70



C-3 – Elevation 20ft Map



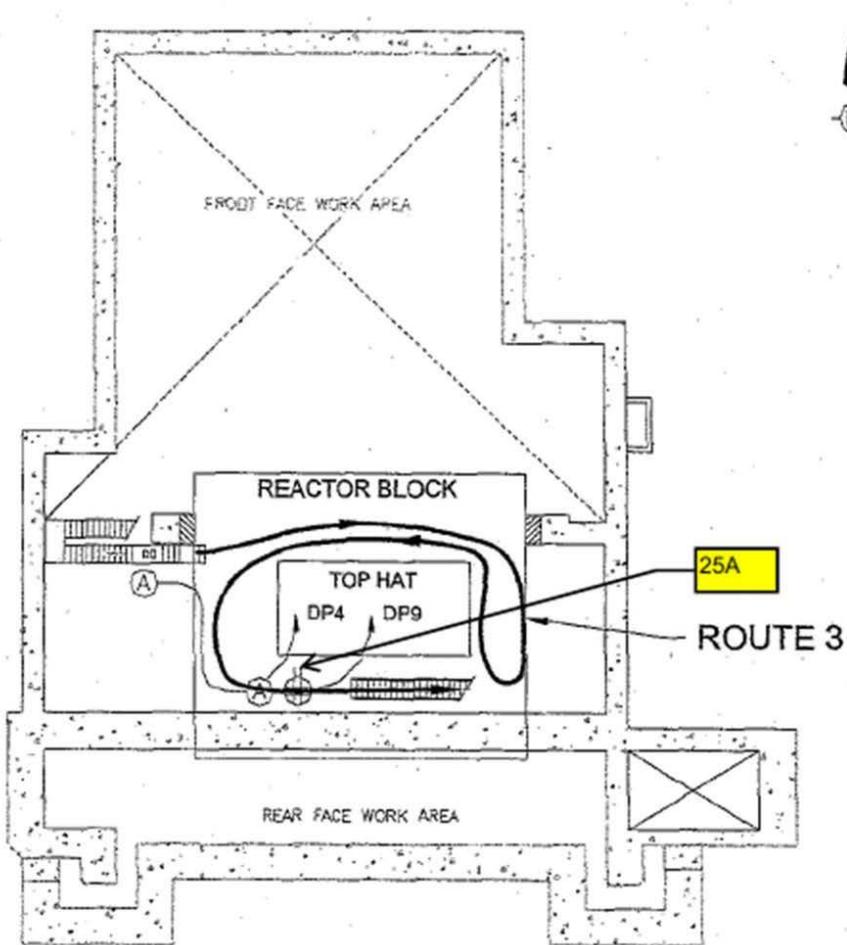
105 F
ABOVE GRADE 2
(ELEVATION 20'-9")

C-3 – Summary Table Elevation 20'

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
				This map is example of why current Surveillance and Maintenance plan DOE-RL 2003-45 should be updated. Current existing building conditions not accurately reflected in surveillance routes.



C-4—Elevation 42' Map



105 F
ABOVE GRADE 4
(ELEVATION 42'-4 5/8")



C-4 – Summary Table & Photos Elevation 42'

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
25A	3049	Interior building detail	42'4 5/8"	Fixed contamination spot on SW corner next to top hat. Add to surveillance Recommend continuing observation.

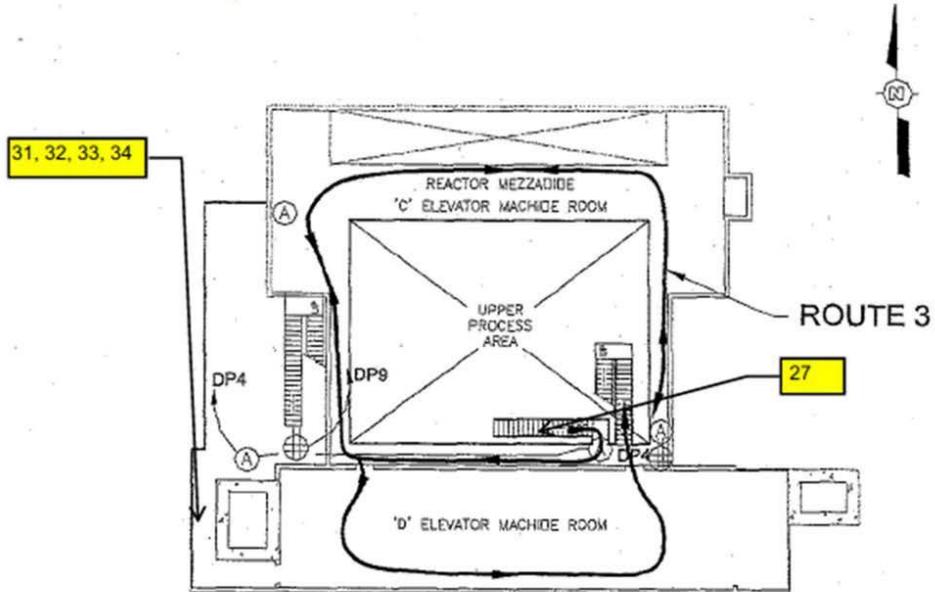
NEW ITEM 25A



3049 25A Contamination spot on SW corner next to top hat on floor



C-5 – Elevation 56' Map



105 F
ABOVE GRADE LEVEL 5
(ELEVATION 56'-4")



C-5 – Summary Table & Photos Elevation 56'

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
27	3050 3051 3052	Stairs	42'4 5/8"	Safety and structural inspection concur stair is acceptable. Tread measures 10 ½ x 29 ½ x 2 ½ if tread replacement is ever planned Recommend continuing observation.
31 32 33 34	3087	Interior building detail - ISS Wall gaps	56'4" wall	Markup of photo 3087 showing 6 bright spots (outside light in 1 – large, 2- medium and 3-small spots) which are SSE openings to the outside for bat intrusion along one vertical to sloped siding junction. This photo is from the D Elevator area, 56' elevation, and looking west. This particular location shows a bit higher density of openings, but is somewhat typical of various sizes of openings that were observed at the 56' and 80' elevations. Recommend continuing observation



3050 No change since 2008. Safety and structural inspection concur stair is acceptable. Tread measures 10 ½ x 29 ½ x 2 ½ if tread replacement is ever planned.

C-15

D-75



3051



3052 No change since 2008. Safety and structural inspection concur stair is acceptable. Tread measures $10 \frac{1}{2} \times 29 \frac{1}{2} \times 2 \frac{1}{2}$ if tread replacement is ever planned.



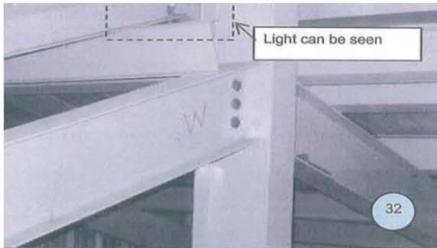
C-16

D-76



2014 Photo # 3087

Markup of photo 3087 showing 6 bright spots (outside light in 1 – large, 2- medium and 3-small spots) which are SSE openings to the outside for bat intrusion along one vertical to sloped siding junction. This photo is from the D Elevator area, 56' elevation, and looking west. This particular location shows a bit higher density of openings, but is somewhat typical of various sizes of openings that were observed at the 56' and 80' elevations.

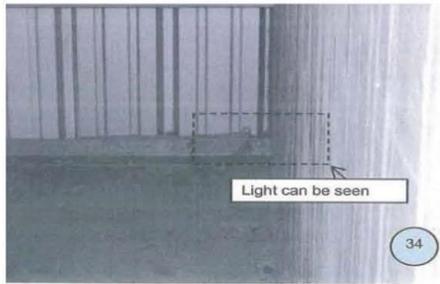
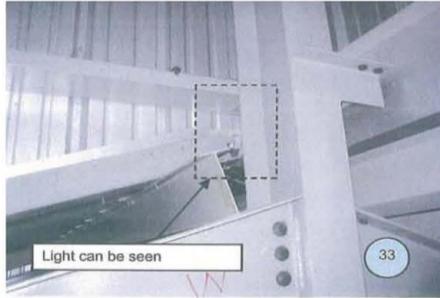


C-17

D-77



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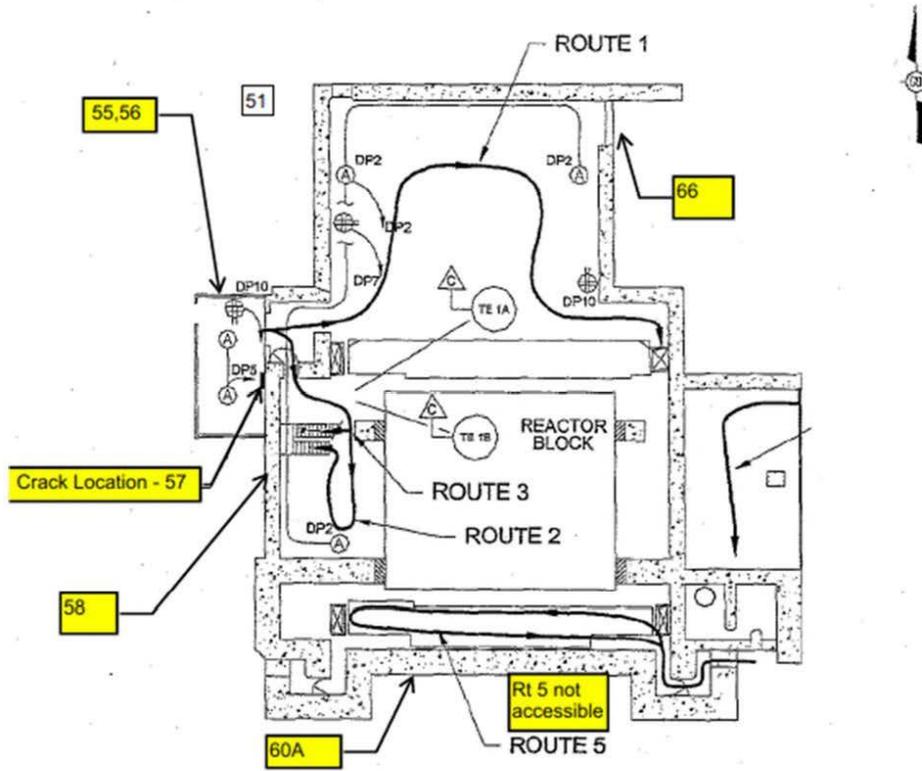


C-18

D-78



C-6 – Exterior Map



105 F
GRADE LEVEL
(ELEVATION 0'-0")



C-6 – Summary Table & Photos Elevation 0' - Exterior

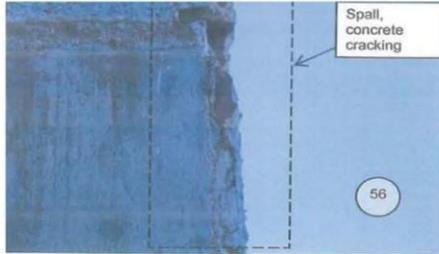
#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
55 56	3012 3013 3014	Exterior wall	0'0"	Repair completed between surveillances. Concrete repair not holding up. Patch chipping away in places Recommend continuing observation
57	3015	Exterior wall pourback	0'0"	Almost full length crack on south side of infill. Refer back to Item #20a Recommend continuing observation
58	3016 3017	Exterior wall detail	0'0"	Downspout at corner of bldg. Interior corner is dry. Recommend continuing observation
60A	3019	Exterior ISS detail	0'0"	NEW: Contamination spot on south wall E of fuel discharge area Recommend continuing observation
64	2991 3002	Exterior ISS detail - steel walls	0'0"	Structural Steel around Route 4 access point verified / bolting pattern suggests that "Man Door Knock Out" shown on 0105F-DD-C0005 / H-1-87254 SHT01 was not installed. Recommend continuing observation
66	3004	Exterior wall detail - existing crack	0'0"	No change since 2008. Verified corner inside front face was dry. Beam pockets. Recommend continuing observation



3012 Repair completed between surveillances. Concrete repair not holding up. Patch chipping away in places

C-21

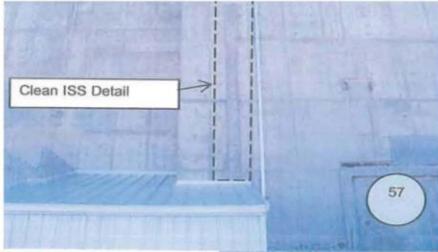
D-81



3013 Repair completed between surveillances. Concrete repair not holding up. Patch chipping away in places



3014 2nd example of same patch failing, just above vestibule door.



3015 Almost full length crack of south side of pourback. Next to downspout at vestibule. Concrete infill doesn't seem to be adhering to old wall. Crack goes all the way to interior. Refer back to 20A for further information.



C-23

D-83



2014 Photo # 3017



3016 Downspout at corner of building. Interior is dry.



2995 No changes to building condition. Downspouts drain immediately adjacent to building from approx. 75'.



2996 No changes to building condition. Downspouts drain immediately adjacent to building from approx. 75'. Wildlife nests not included in assessments.



3019 Contamination spot (FCA-F-0001) on south wall. E of fuel discharge area.



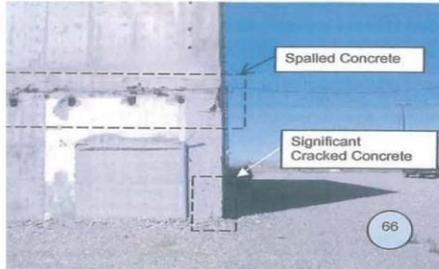
3002



2991 Structural Steel around Route 4 access point was inspected for pattern suggest that "Man Door Knock Out" shown on 0105FDCC0005 / H187254 SHT01

C-26

D-86



3004 Verified corner inside front face dry inside . Beam pockets no change



D 105-F SSE Inspection Results – Historical Detail

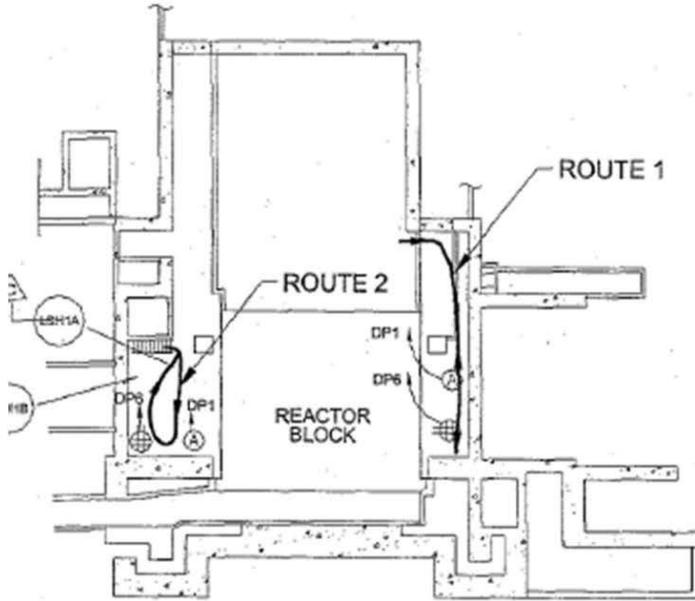
This section presents the Surveillance photos for the F Reactor ISS building. Photos from both the inspection documented in WCH-308 from 2008 and the April 2015 inspection are included. These photos are organized by building elevation and a map of each elevation and a table of itemized description is included. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

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C-1 – - 15ft Elevation Map	2
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C-4 – Elevation 42' Map	19
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C-6 – Summary Table & Photos Elevation 80'	29
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C-1 -- 15ft Elevation Map



105 F
BELOW GRADE LEVEL
(ELEVATION -15'-0")



Letter No. 15-MRM-005
May 29, 2015

C-1 – Summary Table & Photo Elevation -15'

#	New Photo #	Description
2	3023	Cracked Floor
3	3025	Surface Discoloration on stair rails
4	3026	Spalled edge on stairs
5	3027	Surface Discoloration on ducting



3023 Crack from 2008 was not obvious. No water stains on floor.





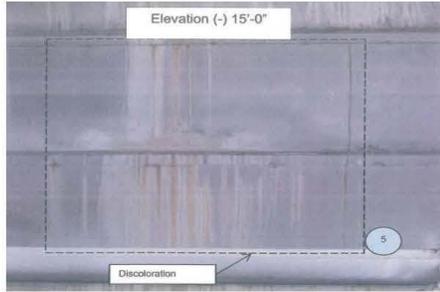
3025 No change. Remove from surveillance.



3026 No change since 2008. Remove from surveillance.



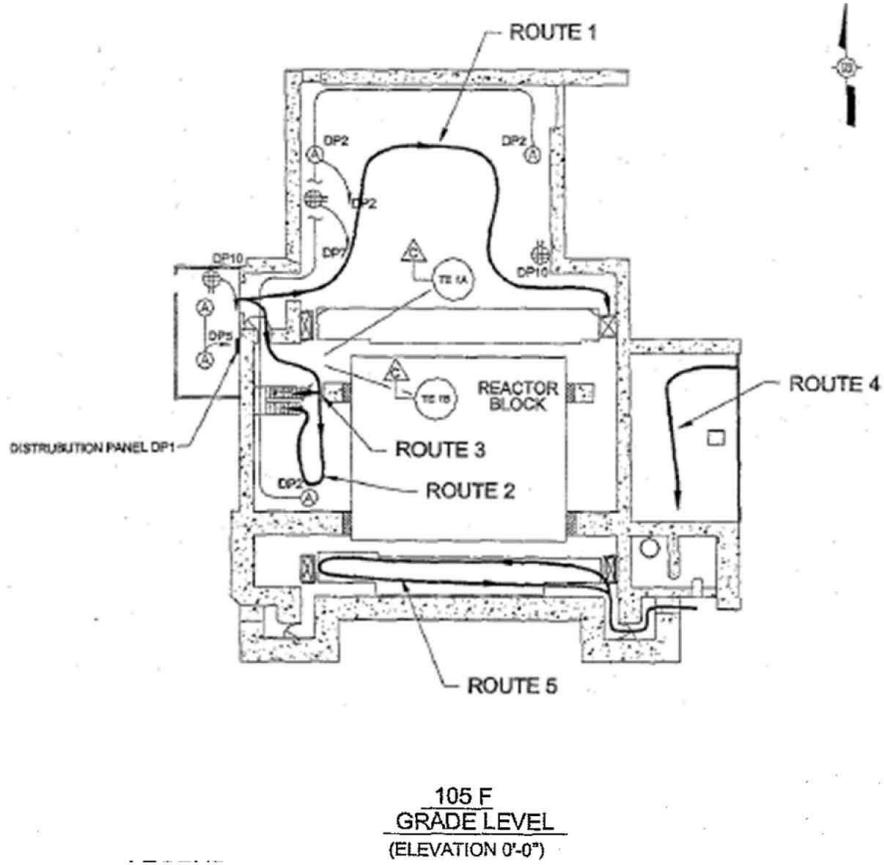
Letter No. 15-MRM-005
May 29, 2015



3027 No change since 2008. Remove from surveillance.



C-2 – At Grade Map



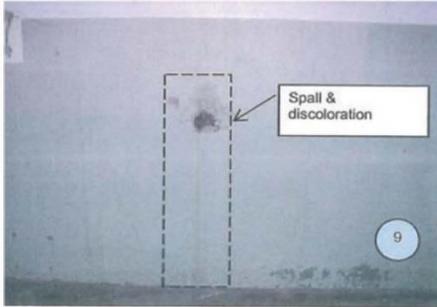


C-2 – Summary Table & Photo Elevation C'

#	New Photo #	Description
6	3029	ISS detail, wooden pourback form
9	3034	Spalled concrete wall
10	3035	ISS detail - pourback
11	3037	Interior building/stairwell detail
11a	3038	Spalled concrete beam at bottom of stairwell
12	NA	Interior building detail
13	NA	Interior building detail
14	NA	Interior building detail
15	3039 3040	Interior building detail
16	3041	Interior steel landing
17	3042	Interior concrete wall



3029 No change since 2008.



3034 No change since 2008. Remove from surveillance



2008 Item mislabeled as 1, really 10



3035 No change since 2008. Dry all around and in corner.



3037 No changes since 2008.

D-10

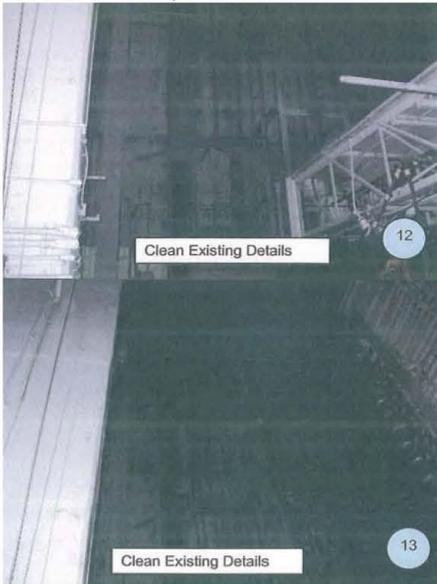
D-97



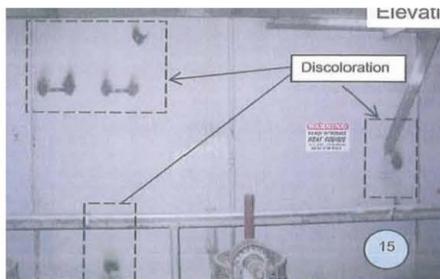
New Item 11A



3038 New spalling location to add to surveillance. No evidence this is new condition. Was not on surveillance route prior to 2014.



No change since 2008. No new photo. Remove from surveillance



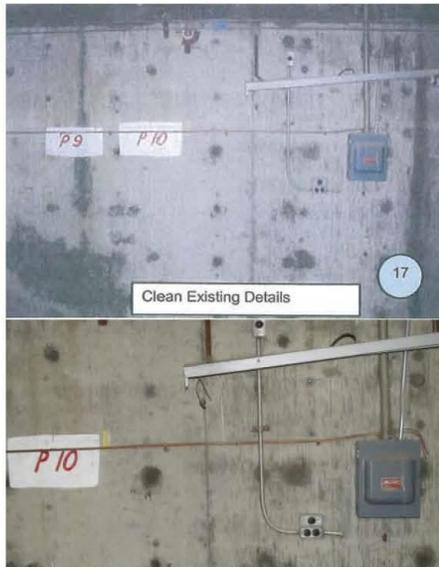
3040 No change since 2008.

D-12

D-99



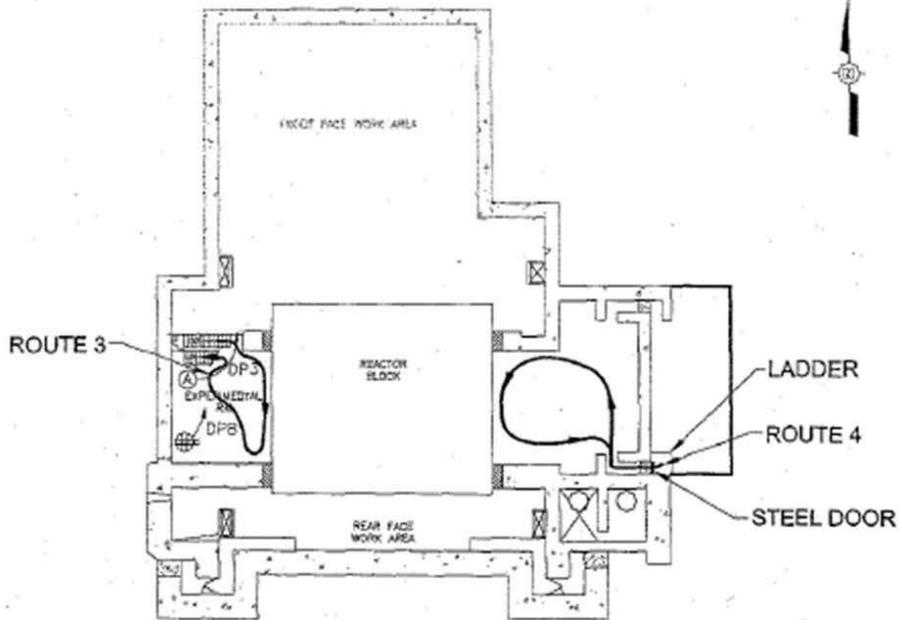
3031 No change since 2008



3042 No change since 2008.



C-3 – Elevation 13' Map



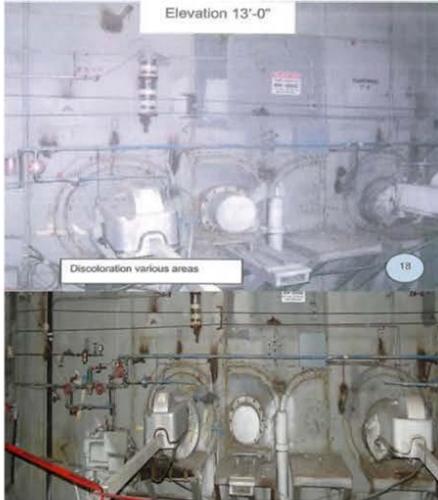
105 F
ABOVE GRADE LEVEL 1
(ELEVATION 13'-0")



Letter No. 15-MRM-005
May 29, 2015

C-3 – Summary Table & Photos Elevation 13'

#	New Photo #	Description
18	3043	Interior building details
19	3044	Interior building details
20	3045	Interior building details
21	NA	Interior building details
22	NA	Interior building wall
23	NA	Interior existing beam



3043 No change since 2008.



3044 No changes since 2008. Remove from surveillance.

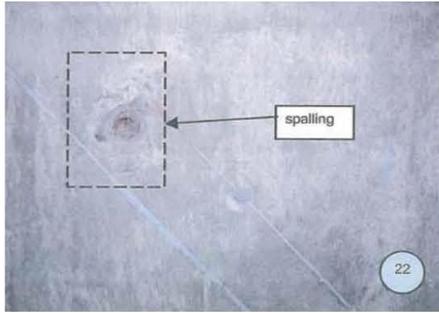


3045 No changes since 2008. Remove from surveillance.



D-17

D-104



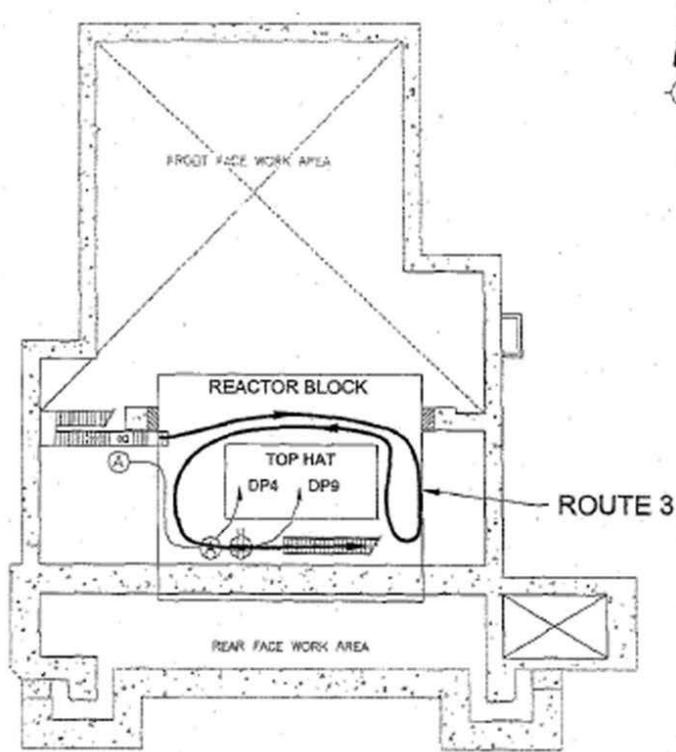
Exact location not found. No significant change. No new photo. Remove from surveillance.



No new photo. No change since 2008. Remove from surveillance.



C-4 – Elevation 42' Map



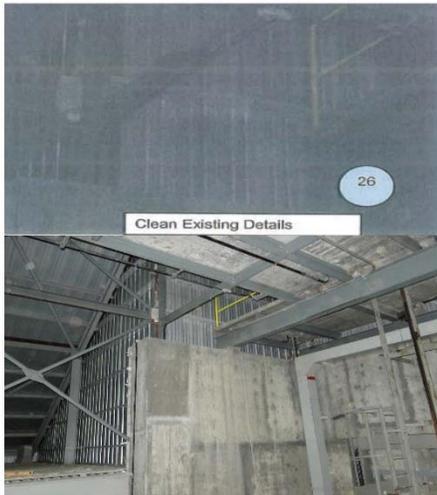
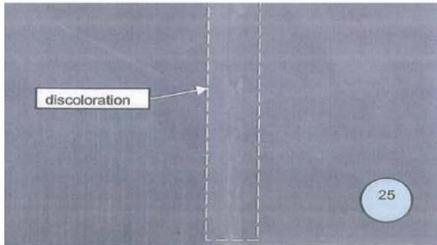
105 F
ABOVE GRADE 4
(ELEVATION 42'-4 5/8")



Letter No. 15-MRM-005
May 29, 2015

C-4 – Summary Table & Photos Elevation 42'

#	New Photo #	Description
24	NA	Interior building detail
25	NA	Interior building detail
26	3047	Interior building detail



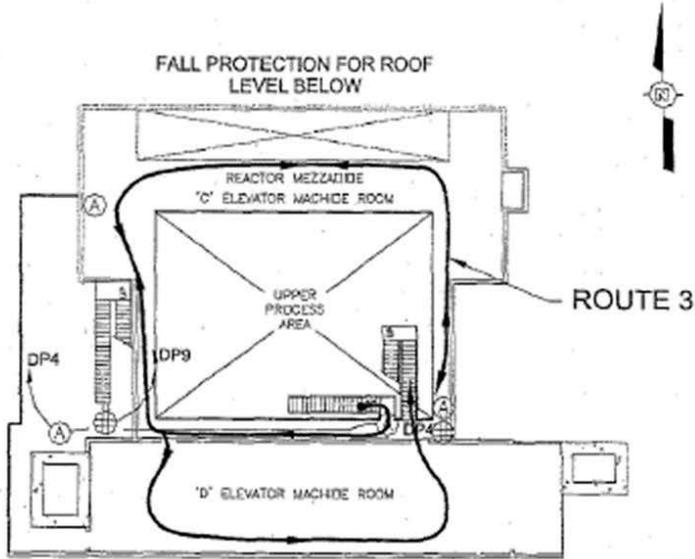
3047 No significance. Remove from surveillance

D-21

D-108



C-5 – Elevation 56' Map

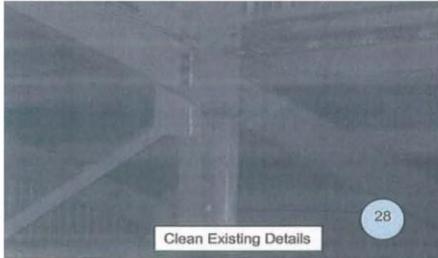


105 F
ABOVE GRADE LEVEL 5
(ELEVATION 56'-4")



C-5 – Summary Table & Photos Elevation 56'

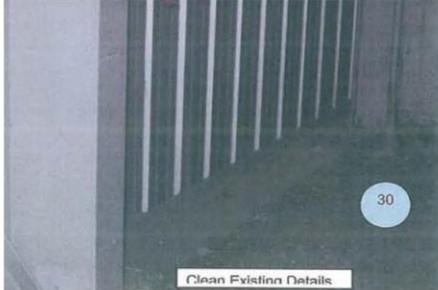
#	New Photo #	Description
28	3053 3054*	Interior building detail openings to exterior
29	NA	Interior building detail
30	NA	Interior building detail
35	NA	Interior building detail
36 37 38	3058 3066	Interior building detail Discoloration determined to be grout stains from CMU infills or aged red lead coating. No structural issues.
39	NA	Interior building detail - ISS roof structure
40	NA	Interior building detail - ISS roof structure
41	NA	Interior building detail - ISS roof structure



3053 No change since 2008. Opening to exterior



No change since 2008. No new photo. Remove from surveillance.



No change since 2008. No new photo. Remove from surveillance.

D-24

D-111



3058 Discoloration is determined to be grout stains from CMU infills. No change since 2008. Remove from surveillance.



D-25

D-112



3066 Discoloration is determined to be grout stains from CMU infills or Aged Red Lead coating. No change since 2008



D-26

D-113

Letter No. 15-MRM-005
May 29, 2015

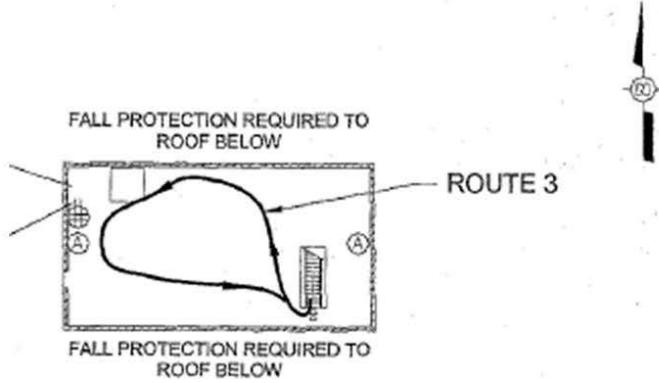


D-27

D-114



C-6 – Elevation 80' Map



105 F
ABOVE GRADE LEVEL 7
(ELEVATION 80'-5 1/4")

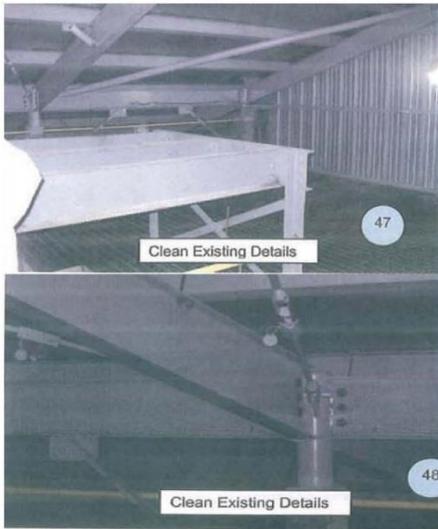


C-6 – Summary Table & Photos Elevation 80'

#	New Photo #	Description
42 43 44 45	NA	Stairs, Interior building detail
46	3066	Interior building detail
47	NA	Interior building detail
48	NA	Interior building detail
49	3067	Interior building detail
50	NA	Interior building detail



3066 no change since 2008. Discoloration confirmed to be grout stains from original CMU infill or Aged Red Lead coating. Remove from future surveillance.

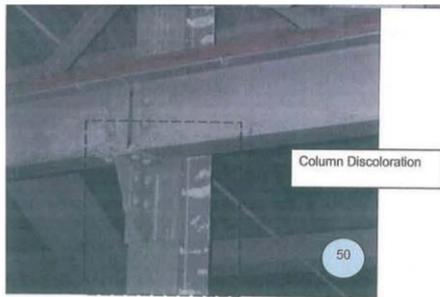


D-30

D-117



3067 Rivots removed as part of SSE Construction. No change since 2008

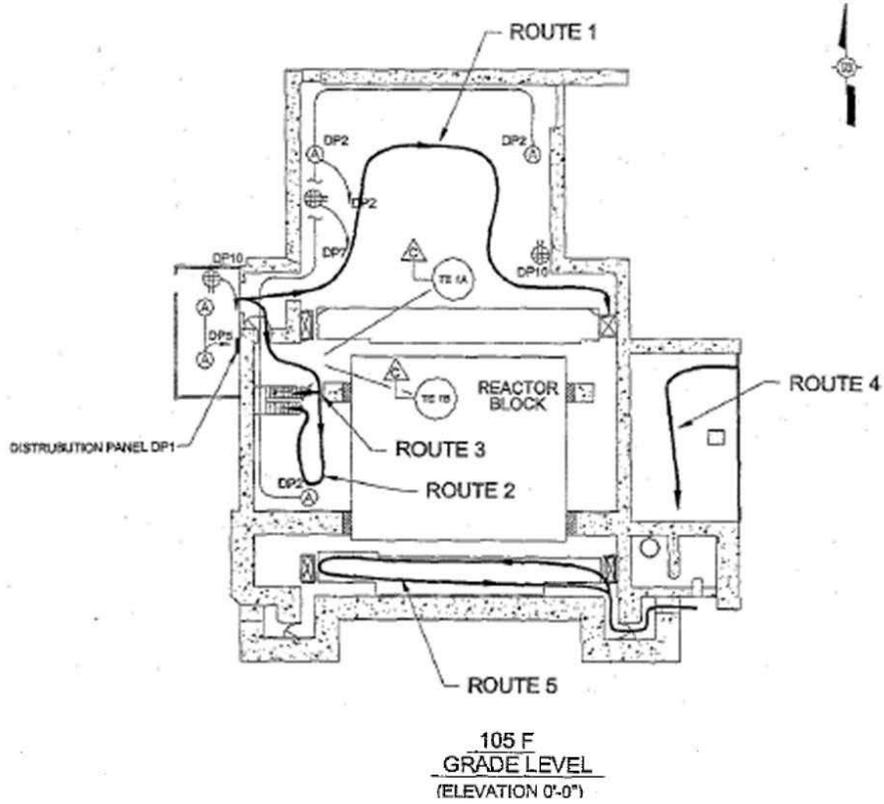


D-31

D-118



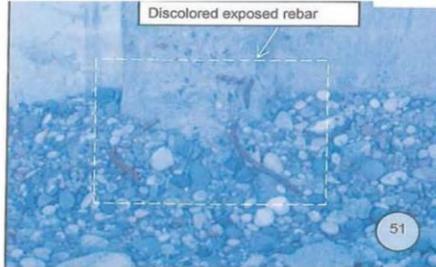
C-7 – Exterior Areas Map



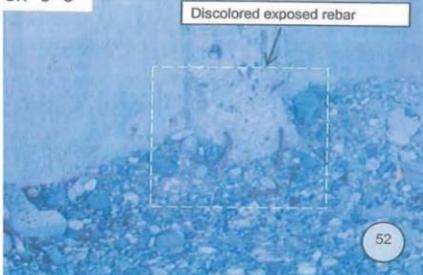


C-7 – Summary Table & Photos Elevation 0' - Exterior

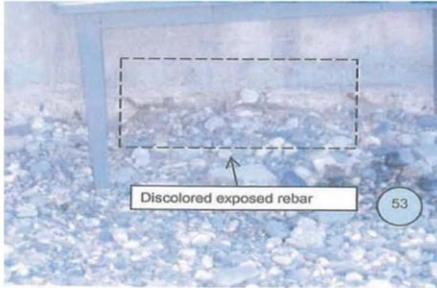
#	New Photo #	Description
51	3008	Exterior - exposed rebar
52	3009	Exterior - exposed rebar
53	3010 3011	Exterior - exposed rebar
54	3010 3011	Exterior - exposed rebar
59	2993	Exterior ISS detail Birds nest on SW corner of bldg.
60	2994 2995 2996	Exterior ISS detail - steel plates Downspouts drain immediately adjacent to bldg from approx. 75'
61	2997	Exterior ISS detail
62	2998 2999 3000	Exterior ISS detail
63	3001	Exterior ISS detail - steel plates Rt 5 access very good shape
65	3003	Exterior ISS detail - steel walls
67	3005 3006	Exterior wall detail - existing crack Verified corner inside front face was dry. Beam pockets.
68	3007	Exterior ISS detail - steel plates



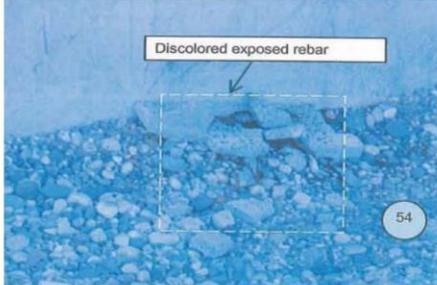
3008 Sometime between surveillances work was completed to cut rebar ends and paint the ends



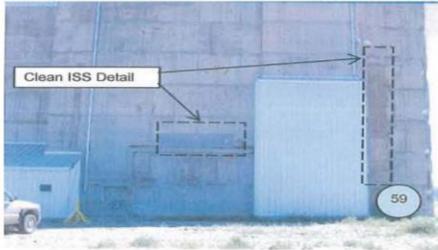
3009 Sometime between surveillances work was completed to cut rebar ends and paint the ends



3010 Picture shows location better than previous... Work completed between surveillances buried rebar under concrete debris and guano from bat habitat.



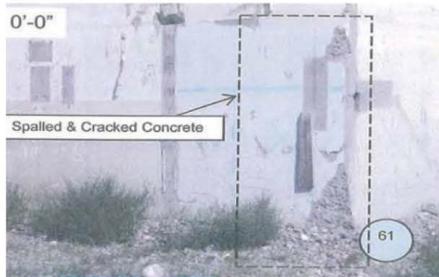
3011 Picture shows location better than previous... Work completed between surveillances buried rebar under concrete debris and guano from bat habitat.



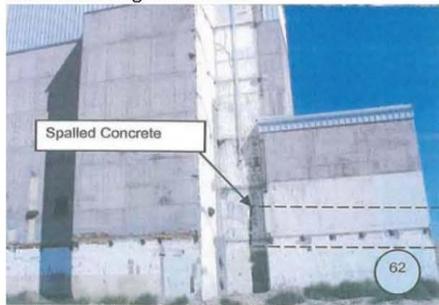
2993 No change in building condition. No reason to continue future surveillance. Birds nest on SW corner of building.



3018 No change in building condition. No reason to continue future surveillance. Birds nest on SW corner of building.



2997 No change since 2008



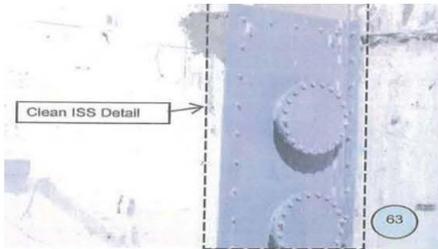
2998 No change to spalling at beam pockets. Rebar exposed at corner in very good condition painted black.



2014 Photo # 2999



3008 No change to spalling at beam pockets. Rebar exposed at corner in very good condition painted black.

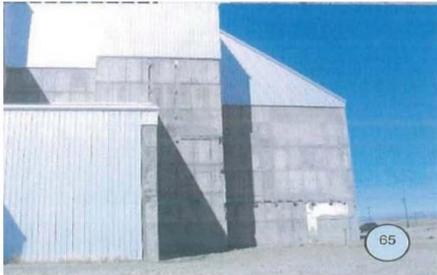


D-38

D-125

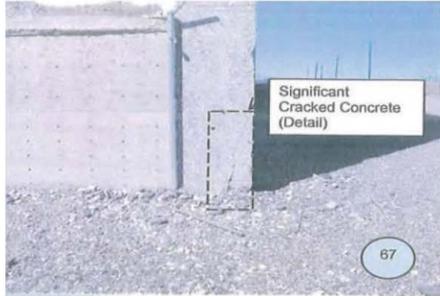


3001 Rt 5 Access very good shape.



3003

D-39



3005 No change since 2008. Verified corner inside front face was dry. Beam pockets.



3006 No change since 2008. Verified corner inside front face was dry. Beam pockets.



D-40



3007 No changes since 2008

D-41

D-128

APPENDIX E
S&M ACTIVITIES REPORTS FOR 105-H SSE ASSESSMENT

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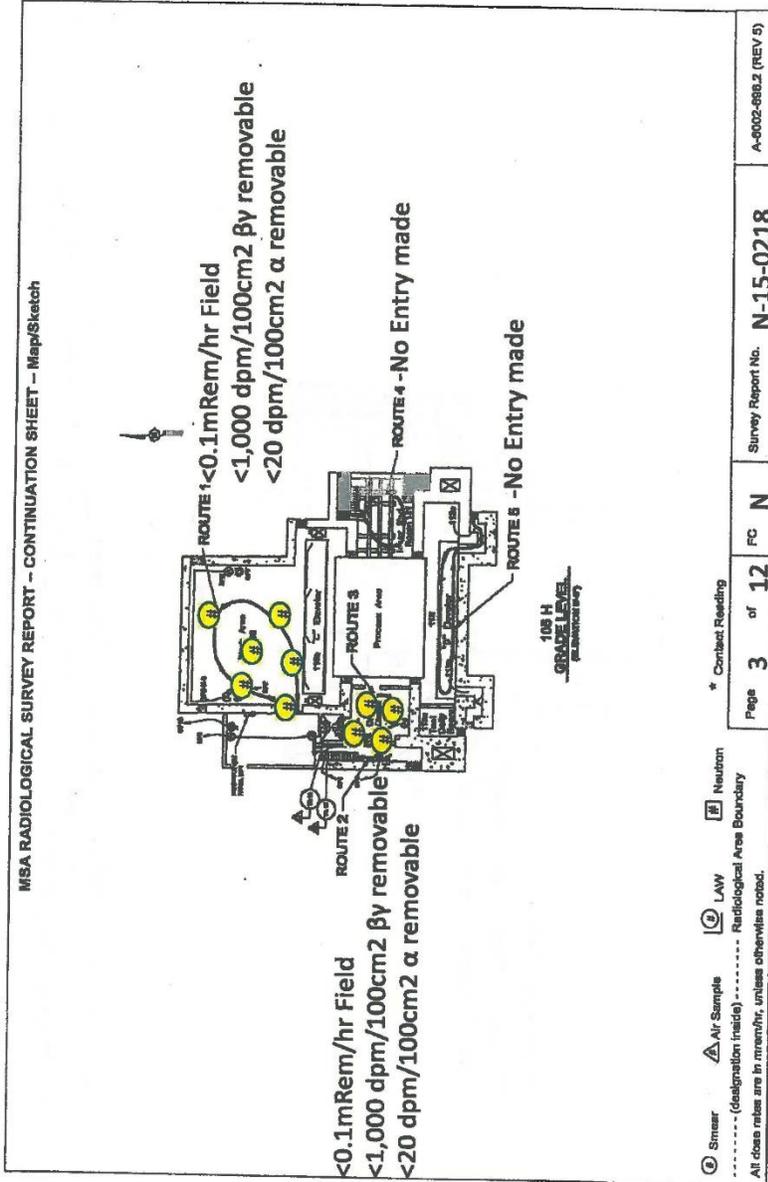
APPENDIX E
S&M ACTIVITIES REPORTS FOR 105-H SSE ASSESSMENT

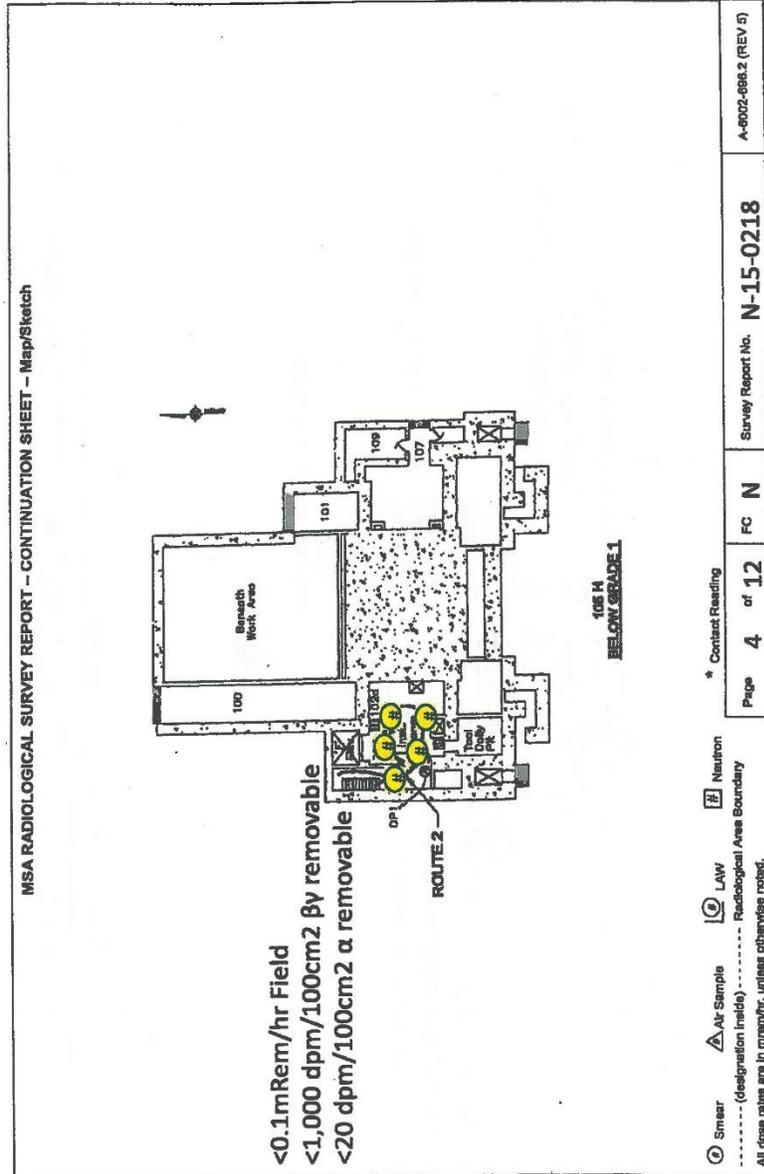
This appendix presents reports associated with surveillance and maintenance activities. The appendix is arranged so that each activity is listed separately, followed by the applicable documents.

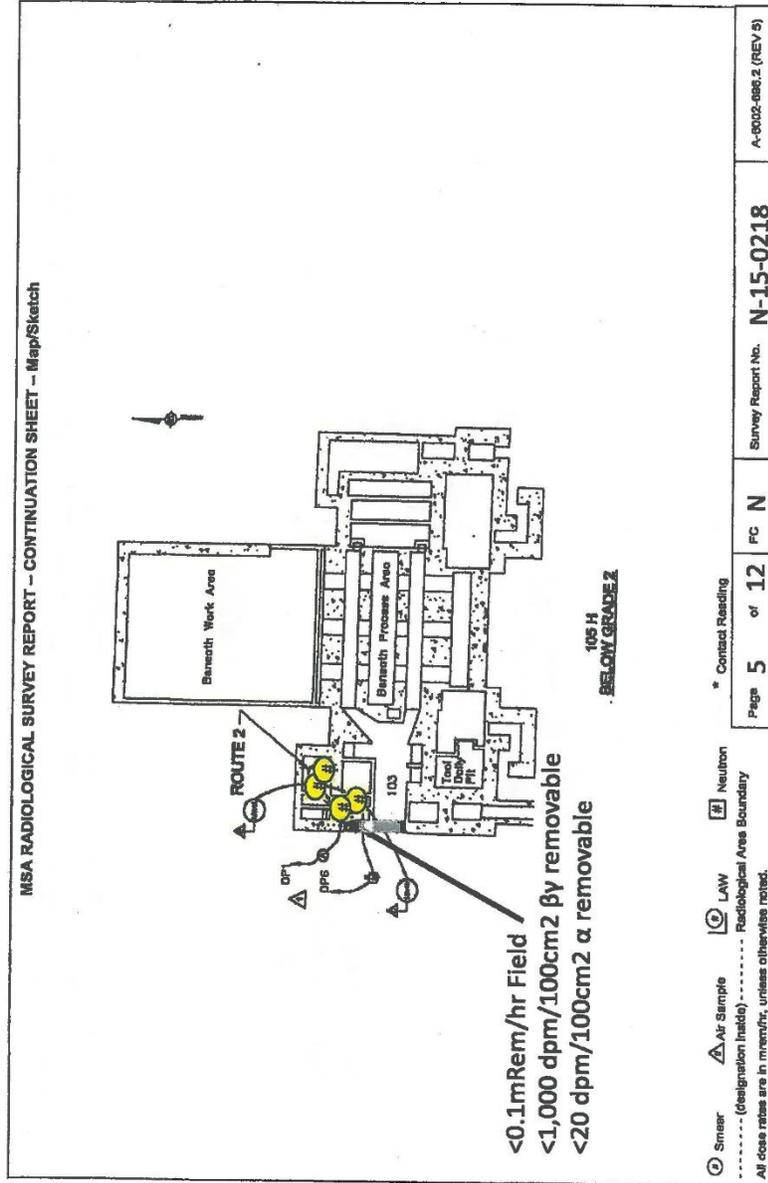
The activities inside the 105-H SSE were conducted along the structural routes identified in DOE/RL-2005-67, *Surveillance and Maintenance Plan for the 105-H Reactor Safe Storage Enclosure*, Rev. 0. These surveillance routes also are included in Work Package 2M-73252/C.

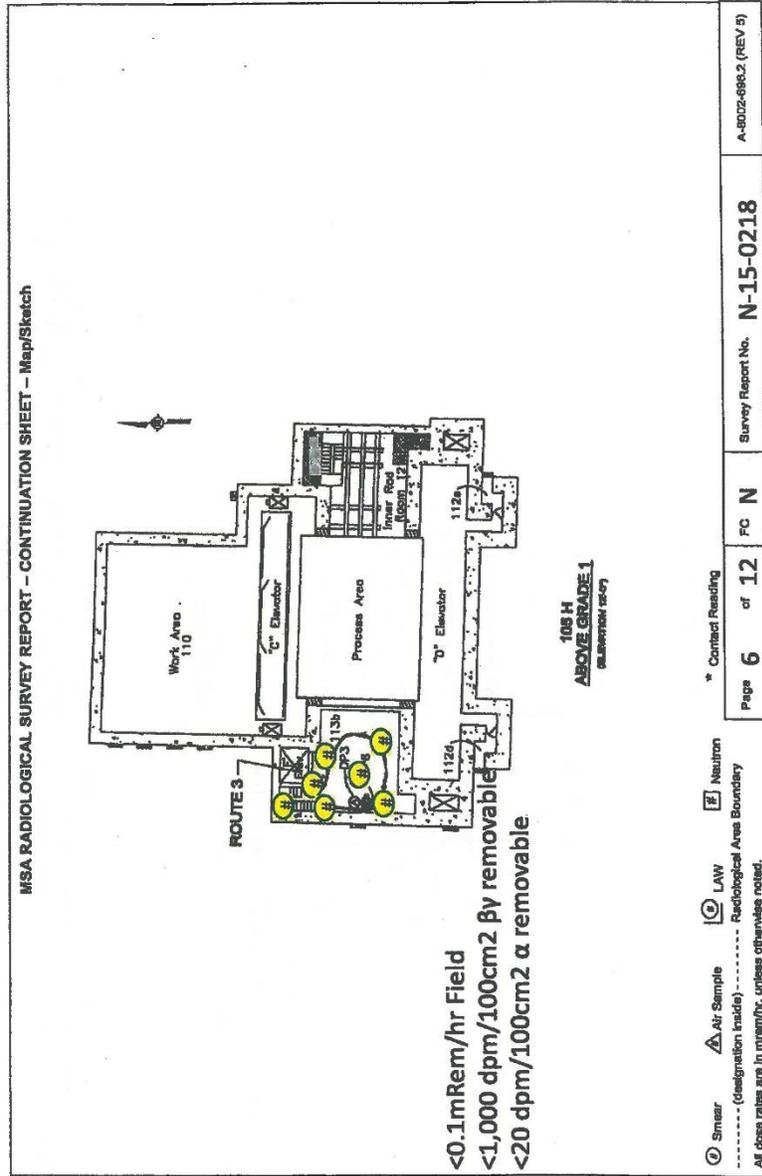
Internal Radiological Survey

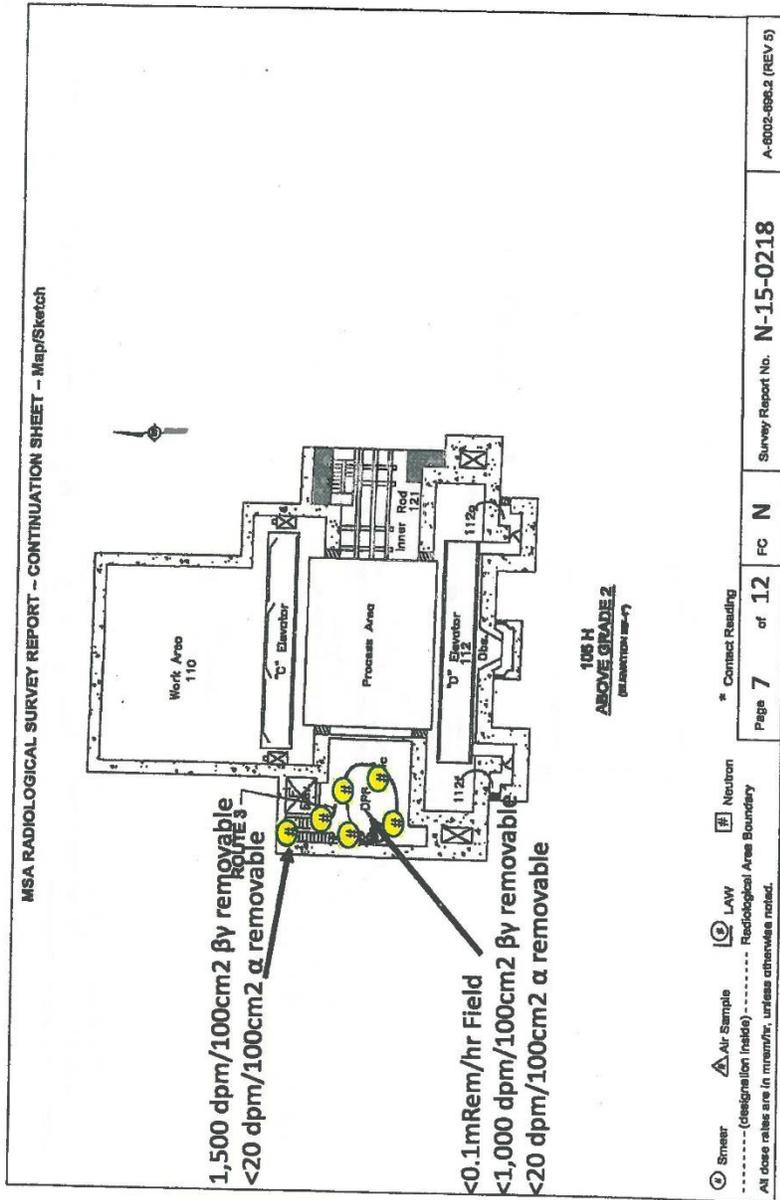
Radiological control technicians performed surveys along the surveillance routes.

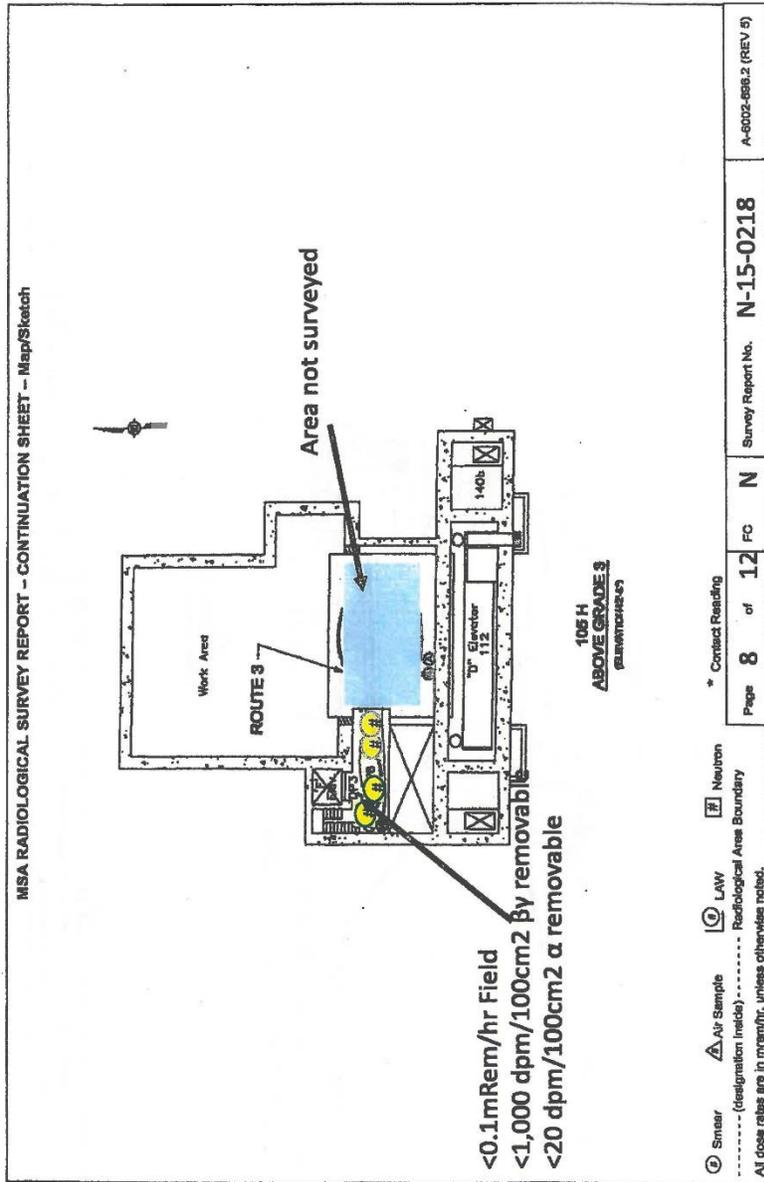


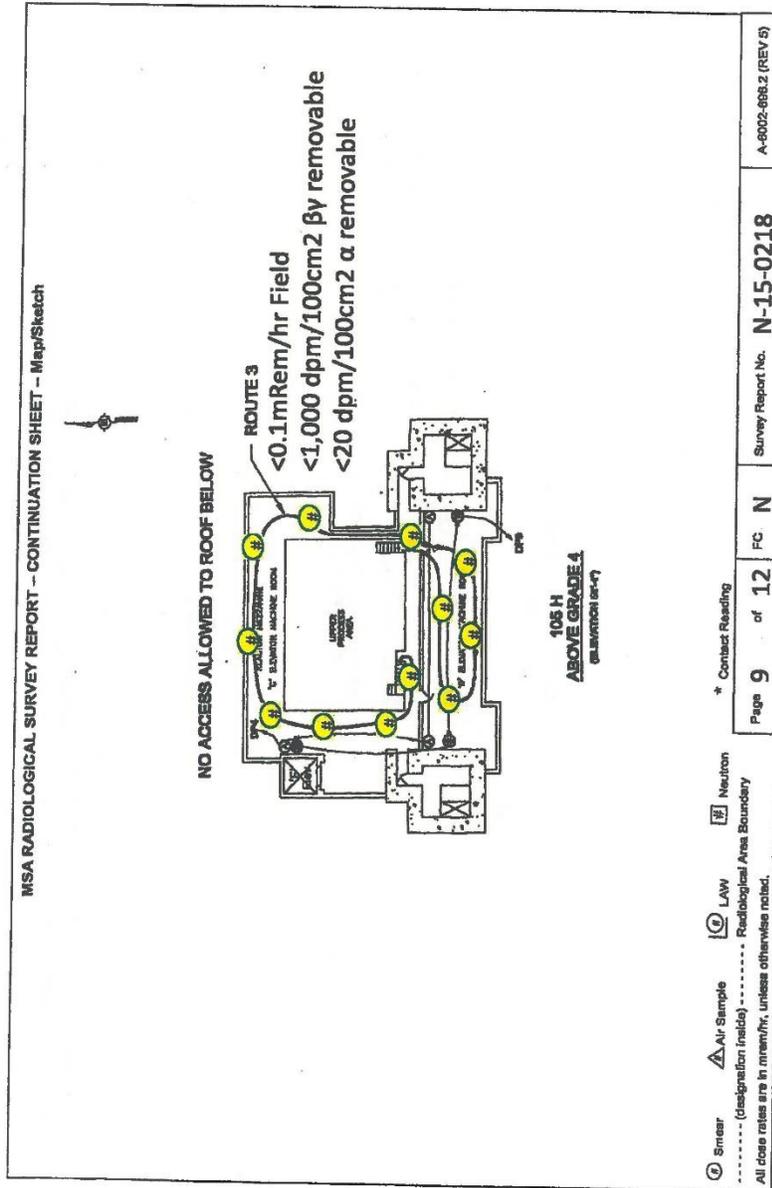


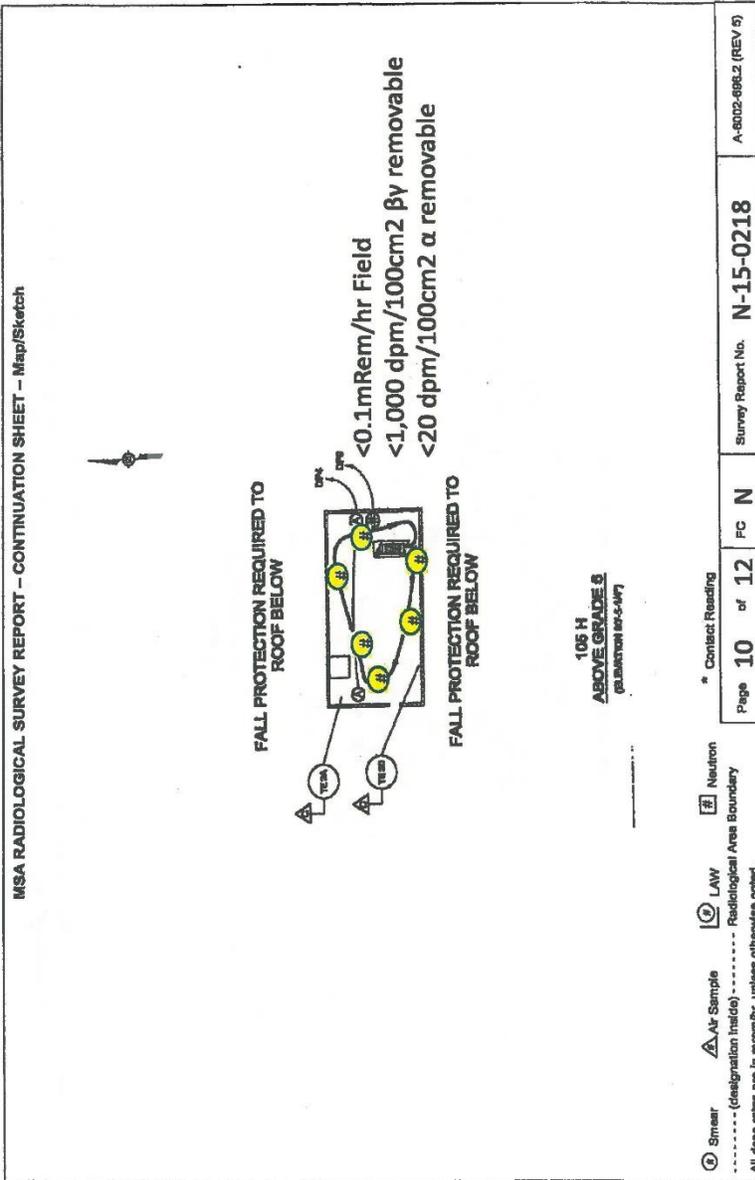












Smear Air Sample LAW Neutron
 (designations inside) Radiological Area Boundary
 All dose rates are in mrem/hr, unless otherwise noted.

MSA RADIOLOGICAL CONTROL LAPEL AIR SAMPLE (LAS) ANALYSIS RECORD

Counter Information: Sample Log No. (Lapel/FC/Incid/?) LAPEL-N-040615 Page 1 of 1

Alpha: SCLL7-0009/003E/5-5-15 DTLIC-0137 0.36 / 2.747 0 / 10 0.00 2005/MO-295
 Instrument ID No./Model/Cal Expiration SCLL7-0009/003E/5-5-15 DTLIC-0137 0.41 / 2.533 511 / 10 51.10 2005/MO-295
 Beta: SCLL7-0009/003E/5-5-15 DTLIC-0137 0.41 / 2.533 511 / 10 51.10 2005/MO-295
 Instrument ID No./Model/Cal Expiration SCLL7-0009/003E/5-5-15 DTLIC-0137 0.41 / 2.533 511 / 10 51.10 2005/MO-295

No.	LAS ID No./Purpose	DATE/TIME LAS WORKIN	WORKER NAME (Print)	WORKER HID No.	Sample Media (V/L)	ON: Flow Rate OFF: Flow Rate	PF	DL (cpm)	Sample T ₀ (min)	MD DAC-h	N ₀ (counts)	DAC-h	Total DAC-h	Survey No.	RCT Signature #	HID
1	2544H-RX ENTRY Initial Count	04/09/15 10:45	JOE WILEY	H0009979	V	4.0 4.0	1	0.000 6.441	5.0 5.0	0.59 0.01	1.0 247.0	0.22 0.00	0.22	N-15-0218	<i>Joe Wiley</i> H0009979	
2	1764A-RX ENTRY Initial Count	04/09/15 10:45	Ttm Schwisow	h7526838	V	4.0 4.0	1	0.000 6.441	5.0 5.0	0.59 0.01	6.0 272.0	1.22 0.00	1.22	N-15-0218	<i>Ttm Schwisow</i> H0009979	
3	N/A															N/A
4																
5																
6																
7																
8																
9																
10	N/A															N/A

DEFINITIONS:
 * If s is record, specify record identifier. V - Vapor F - Fluorone
 E_s = Instrument counting efficiency (cpm/cpm)
 CF = Inverse of counting efficiency (cpm/cpm)
 N₀ = Number of background counts recorded during background counting interval (T₀)
 T₀ = Background counting interval (min)
 T₁ = Total time the lapel air sampler was run (min)
 T₂ = Lapel air sample count time (min)
 N₁ = Gross number of counts measured (sample + background) during the gross count time (T₁)
 Flow rate = Start and ending flow rates of the lapel air sample (L/min)
 PF = Assigned protection factor for respiratory protection
 DAC = Derived Air Concentration (uCi/mL) from 10CFR63
 See MSC-1538 Section 5.2.7 for explanation of formulae used.

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION
 Formmaster ID No.: 3548 RSR# N-15-0218 4/14/2015
 Name/Title: PA. Schwisow 4/14/15 4/14/2015
 Log Reviewed By: PA. Schwisow 4/14/15 4/14/2015
 MSA-RC-SAL-LAPEL-001 (09/30)

MSA RADIOLOGICAL CONTROL LAPEL AIR SAMPLE (LAS) ANALYSIS RECORD

Counter Information: Sample Log No. (Lapel-FC-AMDDYY) LAPEL-N-040715 Page 1 of 1

Alpha: SCLL7-00090305E-5-15 DTLLC-0137 0.38 / 2.747 0 / 10 0.00 200E/MO-285
 Instrument ID No./Model/Cal Expiration Detector ID No. DTLLC-0137 E_c / CF N_b (counts) / T_b (min) R_b (cpm)
 Beta: SCLL7-00090305E-5-15 0.41 / 2.433 821 / 10 52.10 200E/MO-285
 Instrument ID No./Model/Cal Expiration Detector ID No. N_b (counts) / T_b (min) R_b (cpm)

No.	LAS ID No./Purpose	DATE/TIME LAS WORK	WORKER NAME (Print)	WORKER HID No.	Sample Rate (W.P.)	ON: Flow Rate OFF: Flow Rate	PF	DL (cpm)	Sample T_b (min)	MD DAC-h	N_b (counts)	DAC-h	Total DAC-h	Survey No.	RCT Signature	HID
1	2544-HRX ENTRY Inter-count Decay 3/1/23-5	04/08/15 10:45	JOE WILEY	H0009979	V	4.0 4.0	1	0.000 6.503	5.0 5.0	0.56 0.01	0.0 226.0	0.00 0.00	0.00	N-15-0218	Joe Wiley H0009979	
2	17944-RX ENTRY Inter-Count Decay 4/22-5	04/08/15 10:45	Tim Schwisow	H7528536	V	4.0 4.0	1	0.000 6.503	5.0 5.0	0.56 0.01	0.0 265.0	0.00 0.00	0.00	N-15-0218	Joe Wiley H0009979	
3	N/A														N/A	
4																
5																
6																
7																
8																
9																
10	N/A														N/A	

* If a recount, specify recount date/time. ** V - Ventvisor F - Fluoroscope
 Definition: E_c = Instrument counting efficiency (cpm/cpm) F - Fluoroscope
 CF = Inverse of counting efficiency (cpm/cpm) CF = Inverse of counting efficiency (cpm/cpm)
 N_b = Number of background counts recorded during background counting interval (T_b)
 T_b = Background counting interval (min) T_b = Background counting interval (min)
 T_s = Total time the lapel air sampler was run (min) T_s = Total time the lapel air sampler was run (min)
 N_c = Gross number of counts measured N_c = Gross number of counts measured
 T_c = Lapel air sample count time (min) T_c = Lapel air sample count time (min)
 Flow rate = Start and ending flow rates of the lapel air sampler
 PF = Assigned protection factor for respiratory protection σ = Counting Error
 DAC = Derived Air Concentration (uCi/mL) from 10CFR83
 See MSA-13308 Section 6.2.7, for explanation of formulae used.

DAC (uCi/mL) Value Used:
 α = 5 E-12 (Default = 8E-12)
 β = 1 E-08 (Default = 1E-8)

Flowmeter ID No.: 3548 Cal Due: 4/14/2015
 Name/Org: C. Brostman / SRS Date: 10-7-15
 Log Reviewed By (Print/Sign): RA Shuster / [Signature] Date: 4/13/15
 MSA-RC-SAL L-001 (09/30) RSR # N-15-0218 Pg 12 of 12

Industrial Hygiene Report

The industrial hygienist conducted general-area, direct-reading instrument monitoring of the surveillance routes before additional personnel entered to complete surveillance activities. The monitoring was for carbon monoxide, flammable gas, oxygen, and volatile organic compounds.

**Mission Support Alliance, LLC
IH DRI Monitoring Survey**

Date: 05/06/2015, 04:13 PM

Survey ID: 15-60119 - 105H Five Year Surveillance

Survey Date: 04/06/2015

Survey ID: 15-60119	Survey Date: 04/06/2015	Survey Status: Complete
Survey Title:	105H Five Year Surveillance	
Sample Plan:	IHSP-14-00179 - DRI (VOC, Multigas)	
WO/Procedure:	NA	
BHA:		
Requestor:	Land & Facilities Management	Project IH: Hokanson, Eric J
Surveyor:	Hokanson, Eric J	
Job Contact:	Moren, Rick	
Contact Phone:	(509)376-0852	Contact Cell Phone: (509)713-0098
Engineering Cntls:	Administrative Cntls: Boundary, Work Package Instructions	

Meteorology Data		
Standard Conditions:	Yes	Weather Date: 04/06/2015
Pressure:		Humidity:
Wind Direction:		Temperature:
		Time:
		Wind Speed:

Mission Support Alliance, LLC

Date: 05/06/2015, 04:13 PM

Survey ID: 15-60119 - 105H Five Year Surveillance

Survey Date: 04/06/2015

Calibration

Instrument		Pre Use Function Test		Post Use Function Test	
ID:	2443	Date:	04/06/2015	Date:	04/06/2015
Type:	ITX ISC	Time:	0814	Time:	1545
Last Cal Date:	03/16/2015	Leak Check:	Yes	By:	Hokanson, Eric J
Next Due Cal Date:	04/16/2015	Battery Check:	Yes	Location:	Office
Lamp:	N/A	By:	Hokanson, Eric J		
Serial Number:	0304005-268	Location:	Office		
DRI Sampling Pump: 2025 - ISP ISC					
Last Done Date: 11/24/2014					
Next Due Date: 05/24/2015					
Flow Fault Check: No					
Sensor(s)		Pre Use Function Test		Post Use Function Test	
Sensor:	ITX ISC CO	As Found:	71	As Left:	69
Calibration Source:	Tri-Gas (CO)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	70.0 ppm				
Sensor:	ITX ISC H2S NA				
Sensor:	ITX ISC LEL	As Found:	26	As Left:	24
Calibration Source:	Tri-Gas (Isopentane)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	25% LEL				
Sensor:	ITX ISC NO2 NA				
Sensor:	ITX ISC O2	As Found:	18.6	As Left:	18.9
Calibration Source:	Tri-Gas (O2)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	19.0%				
Sensor:	ITX ISC SO2 NA				

Mission Support Alliance, LLC

Date: 05/06/2015, 04:13 PM

Survey ID: 15-60119 - 105H Five Year Surveillance

Survey Date: 04/06/2015

Calibration

Instrument		Pre Use Function Test	Post Use Function Test
ID:	3919	Date: 04/06/2015	Date: 04/06/2015
Type:	MiniRAE 3000 RAE	Time: 0809	Time: 1550
Last Cal Date:	03/26/2015	Leak Check: Yes	By: Hokanson, Eric J
Next Due Cal Date:	04/26/2015	Battery Check: Yes	Location: Office
Lamp:	11.7 eV	By: Hokanson, Eric J	
Serial Number:	592-902318	Location: Office	
Sensor(s)		Pre Use Function Test	Post Use Function Test
Sensor:	MiniRAE 3000 RAE PID	As Found: 11.8	As Left: 10.5
Calibration Source:	Isobutylene	Adjusted To: N/A	
Lot Number:	5-026-67		
Manufacture Date:	02/16/2015		
Expiration Date:	02/28/2018		
Cal Source Value:	10 ppm		

Mission Support Alliance, LLC

Date: 05/06/2015, 04:13 PM

Survey ID: 15-60119 - 105H Five Year Surveillance

Survey Date: 04/06/2015

Readings

Type:	Area			
Zone - Location:	100H STRU - OTHER (Roads etc.)			
Specific Location:	105H Surveillance Routes			
Status:	N/A			
Activity:	Safety Inspection of 105H Surveillance Routes			
Date/Time:	04/06/2015 0950			
Device	Agent	Range	Result	Action Limit
Inst-2443 - CO	Carbon Monoxide	<	0.000 PPM	12 ppm
Inst-2443 - LEL	Flammable Gas	<	0.000 %	25 %
Inst-2443 - O2	Oxygen		20.900 %	23.5 %
Inst-3919 - PID	Volatile Organic Compound	<	0.000 ppm	2 ppm
Reading Details:	General area monitoring of the 105H surveillance routes was conducted to verify conditions prior to additional personnel entering to complete work. Safety inspection and routes reviewed were per work document 2M-73151/C - C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance. No abnormal readings were observed along the tour of the surveillance routes.			

Field Information Verified By: Hokanson, Eric J

Date: April 6, 2015

Approved By: Hokanson, Eric J

Date: April 6, 2015

(The electronic approval indicated above acts as the authentication of this record on the above date)

Industrial Safety Report

The industrial safety professional conducted safety inspection of the surveillance routes before additional personnel entered to complete surveillance activities.

105 H Reactor Initial Safety Inspection

On 6 Apr. 2015 MSA Safety team made initial entry into the 105 H for a safety inspection prior to any work to be completed for the 5 year reactor surveillance. This safety team consisted of 2 Radcon personnel, 2 Biologist (looking for potential wildlife), an Industrial Hygienist, and an Industrial Safety Professional. This report only covers the Industrial Safety evaluation.

As can be imagined, this reactor was very dusty and dirty and there were several areas of concentrated Bat droppings, but none of this was of any health hazard concern. From an Industrial Safety perspective, this reactor is pretty free and clear of any major safety hazards along the prescribed tour route. The D&D team did a good job of delineating any areas of danger (photos enclosed), and did a pretty good job of identifying (with orange paint) the biggest concern that we found on our tour which was “loose” steps (some photos enclosed of examples). I use the term “loose” for a lack of a better word, as all steps are still structurally sound and can comfortably be navigated without fear of the step collapsing, or falling off. I will state that not all “loose” steps are identified with orange paint and caution needs to be exercised when ascending and descending stair case on Route 3.

Photo 1



Photo 2



Photo 3



Photo 4



Structural Inspection Report

A team of engineers performed an inspection to determine the SSE conditions and structural adequacy. The rear face/discharge elevator was entered for the inspection.



Mr. Rick Moren
Director of Long-Term Stewardship
Mission Support Alliance, LLC
P.O. Box 650
Richland, WA 99352

Dear Mr. Moren,

SUBJECT: Contract 55534; 105-H Safe Storage Enclosure Engineering Inspection Report

References:

- 1) DOE/RL-2005-67, Rev 0, Surveillance and Maintenance Plan for the 105-H Reactor Safe Storage Enclosure
- 2) MSA Work Package; 2M-73151/C, for C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance
- 3) WCH-470 Rev 0., 105-H Safe Storage Enclosure, Five Year Surveillance in 2010
- 4) DOE/RL-200-57 Rev. 2, Removal Action Work Plan for 105-D and 105-H Building Interim Safe Storage and Ancillary Buildings

This letter and report package is provided as deliverable #5 of the subject contract as part of the 105-H Interim Safe Storage (ISS) Building Surveillance / Inspections that was performed on April 7, 2015. In accordance with Ref. 1 and 2, an inspection was performed to determine the Safe Storage Enclosure (SSE) conditions and structural adequacy under ISS. An exterior and interior visual inspection of the SSE was performed. The surveillance routes used were as noted in Ref. 1 (with some limitations) and were the same routes used in the prior inspection (Ref. 3). Polestar's evaluation of the inspection data is described in Attachment A.

The inspections, assessment and any evaluations were performed by a team consisting of: Jaimie Ryan, Field Engineer; Tom Rodovsky, PE; Mike Custer, PE; and Mark Morton, PE. Not every person participated in each activity, but this team was engaged / available for each SSE inspection.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects – very similar to the conditions described in Ref. 3. There is one location at the west side of the front face area that was identified as being vulnerable for unauthorized access – not because of degradation, but because (inexplicably) the SSE design criteria was not appropriately implemented at this location.

Recommendations from the 2015 105-H SSE inspection are in three categories:

1. SSE Structure – To summarize a few items:

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Suite 4
Richland, WA 99354

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Page 1



- Attachment A Figure A-1 and Attachment C-1 photo 3464 shows a 24" by 24" opening in the concrete west wall of the front face that is only closed by a bolted plate (just N of the vestibule). With a wrench or ratchet, the plate could be removed in a very short time and access to the interior of the SSE could be gained. Per Section 2.1.5 of Ref 4, any remaining entrances will be welded shut. It is recommended that this item be addressed in the near term.
 - Small Openings in the Siding / Flashing - Consideration should be given to instituting a corrective maintenance program to close openings at the exterior and interior siding vertical corners that are currently suspected access points for bats and small birds. Note that the limitations listed in the biological survey that was done concurrent with this engineering inspection must be considered prior to planning and implementation to correct this item. This consideration would become a strong recommendation prior to moving to significantly longer durations between internal inspections to assure that excessive roosting and feces accumulation does not occur between future extended entries.
 - Two of four south side downspouts at the rear face wall have broken off – not a structural or engineering issue, but the project may consider re-installing at some point for appearances.
 - Swallow nesting at concrete / siding junction point – not an issue presently, but continued building up of feces around the building and on installed steel caps may present personnel or corrosion concern in the future.
2. Future inspection of surveillance routes (Ref. 1) – Conditional recommendations for access to Routes 4 and 5 are as follow;
- i. Access for Route 4 is recommended:
 - a) If there is evidence of a large bat roosting issue in the other parts of the structure which may indicate that the Route 4 spaces may be vulnerable to that same condition, or
 - b) Prior to moving to significantly longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started.
 - ii. Access for Route 5 is recommended:
 - a) If the downspout landing drainage below the 2 down spout drainage areas on the south side of the building show evidence of subsidence indicating some underground movement, possibly into the below grade areas of the rear face area, or
 - b) Prior to moving to significantly longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started.
3. S&M Plan (Ref. 1) – Recommend that Reference 1 be revised – in the near term to capture current accessibility conditions and rationale for including or excluding inspecting the various inspection routes in the future. Specifically:



- i. Highlight the need to open two locked doors in the vestibule for the main routes, and that additional door on the west side grade level for Route 4 and the large bolted plate at the SW corner to access Route 5 must be removed for access to these respective routes.
- ii. Provide the rationale for skipping Routes 4 and 5 at times and to call out under what conditions those routes would be expected to be or required to be inspected.
- iii. When these modifications are undertaken, consideration should be given to updating all of the maps and SSE footprint to match field observations for the 105-H SSE. The recommended modifications would not necessarily change the main surveillance routes, but would more accurately show the physical layout.

ATTACHMENTS – Attachment A is an assessment of the data collected and results of the SSE inspections completed in April 2015. Attachment B condenses the Attachment A information into a high level synopsis and a format suitable for direct inclusion into the MSA 2015 105-H SSE Inspection document.

Available photos from the earlier inspection in 2008 and similar view, new photos are contained in Attachments C and D. The outcome from the April 2015 inspection, as detailed in Attachment C and D, fall into three categories that are recommended to form the basis for the next 105-H SSE inspection.

(a) Attachment C includes Reference 3 items that were re-inspected in April 2015 and recommended to continue on the inspection / recommended maintenance list for future action;

(b) Attachment C also includes newly identified items from April 2015 that require future inspection or maintenance action.

(c) Attachment D includes new photos and Reference 3 items that were observed either specifically or generally in April 2015 and are not required for future inspections but are preserved herein for possible comparisons in future 105-H SSE inspections.

We are pleased to provide these inspection and reporting services to MSA and request that you contact me at 509-946-8279 if you have any questions concerning this report letter and attachments.

Kind regards,

A handwritten signature in black ink, appearing to read "Mark R Morton".

Mark R Morton PE

ISS Support Project Manager



Letter No. 15-MRM-006
May 29, 2015

cc: Finney, S – MSA Procurement
Bailey, P;
Miller, K;
Morton, M;
File / LB

Enclosure(s)

Attachment A – ASSESSMENT OF INSPECTION DATA
Attachment B - 105-H BUILDING INSPECTION REPORT INSERT FOR MSA
Attachment C – 105-H SSE INSPECTION RESULTS – For further consideration
Attachment D – 105-H SSE INSPECTION RESULTS – Historic record

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Suite 4
Richland, WA 99354

www.polestartechnicalservices.com

Office: 509-946-8279

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Attachment A – ASSESSMENT OF INSPECTION DATA

The interior and exterior inspection of the 105 H SSE was conducted by Mark Morton and Jaimie Ryan of Polestar Technical Services and MSA RCT Joe Wiley on April 7th, 2015. The weather on that day was approximately 55 degrees, slight overcast with gusty winds, and no rain on the day of the inspection. Of note, there was significant rain a few days earlier, and reports from those MSA staff entering the vestibule indicated that some leakage and puddles were observed on the west side of the vestibule under the exterior vents.

- A. **Interior Conditions** – noteworthy items from the interior SSE inspection are discussed below. Items 2 and 3 are of a structural / design criteria nature and results in recommendations for continued monitoring with each SSE entry.
1. The -30 ft. and -15 ft. rooms were noted as being exceptionally dry and free of defects. Although a significant amount of sand and dirt has blown in on the stairs and floors, the concrete floors, walls and ceiling showed no signs of water in-leakage during the ISS period.
 2. Observation of SSE metal sheathing at the 56' and 80' levels showed multiple openings at junction points where outside light could be seen – evidence of a possible access point for small birds, bats, insects, spiders, etc. While not every pinpoint of outside light is big enough for bird or bat access, there is ample evidence of a number of bats being in the structure in the past and reports of one or two seen on the initial entry by the MSA safety team on April 6th. If any closure of these openings is considered, timing is an issue with the biological team, but a program of maintenance may be recommended to close off the identifiable openings with a wire mesh or metal fabric from the outside. Adhesive or self-tapping screws with a non-corrosive metal mesh or metal fabric would seem to provide an effective and fast way to inhibit further entries, this approach would presumably use an articulated man-lift of significant size. Additionally, consideration for galvanic corrosion with the galvalum roof / siding materials must be accounted for when selecting a material for closure. The area shown in Attachment C-4, photos 3454 and 3455 are a few typical instances. If or when a maintenance program is planned, the timing noted in the 105-H SSE ecological reviews must be considered. Further, it is strongly recommended that this maintenance be completed prior to significantly extending the SSE surveillance periodicity.
 3. **West Wall of the Front Face**
 CONDITION - Through the 3' thick SSE wall just to the North end of the vestibule structure (Figure A-1 and left side of Figure A-2) is a metal plate affixed to the outside over a full penetration opening that is about 24 inches square. This raises a security issue (and a deviation from the original design criteria of the SSE) since simply unbolting this plate would provide unauthorized access to the SSE interior. This area is shown below and is included in Attachment C-1, photo 3464 (inside) and in Attachment C-5 photos 3476 and 3477 (outside).
 INVESTIGATION – The Bechtel Hanford construction Subcontract Technical Representative (Daryl Schilperoort) that covered the construction contract for the SSE



construction did not remember any reason for or approval of a deviation to plate this opening versus a pour-back that would have met the SSE design criteria listed in Ref 4 for an opening of that size within 10' of outside grade elevation. This area was photographed in the previous WCH inspection report – with no record of concern for this item. It may be that the previous inspection team had good reactor and structural knowledge, they lacked the historic background and security basis for the pourback versus plate decision making used during design and construction of the SSE.



Figure A-1 – Front Face opening interior



Figure A-2 – Front Face opening exterior (with close up of one bolt closure)

ASSESSMENT / RECOMMENDED ACTION – While there is a risk of unauthorized access introduced by this item, and regulator and public confidence issues would result from an authorized entry, significant public safety risk (real health and industrial / radiological safety harm) is minimal given the very good conditions inside the SSE. However, there are easy actions to remove the risk completely short of installing a concrete pourback per the original design. Polestar recommends that when the SSE is closed, the same weld material used for the doors in



the vestibule be applied to form a complete weld around the exposed threads (Figure 2) on three bolts on this plate – evenly spaced on the North side, top and South side of the plate. No strength is required of the weld material on the Hilti-bolt / nut junction, rather the weldment would damage the threads enough to prevent easy removal of these three nuts, thus effectively removing the possibility of a quick unauthorized entry. Grinding weldment and a wrench could still remove the plate with more planning and time – but then it’s more an act of planned vandalism than a quick entry with as little as an adjustable wrench available on many boats in the river.

B. **Exterior Conditions** – Several areas of spalled concrete appeared in the 2008 inspection with no changes noted in the April 2015 inspection. Most noticeable was the Northeast corner of the building. The spalled and broken corners (from demolition) are only cosmetic items, i.e., of no structural concern, and are not changing in any significant way over a number of years. In addition, there are two other items of note were observed and investigated;

1. The pourback at the front face on the NE corner of the building (shown in Figure A-3 and included in Attachment C-5 Item # 68 and new photo 3491) includes a portion that is polyurethane foam and is badly weathered. This is not a structural issue since the inside of this pourback was observed to be dry and well-sealed. Rather it only begs a question since it is so obvious and upon close inspection is weathered so badly. At some point, scraping out the old foam and painting this area may be a prudent action just to preclude future questions.



Figure A-3 – Foam Entrained in Pourback at Northeast Corner of SSE

2. Grade level plate could provide interior access as discussed in Item A.3 above.

C. **Surveillance Routes & Maps**



1. Map figures in Ref 1 are inconsistent with other SSE map figures in all the other S&M Plans. Ref 1 includes Figure 2-2 as Below Grade 1 and Figure 2-3 as Below Grade 2, with no indication exactly what elevation these two levels are and the reader is left to assume which is lower / higher. Not until careful examination of some of Ref 3 pictures from the previous surveillance inspections was it determined that below grade 2 is -30ft, and below grade 1 is -15ft.
2. Routes 4 and 5 – No entry and Route 4 and 5 were not accessed nor were these areas entered in the 2008 inspection.
 - i. For Route 4 - The man door noted in Ref 1 for Route 4 was inspected but not opened per direction of MSA management. Exterior inspection of the roof, siding and flashings in this area showed no signs for concern.
 - ii. For Route 5 – Inspections of the exterior wall of the rear face space (south side of the SSE) and Route 3 at elevation 56' showed no signs for concern with the integrity of the concrete envelope of the rear face / D elevator area.
 - iii. Two potential changes in the SSE or S&M Program could support a future recommendation to open the door for access to Route 4: (a) Moving to longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started, (b) Evidence of a large bat or other biota roosting issue in the other parts of the structure would indicate that these spaces may be vulnerable to that same condition.
 - iv. Two potential changes could support a future recommendation for inspection of Route 5: (a) The downspout landing area at +20 feet and the drainage below the 2 down spouts on the South side of the building show evidence of additional damage or subsidence indicating some underground movement, possibly into the below grade areas of the rear face area.(b) Moving to longer durations between internal inspections, simply to define a baseline condition of the entire structure when the extensions are started.
3. Since the conditions noted in 2.i and 2.ii above are similar to other areas of the SSE that were inspected inside and out without significant issues, it is reasonable to reach a conclusion that the interiors of these spaces is acceptable at this point in time.



Attachment B - 105-H BUILDING INSPECTION REPORT INSERT FOR MSA

Engineering Inspection – Appendices X and X+1 provides the record of the inspection, discussion, pictures, and checklist of the structural inspection of the interior and exterior of the structure. Appendix X contains those items with a maintenance and or continued monitoring recommendation, while Appendix X+1 photos and notes are provided as a general record of the condition of the Safe Storage Enclosure.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in fair and stable condition with no significant defects. Through the 3' thick SSE wall just to the North end of the vestibule structure is a metal plate affixed to the outside over a full penetration opening that is about 24 inches square. This raises a security issue (and a deviation from the original design criteria of the SSE) since simply unbolting this plate would provide unauthorized access to the SSE interior.

Recommendations - Recommendations from the 2015 105-H SSE inspection amount to two items, one very specific corrective action and a general documentation clarification:

1. SSE Structure – address the steel plate noted above to remove any possibility of unauthorized access to the SSE.
2. Future use of surveillance routes and S&M Plan revision should be considered to reflect actual conditions / maps in the SSE and to provide guidance when and how Routes 4 and 5 shown in the S&M Plan should be used.



C 105-H SSE INSPECTION RESULTS – For Further Consideration

This section presents the Surveillance photos for areas which are recommended for continued monitoring for subsequent SSE surveillances. The items identified herein were collected from both the inspection in the April 2015 and the inspection documented in WCH-470 from 2010.

Each elevation of the building with items recommended for future surveillance inspections is a separate section of this attachment and includes:

1. a map showing the photo locations
2. a portion of the inspection table that applies to that elevation and
3. comparison photos from 2008 to 2015 (when available)

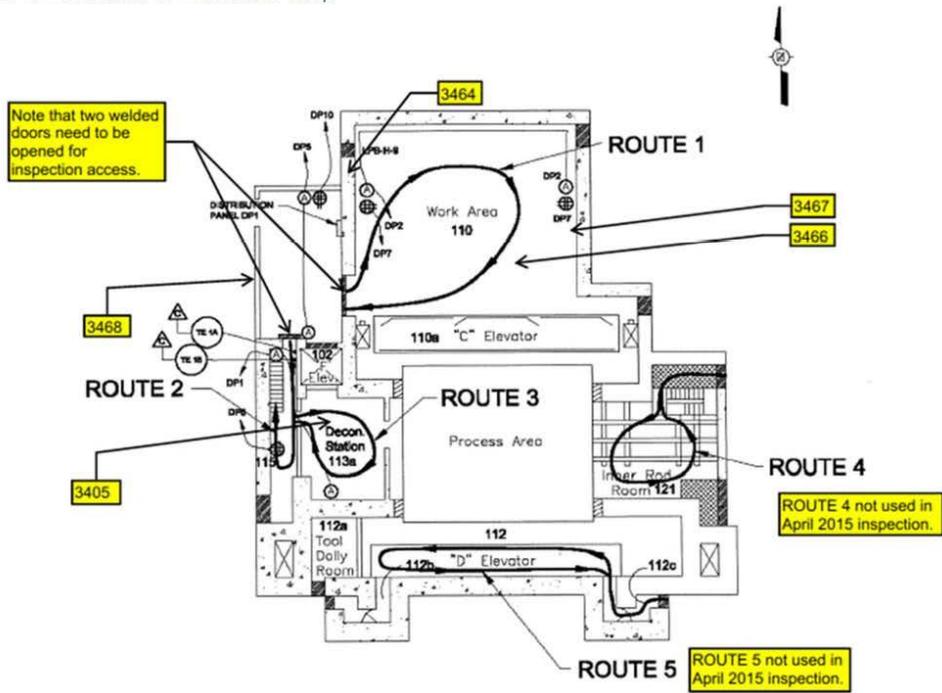
Where a new item is identified within the area covered in a particular section, the new area will be listed in the location table and photo(s) will be provided. If there is no particular area / item for concern on any given elevation, no map or table will be included in this section. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

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C 105-H SSE INSPECTION RESULTS – For Further Consideration	1
C-1 –Elevation 0’ – Interior Map	2
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C-2 –Summary Table & Photos Elevation 42’	8
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C-4 –Summary Table & Photos Elevation 80’	16
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C-5 –Summary Table & Photos Elevation 0” Exterior	18



C-1 – Elevation 0' – Interior Map



C-2



C-1 –Summary Table & Photos Elevation 0' - Interior

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
Item # 1	3464	Wall	Interior Elev. 0	Recommend welding 2 opposing bolts on exterior face. Possible unauthorized personnel access point to front face.
Item #6	3466	Pipes and Wall	Interior Elev. 0	Includes netting @ ceiling that catches debris above front face area Recommend continuing observations
	3405	Decon Room @ 0'	Interior Elev. 0	Minor oil weeping into tray Recommend a catch bowl with absorbent
	3467	Plywood glued and bolted to ground to cover CA	Interior Elev. 0 Front Face	Recommend continuing observations Note** no picture but dry at bottom of C elevator shaft
	3468	Wall vent and ceiling structure/vestibule	Interior Elev. 0 Vestibule	Possible Weather Protection issue. Previous evidence of water intrusion but no entry point seen. Could be weather protection issue



3405 Decon Room @ 0' - Minor oil weeping into tray



Item # 1 2010 Detail Interior Elev. 0'0 Wall

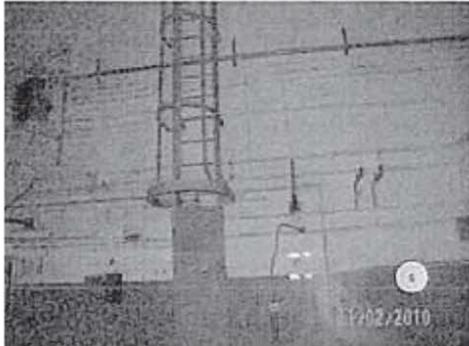


3464 Possible unauthorized personnel access point to front face.

C-4



Letter No. 15-MRM-006
May 29, 2015



Item # 6 2010 Detail Elev. 0 Pipes and Wall, Recommend continuing observations



3466 Includes netting @ ceiling that catches debris above front face area.



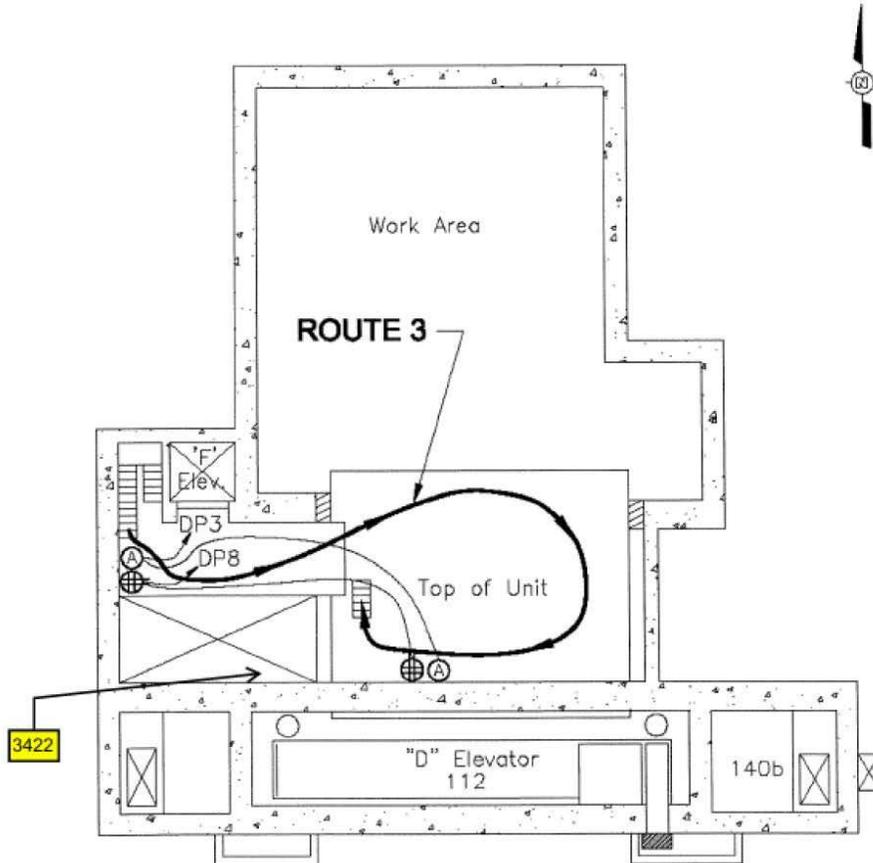
3467 Plywood glued and bolted to ground to cover CA
Note*** no picture but dry at bottom of C elevator shaft



3468 wall vent and ceiling structure in vestibule—previous evidence of water intrusion but no entry point seen.



C-2 – Elevation 42' Map



C-7



Letter No. 15-MRM-006
May 29, 2015

C-2 –Summary Table & Photos Elevation 42'

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3422	Bat Guano accumulating on vent duct flange from stairs on way up to 42' level	Elev. 42' 5"	As seen from stairway to 42' elevation Recommend continuing observations.



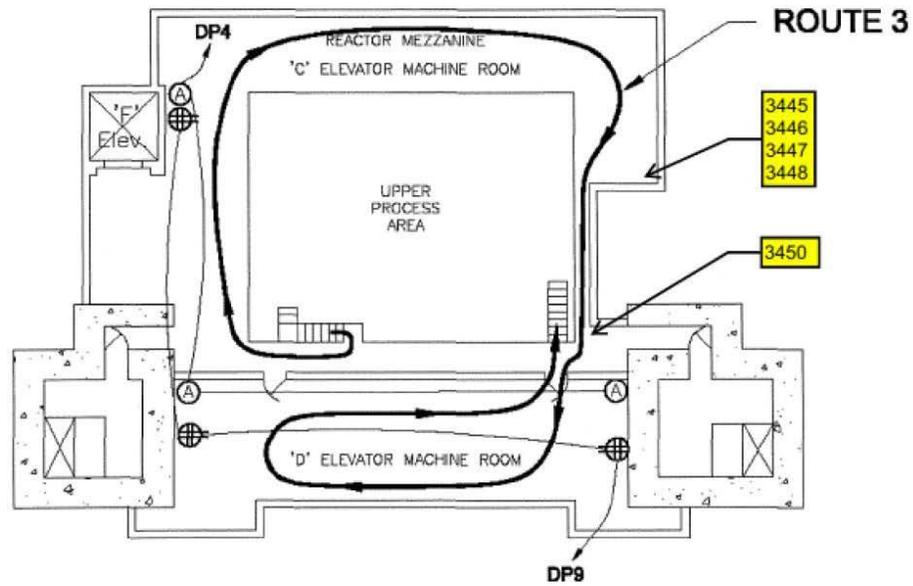
3422 Bat guano accumulating on vent duct flanges.



C-3 – Elevation 56'4" Map



NO ACCESS ALLOWED TO ROOF BELOW





C-3 –Summary Table & Photos Elevation 56'4"

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendation
	3441	Wet spot @ 42' from dripping winch @ 80' level as seen from 56' walkway	Elev. 56'4"	No structural issues
	3456	Leaking winch @ 79' elevation below NE corner of diamond decking @ 80' level	Elev. 56'4"	No structural issue
	3445	Peeling paint on beam. Along east wall	Elev. 56'4"	Red undercoat in good condition after large blister picked off. No structural issue
	3446	Peeling paint on beam. Along east wall	Elev. 56'4"	No structural issue
	3447	Peeling paint on beam. Along east wall	Elev. 56'4"	No structural issue
	3448	Peeling paint on beam. along east wall	Elev. 56'4"	No structural issue



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	3450	Peeling paint on beam. along east wall	Elev. 56'4"	No structural issue
--	------	--	-------------	---------------------



3441 wet spot @ 42' from dripping winch @ 80' level as seen from 56' walkway



3456 Leaking winch @ +79 elevation below NE corner of diamond decking @ 80' elevation



3445 Peeling paint on beam along east wall.



3446 Red undercoat in good condition after large blister picked off.



3447 Blistering/peeling grey paint. Detail of original column with modifications as part of SSE.



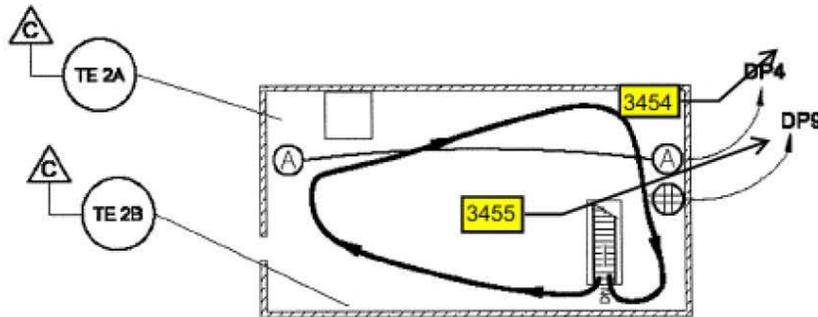
3448 Detail of original column with modifications as part of SSE.



3450 Peeling paint on support. Red undercoat in good condition.



C-4 – Elevation 80' Map



C-15

E-46



C-4 –Summary Table & Photos Elevation 80'

	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3454	Prior roof section east side from 80' and siding corner	Elev. 80'	No issues inside structure. Large vertical opening in siding
	3455	10-12 feet long x 1" gap at interior corner of structure	Elev. 80'	Large opening in siding Animal/bird/pest intrusion point



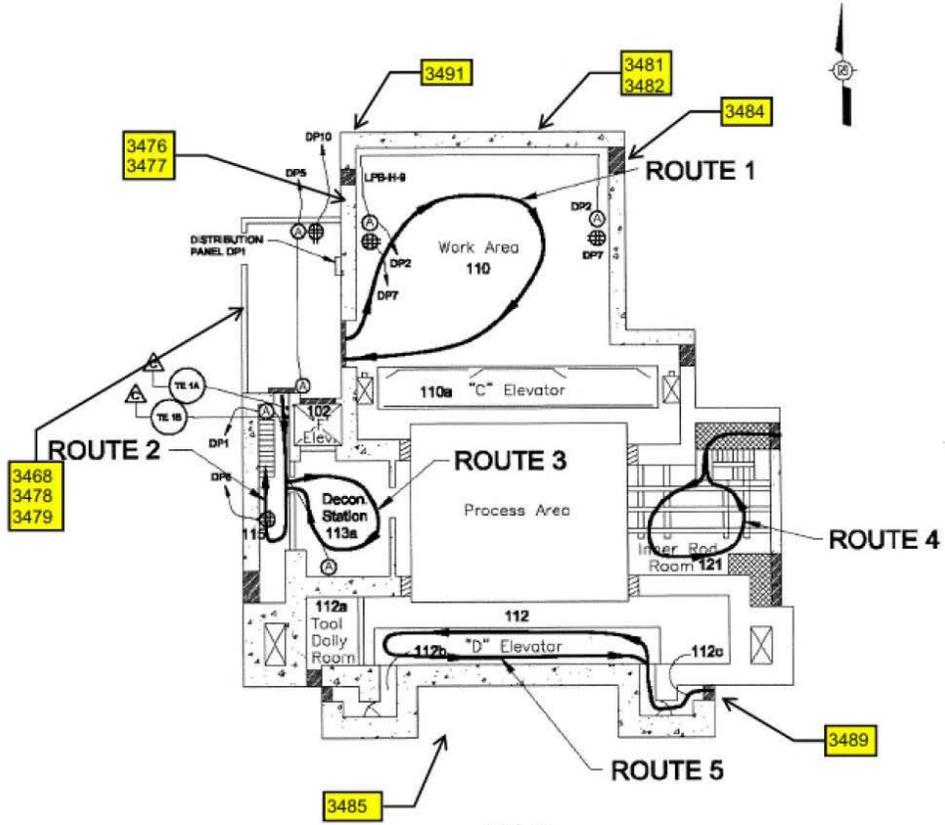
3454 Prior Roof sections east side from 80' elevation. Space is clean and dry with no visible issues other than siding issue.



3455 10-12 feet long x 1" open gap at interior corner of structure. Animal/bird/pest intrusion point



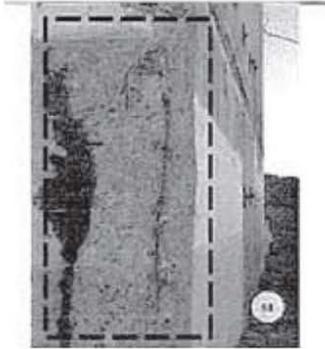
C-5 – Elevation 0' - Exterior Map





C-5 –Summary Table & Photos Elevation 0” Exterior

#	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
Item # 68	3491, 3492	Suspected existing foam joint material	Exterior from Elev. 0'0"	No visible change to condition. Suspected existing foam joint material. No evidence inside of deteriorating condition. Recommend continuing observation
	3476	Exterior view of 3464 Metal cover plate	Exterior from Elev. 0'0"	Exterior of pic # 3464 not sealed properly. Recommend welding at least 2 opposing bolts.
	3477	Close-up of 3476 Metal cover plate	Exterior from Elev. 0'0"	Bolt on metal cover plate. Recommend welding at least 2 opposing bolts
	3478	Exterior view of 3468 Air vents on vestibule.	Exterior from Elev. 0'0"	Reported water entry—no defects seen. Possible weather protection issue.
	3479	Close up of 3478 Air vents on vestibule	Exterior from Elev. 0'0"	Reported water entry—no defects seen. Possible weather protection issue.
	3481	Seam of roof/concrete structure	Exterior perimeter	100's of birds building mud nests under ledge at seam locations around entire building.
	3482	Seam of roof/concrete	Exterior perimeter	100's of birds building mud nests under ledge at seam locations around entire building. Recommend continuing observations
	3484	Cracked concrete on pourback	SW corner	Cracked concrete on pour-back. Does not appear to be an issue but should be watched. Recommend continuing observations
	3485	Bird feces on metal cap	Building exterior	Lots of bird feces on metal cover caps Recommend continuing observations
	3489	Birds on building seam	Building exterior	Birds nesting on seam between metal roofing and concrete Recommend continuing observations



Item # 68 2010 Detail Discoloration, Suspected existing foam joint material.



3491 - No visible change to condition. Suspected existing foam joint material. No evidence inside of deteriorating condition.



3476 exterior of view 3464 not sealed properly. At least 2 opposing bolts need to be welded shut.

C-19



3477 bolt on metal cover plate. Recommend welding.



3478 exterior view of 3468
Reported water entry—no defects seen.



3479



3481 100's of birds building mud nests under ledge at seam locations around entire bldg.



3482



3484 cracked concrete on pour back-does not appear to be an issue but should be watched.



3484 Blow-up of crack on pour back near SW corner of building.

C-21



3485 Lots of bird feces on metal cap covering.



3489 Metal cover plate with birds nesting above.



Attachment D - 105-H INSPECTION RESULTS – Historic Record

This section presents the general inspection photos for the H Reactor Safe Storage Enclosure that do not show any concerns, but are preserved here for possible comparison during future inspection efforts. Photos from both the inspection documented in WCH470 from 2010 and the April 2015 inspection are included. These photos are organized by building elevation and a map of each elevation and a table of itemized description is included. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

Contents

Attachment D - 105-H INSPECTION RESULTS – Historic Record 1

 D-1 – -30ft Elevation Map 2

 D-1 – Summary Table & Photos Elevation – -30ft..... 3

 D-2 - -15ft Elevation Map 6

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 D-3 – Elevation 0’ Interior Map 11

 D-3 – Summary Table & Photos Elevation 0’ Interior 12

 D-4 – Elevation 12’4” Map 17

 D-4 – Summary Table & Photos Elevation 12’4” 18

 D-5 – Elevation 23’4” Map 21

 D-5 – Summary Table & Photos Elevation 23’4” 22

 D-6 – Elevation 42’ Map 26

 D-6 – Summary Table & Photos Elevation 42’ 27

 D-7 – Elevation 42’ Map 33

 D-7 – Summary Table & Photos Elevation 56’4” 34

 D-8 – Elevation 80’ Map 41

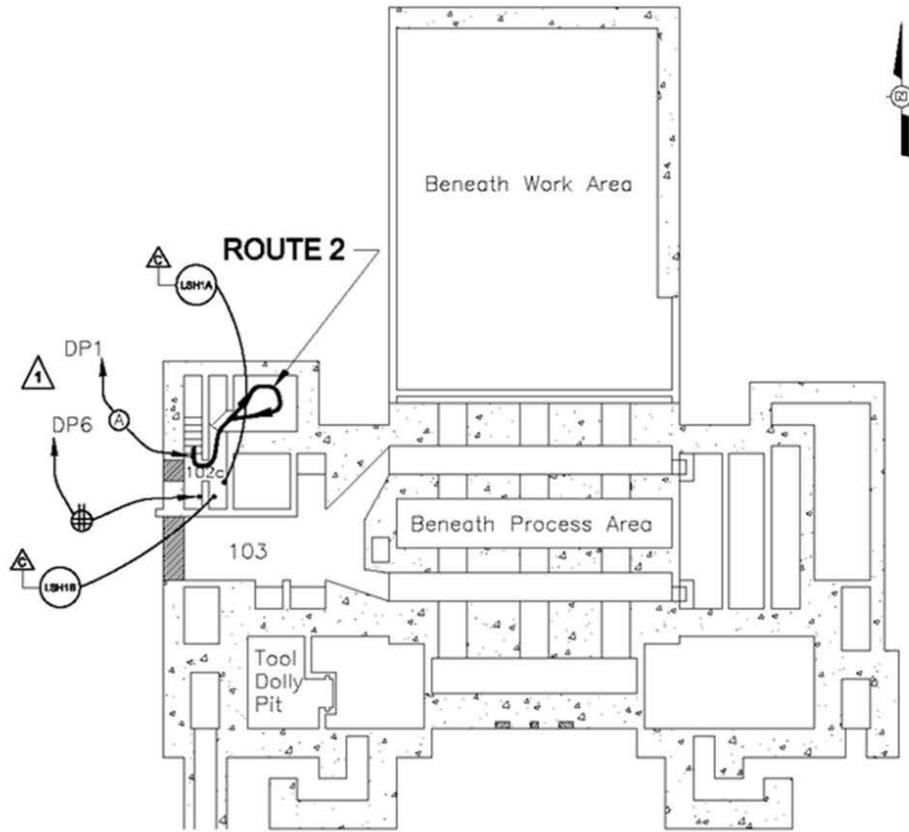
 D-8 – Summary Table & Photos Elevation 80’ 42

 D-9 – Elevation 0’ Exterior Map 50

 D-9 – Summary Table & Photos Elevation 0’ Exterior 51



D-1 -- -30ft Elevation Map

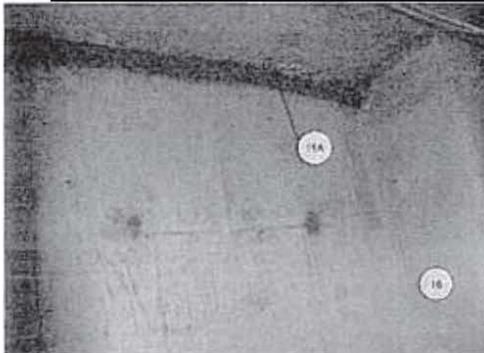


105 H
BELOW GRADE 2

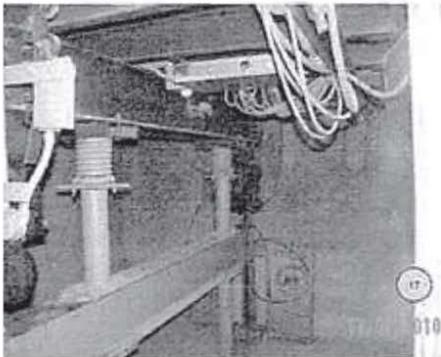


D-1 – Summary Table & Photos Elevation – -30ft

#	New Photo #	Description
Item # 16	No new photo	Pourback
Item # 17	3400	Bottom support structure at F Elevator
Item # 18	No new photo	Wall
	3401	Rubble at bottom of elevator shaft looking up shaft
	3402	



Item # 16 2010 Detail Below Grade 2 -30' Pourback. Spalling

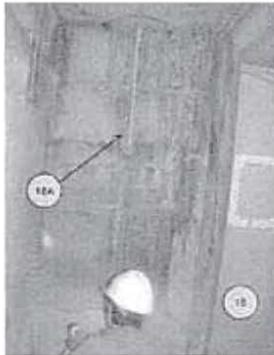


Item # 17 2010 Detail Below Grade 2 -30" Concrete Wall. No visible issues

D-3



3400 No visible issues



Item # 18 2010 Detail Below Grade 2 -30' Concrete Wall, Discoloration



3401 Rubble at bottom of elevator shaft Looking up shaft

D-4

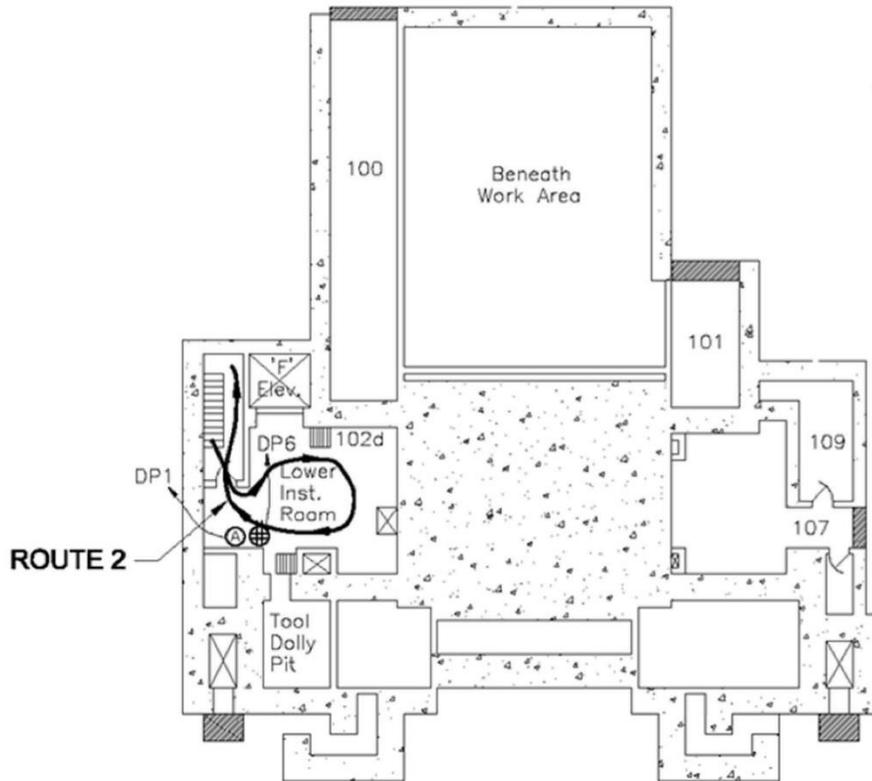
E-57



3402 Looking up Elevator shaft. No visible issues.



D-2 --15ft Elevation Map



**105 H
BELOW GRADE 1**

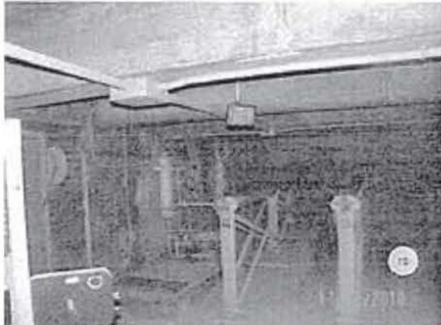


D-2 – Summary Table & Photos -15ft

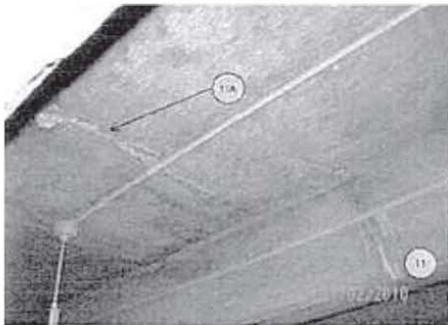
#	New Photo #	Description
Item # 9	No new photo	Interior Stairs
Item # 10	No new photo	Ceiling Beam and wall
Item # 11	No new photo	Ceiling
Item # 12	No new photo	Ceiling Beam and Wall
Item # 13	3403	Ceiling and Wall
Item # 14	No new photo	Ceiling and Wall
Item # 15	No new photo	Ceiling and wall
	3404	Ceiling and wall detail



Item # 9 2010 Detail Below Grade 1 -15' Interior Stairs, No visible issues



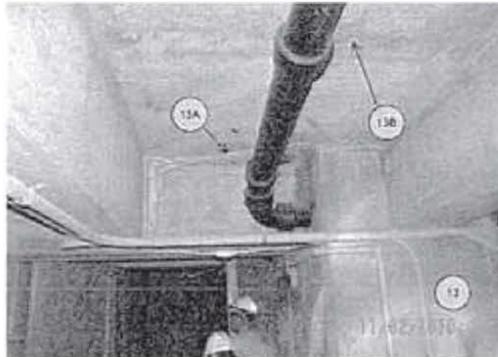
Item # 10 2010 Detail Below Grade 1 -15' Ceiling Beam and Wall, No visible issues



Item # 11 2010 Detail Below Grade 1 15' Ceiling, Discoloration and Corrosion



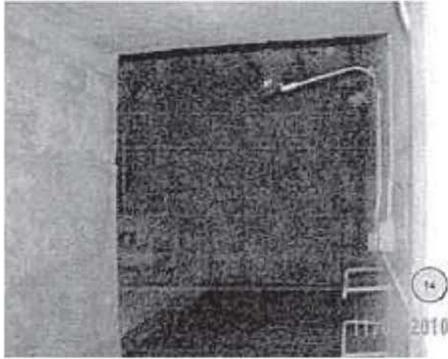
Item # 12 2010 Detail Below Grade 1 -15' Ceiling Beams and Wall, Discoloration and Corrosion



Item # 13 2010 Detail Below Grade 1 -15' Ceiling to wall Joint, discoloration



3403 No visible issues.



Item # 14 2010 Detail Below Grade 1 -15' Ceiling and Wall, No visible issues



Item # 15 2010 Detail, Below Grade 1 -15' Ceiling Beam and wall, no visible issues



3404 Interior very dry. No visible issues.

D-10

E-63



D-3 – Summary Table & Photos Elevation 0' Interior

#	New Photo #	Description
Item # 3	No new photo	Wall
Item # 4	No new photo	Wall
Item # 5	No new photo	Pourback
Item # 7	No new photo	Reactor Core Details
Item # 8	No new photo	Floor Grating
Item # 19	No new photo	Ceiling Beam and Wall
Item # 20	No new photo	Wall
Item # 21	No new photo	Interior pipes and Wall
	3406	Decon Room 0'
	3407	Decon Room 0'
	3409	Decon Room 0' Block isolation Reactor to rear face



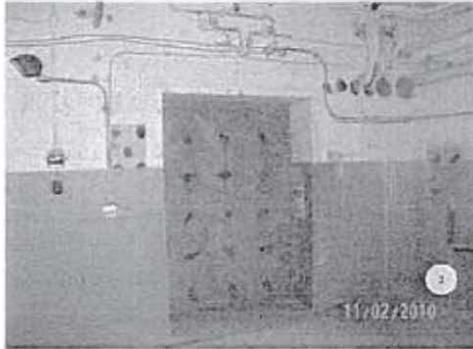
3406 Pour back in good condition



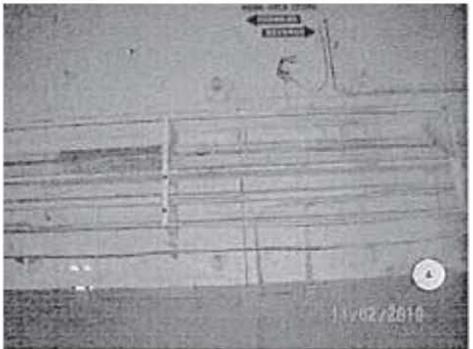
3407 Interior very dry



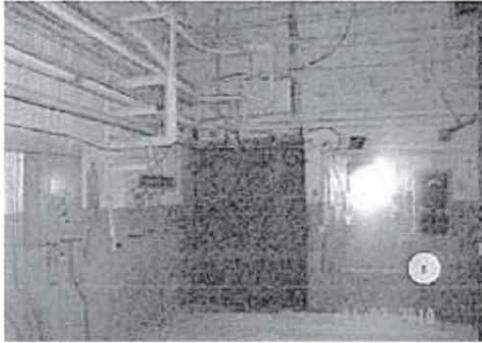
3409 Block isolation Reactor to rear face. No visible issues.



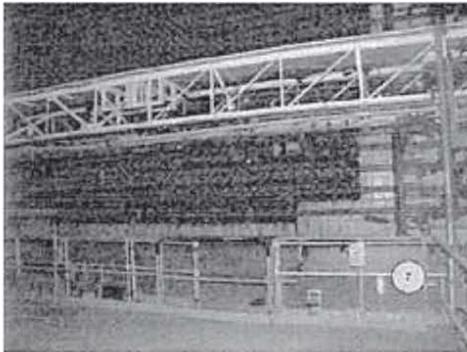
Item # 3 2010 Detail Elev. 0' Wall, No visible issues



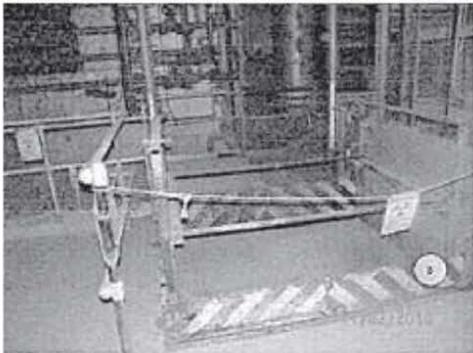
Item # 4 2010 Detail Elev. 0' Wall No visible issues



Item # 5 2010 Detail Elev. 0 Pourback, No visible issues



Item # 7 2010 Detail Elev. 0 Reactor Core Details, No visible issues



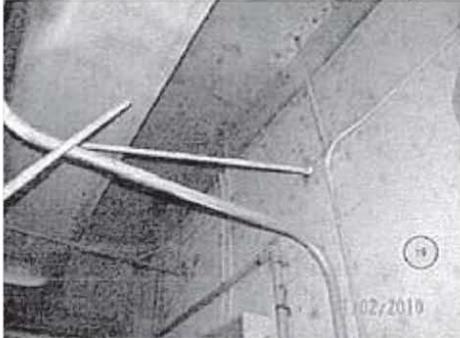
Item # 8 2010 Detail, Elev. 0' Floor Grating , mild corrosion

D-15

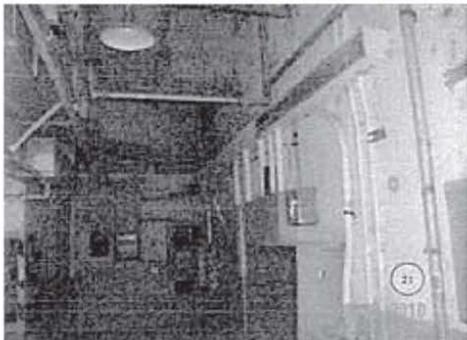
E-68



Item # 19 2010 Detail elev. 0, Ceiling Beam and Wall, No visible issues



Item # 20 2010 Details Elev. 0 Masonry Wall, No visible issues



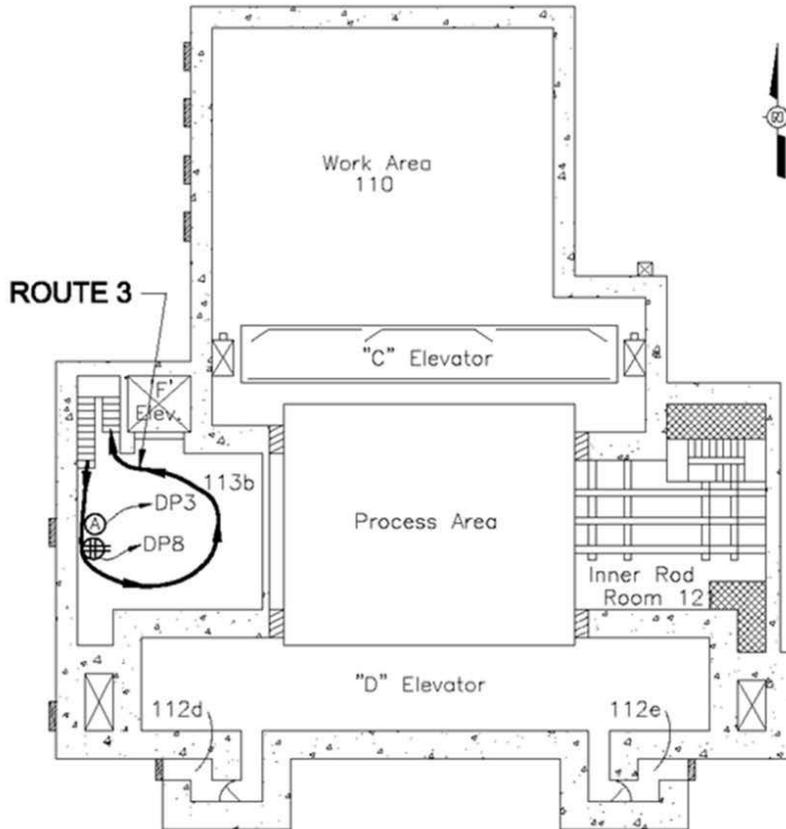
Item # 21 2010 Detail Elev. 0 Masonry Wall, No visible issues

D-16

E-69



D-4 – Elevation 12'4" Map

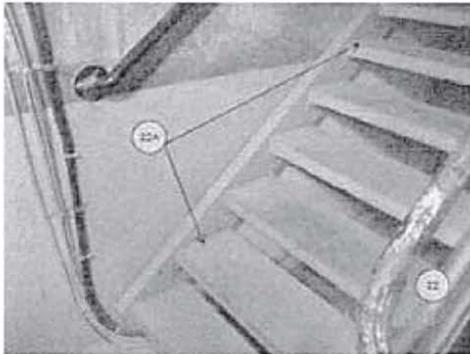


105 H
ABOVE GRADE 1
(ELEVATION 12'-0")

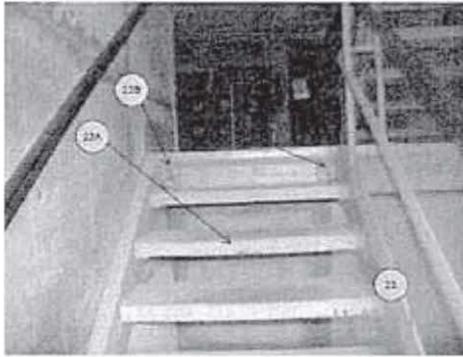


D-4 – Summary Table & Photos Elevation 12'4"

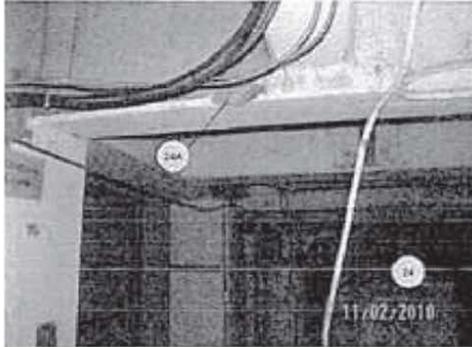
#	New Photo #	Description
Item # 22	No new photo	Stairs
Item # 23	No new photo	Stairs
Item # 24	No new photo	Ceiling beam
Item 25	No new photo	Ceiling beam and wall
Item # 26	No new photo	Metal door and wall
Item # 27	No new photo	Mechanical components
	3414	Control Room detail



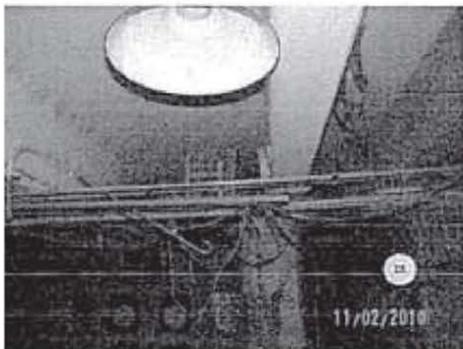
Item # 22 2010 Detail Elev 12'0", Stairs, Loose steps



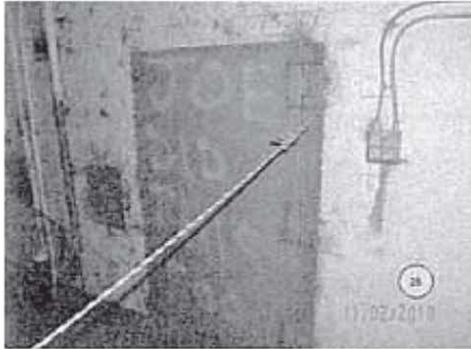
Item 23 2010 Detail, Stairs, Loose steps, corrosion



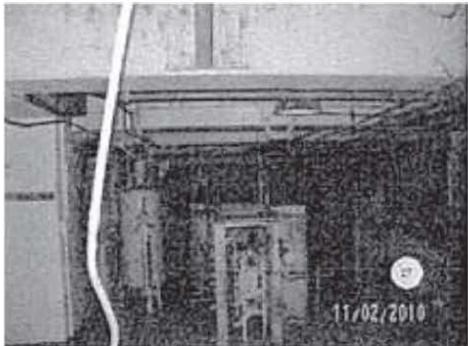
Item # 24 2010 Detail Ceiling beam, spalling



Item # 25 2010 Detail Ceiling beam and wall, No visible issues



Item # 26 2010 Detail Metal Door and Wall, No visible issues



Item # 27 2010 Detail Mechanical components, No visible issues



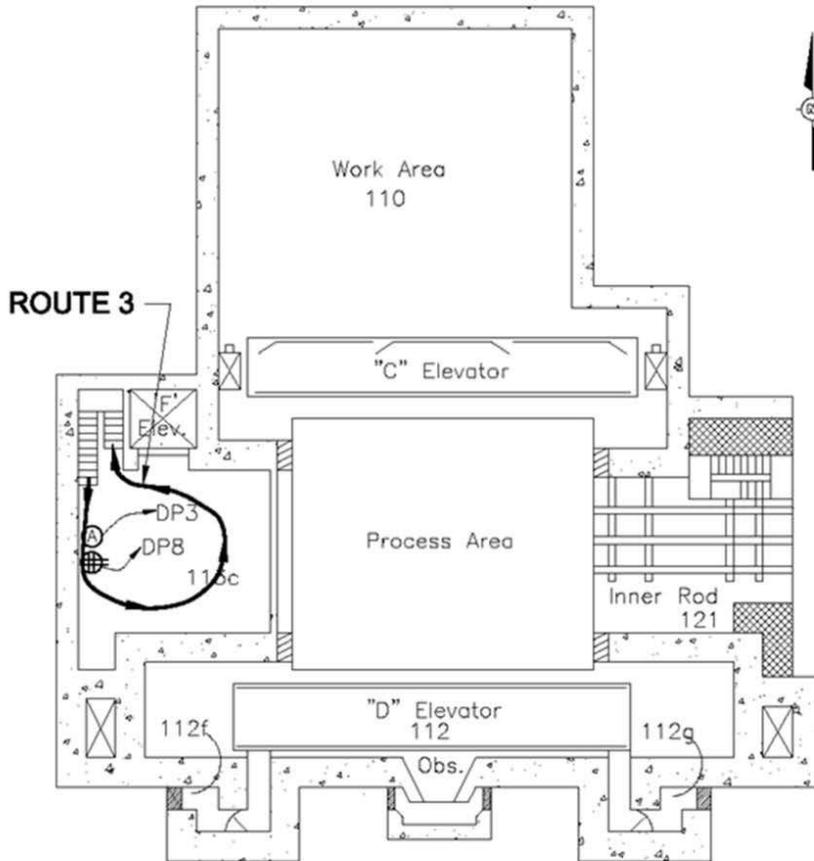
3414 12' Elevation. No visible issues.

D-20

E-73



D-5 – Elevation 23'4" Map



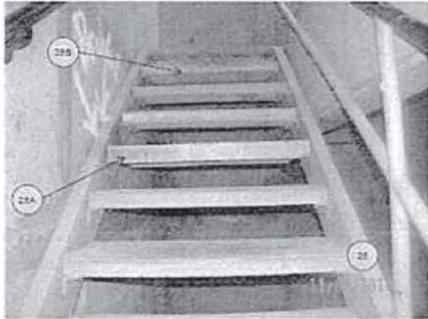
105 H
ABOVE GRADE 2
(ELEVATION 23'-4")



Letter No. 15-MRM-006
May 29, 2015

D-5 – Summary Table & Photos Elevation 23' 4"

#	New Photo #	Description
Item # 28	3415, 3417	Stair
Item # 29	No new picture	Elevator
Item # 30	No new picture	Reactor core



Item # 28 2010 Detail Stair, Repaired step, loose step



3415 on way up to 22 foot level. Wood stair in good condition



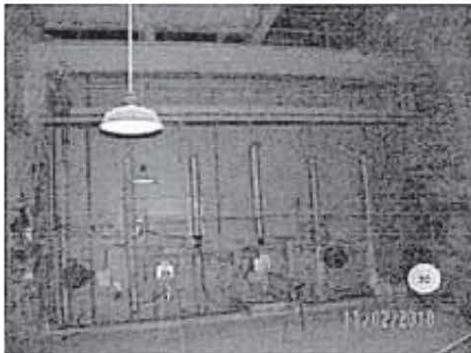
3417 Historic mark on wall. Stair has been replaced and is in good condition

D-23

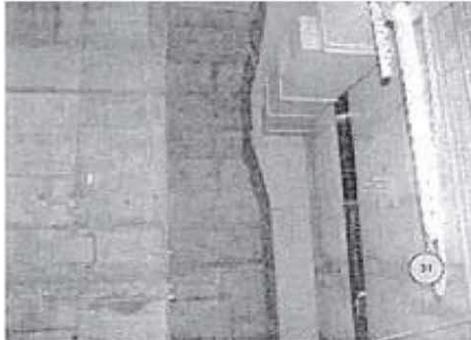
E-76



Item # 29 2010 detail Elevator No visible issues



Item #30 2010 Detail, Reactor Core details, no visible issues



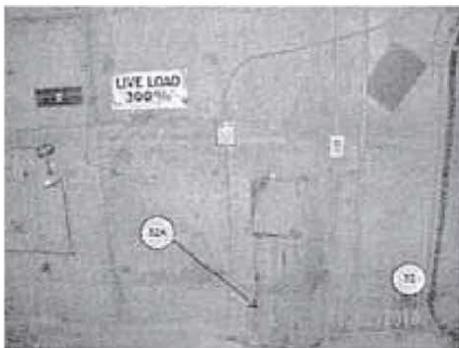
Item # 31 2010 details wall, no visible issues



3419 Dry/Clean with no visible issues.



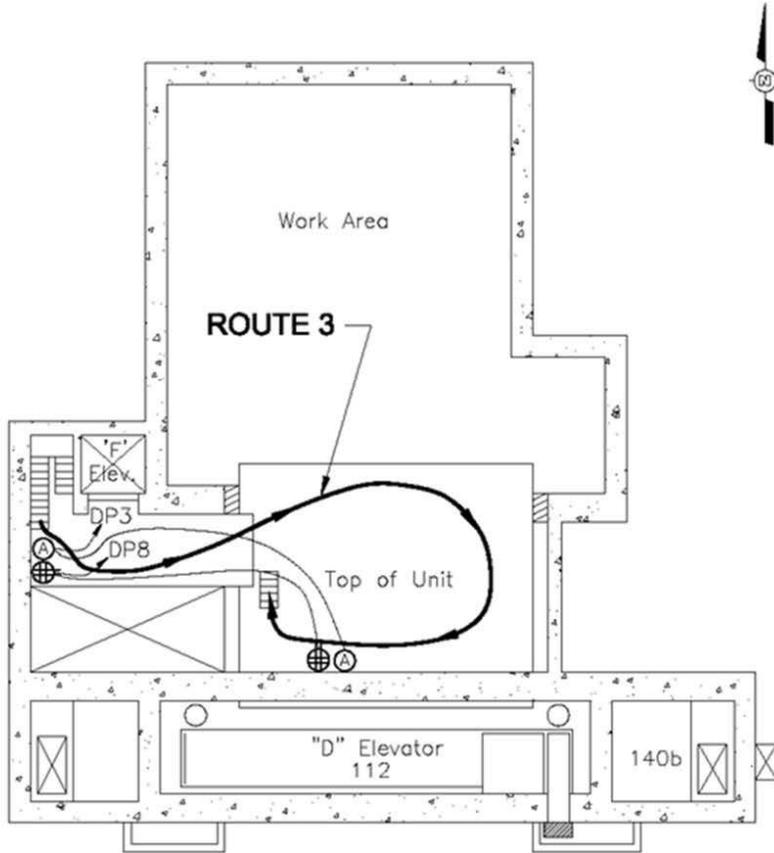
3420 Dry/Clean with no visible issues.



Item # 32 2010 Details, Wall and Metal Plate detail, minor corrosion



D-6 – Elevation 42' Map



105 H
ABOVE GRADE 3
(ELEVATION 42'-5")

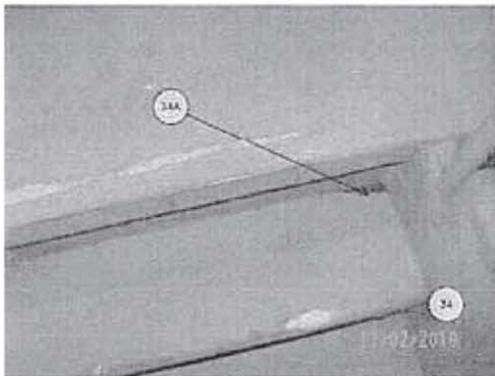


D-6 – Summary Table & Photos Elevation 42'

#	New Photo #	Description
Item # 31	3419, 3420	Wall
Item # 32	No new photo	Wall and Metal Plate detail
Item # 33	No new photo	Stairs
Item # 34	No new photo	Stairs
Item # 35	No new photo	General Floor
Item # 36	No new photo	General Floor
Item # 37	No new photo	Stair
Item # 38	No new photo	Top of Unit Area
Item # 39	No new photo	Top of Unit Wall and Stair
	3425	General area detail
	3426	General area detail



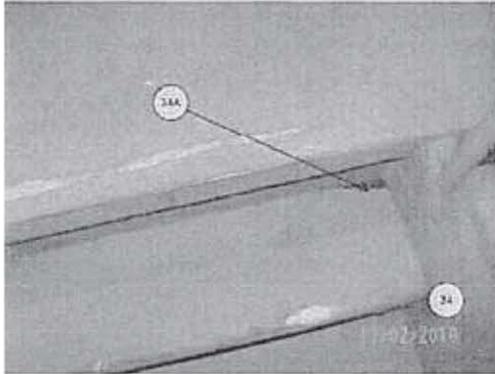
Item # 33 2010 Detail Stairs, loose steps



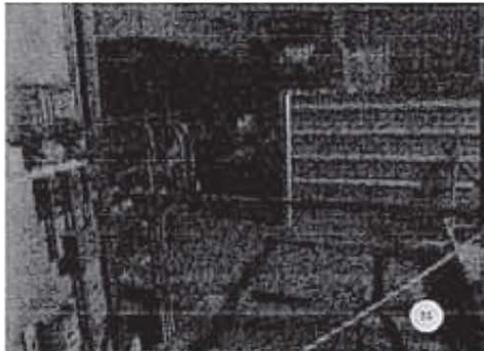
Item # 34 2010 Detail stairs, spalled end and discoloration

D-28

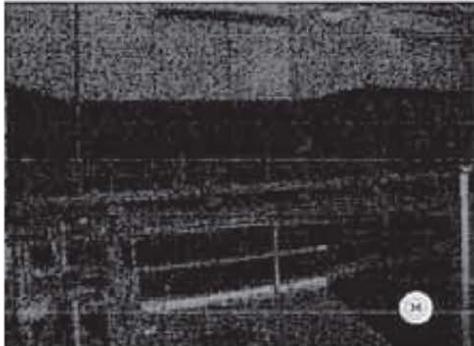
E-81



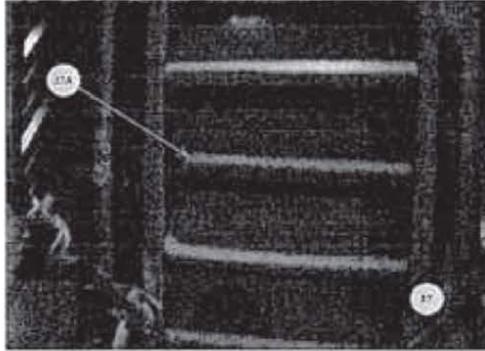
Item # 34 2015 detail



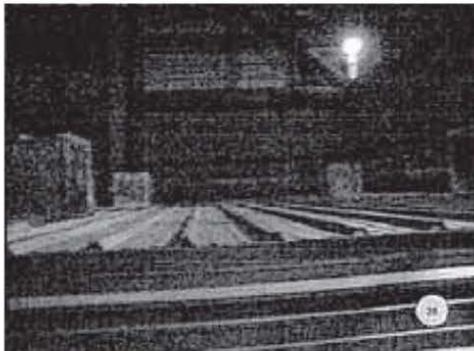
Item 3 35 2010 Detail General Floor, No visible issues



Item # 35 2010 Detail General Floor, No visible issues



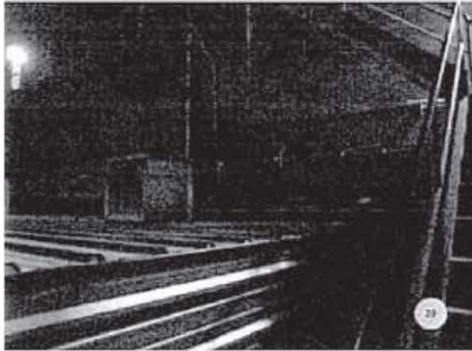
Item # 37 2010 Detail, Stairs, Loose stair



Item # 38 2010 Details, top of Unit Area, No visible issues

D-30

E-83



Item # 39 2010 Details Top of Unit, Wall and Stair Details, No visible issues



3421



3425 42' level detail No visible issues.

D-31

E-84



3426 42' level detail No visible issue.

D-32

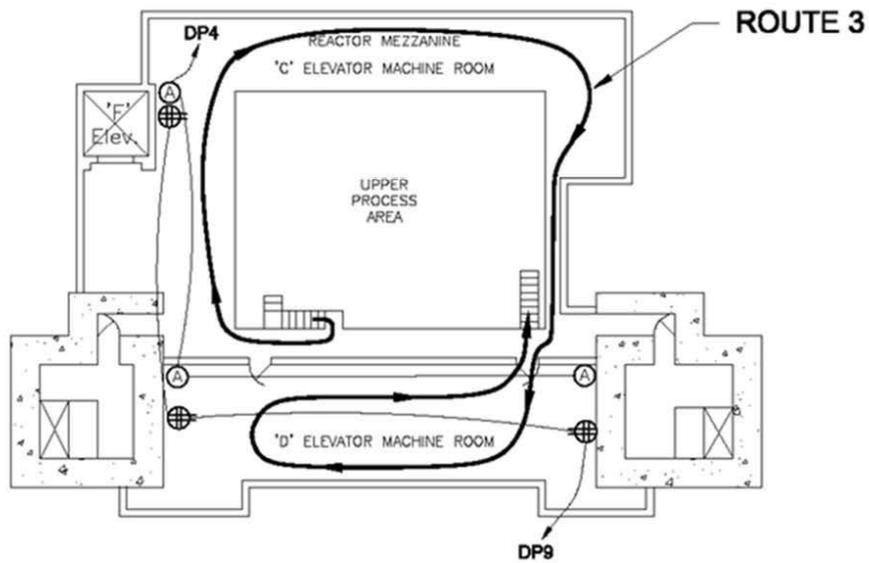
E-85



D-7 – Elevation 42' Map



NO ACCESS ALLOWED TO ROOF BELOW

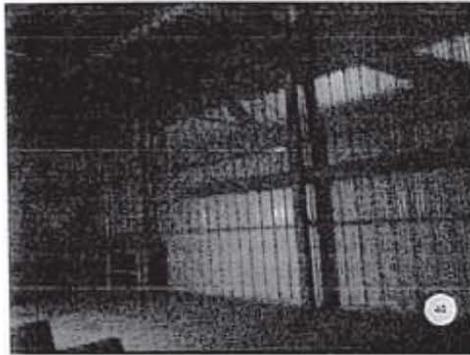


105 H
ABOVE GRADE 4
(ELEVATION 58'-4")



D-7 –Summary Table & Photos Elevation 56' 4"

#	New Photo #	Description
Item # 40	No new photo	ISS Steel Beams, Girts, Braces & Columns
Item # 41	No new photo	ISS Steel Beams, Girts, Braces & Columns
Item # 42	No new photo	ISS Steel Beams, Girts, Braces & Columns
Item # 43	No new photo	Wall
Item # 44	No new photo	ISS Steel Walls, Column and Beams
Item #45	No new photo	ISS Steel Ceiling
Item # 46	No new photo	ISS Steel Column Roof and Beam details
Item # 47	No new photo	ISS Steel Roof Details
Item # 48	No new photo	ISS Steel Column Beam and Truss Details
Item # 49	No new photo	ISS Beams & Connections
	3428	Foam pieces on floor from roofing project
	3429	Detail of roofing/floor construction.
	3430	Detail of roofing/floor construction.
	3432	General structure detail
	3433	Looking down onto old roofing structure—dirt in air
	3440	Beam detail with mortar stains from masonry infills.
	3444	NE corner along E wall 42' Elev. As seen from 56' level



Item # 40 2010 Detail ISS Steel Beams, Girts, Braces and Columns, No visible issues



Item # 41 2010 Details Steel Beams, Girts, Braces & Column, No visible issues



Item # 42 2010 Details Steel Beam, girts, braces & Columns, No visible issues

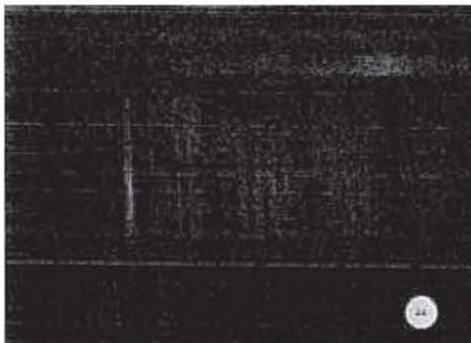
D-35



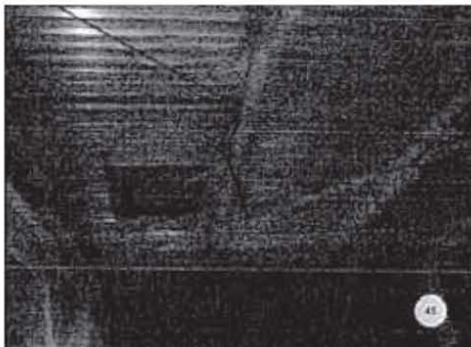
Letter No. 15-MRM-006
May 29, 2015



Item# 43 2010 Details Wall, No visible issues



Item # 44 2010 Details, ISS Steel Walls, Column and Beam, No visible issues



Item # 45 2010 Details ISS Steel Ceiling, No visible issues

D-36

E-89



Item # 46 2010 Detail ISS Steel Column Roof and Beam details, No visible issues



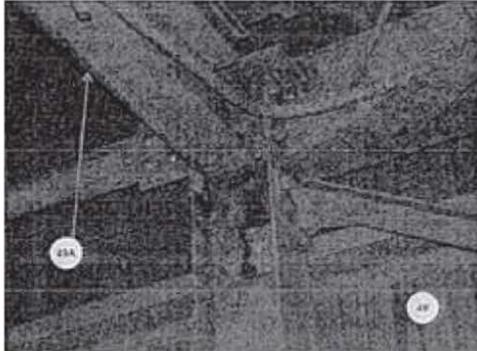
Item # 47 2010 Details ISS Steel Roof Details, No visible issues



Item # 48 2010 Details ISS Steel Column Beam and Truss Details, No visible issues

D-37

E-90



Item # 49 2010 Details, ISS Beams and Connection, discoloration



3428 Foam pieces on floor from roofing project.



3429 Detail of roofing/floor construction. No visible issues. Comparable condition in a number of SSE Structures.

D-38

E-91



3430 detail of roofing/floor construction. No visible issues. Comparable condition of a number of SSE Structures



3432 Clean and Dry. No visible issues.



3433 Looking down onto old roofing structure—dirt in the air. No visible issues.



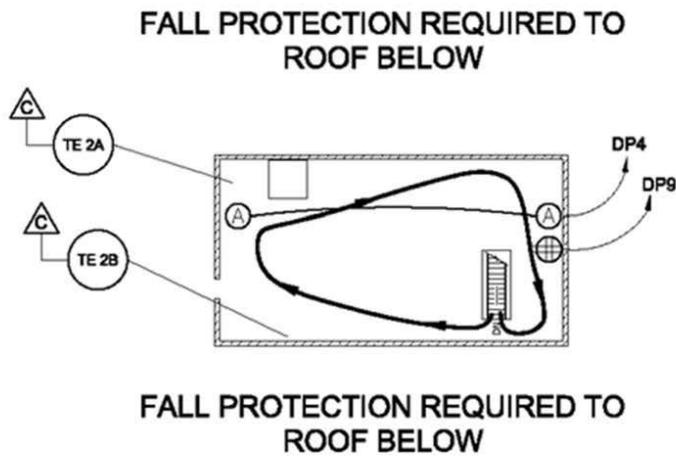
3440 Beam detail with mortar stains from masonry infills. No visible issues.



3444 Clean/Dry interior detail. NE corner along E wall 42" elev. As seen from 56'



D-8 – Elevation 80' Map

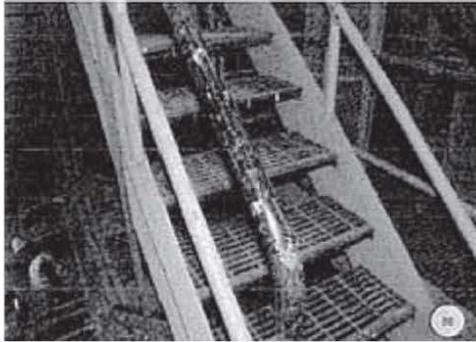


105 H
ABOVE GRADE 5
(ELEVATION 80'-5-1/4")

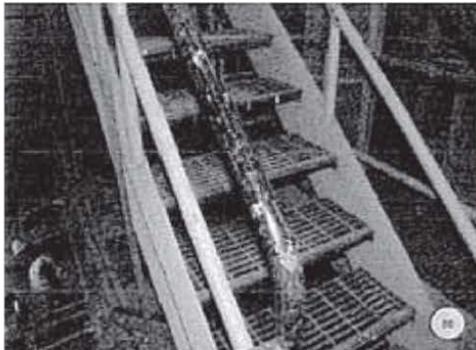


D-8 –Summary Table & Photos Elevation 80'

#	New Photo #	Description
Item # 50	No new photo	Stairs
Item # 51	3451	Stairs
Item # 52	3451	ISS Steel Column, Roof and Beam Details
Item # 53	3451	ISS Steel Column, Roof and Beam Details
Item # 54	3451	ISS Steel Column, Roof and Beam Details
Item # 55	3451	ISS Steel Column, Roof and Beam Details
Item # 56	No new photo	ISS Steel Column, Roof and Beam Details
Item # 57	No new photo	ISS Steel Column, Roof and Beam Details
	3452	Area Detail
	3453	Area Detail
	3457	Structure Detail
	3458	Structure Detail
	3459	Structure Detail
	3460	Prior roof SW corner as seen from +80' elevation.
	3461	Prior roof W corner as seen from +80' elevation
	3462	Prior roof W corner as seen from +80' elevation
	3463	Structure Detail



Item # 50 2010 Detail Elev. 56'-4" to Elev. 80'-5 1/4", Stairs, Corrosion



Item # 51 2010 Detail Elev. 56' 4" to Elev. 80' 5 1/4", Stairs, Corrosion



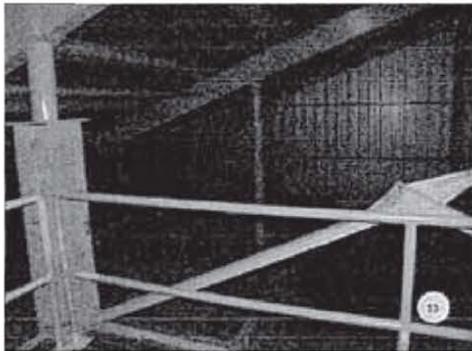
Item # 52 2010 Detail ISS Steel Column, Roof and Beam Detail, No visible issues

D-43

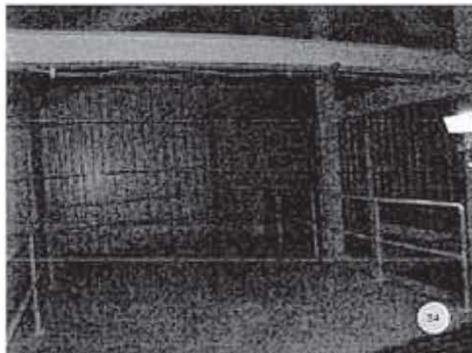
E-96



3451 Old pics 52, 53, 54, 55 general area detail. No visible issues



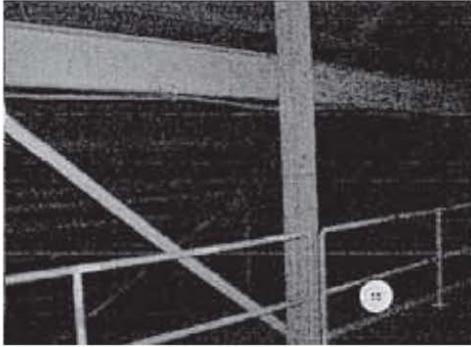
Item #53 2010 Details ISS Steel Column, roof and Beam Details, No visible issues



Item # 54 2010 Detail ISS Steel, Column, roof and Beam Details, No visible issues

D-44

E-97



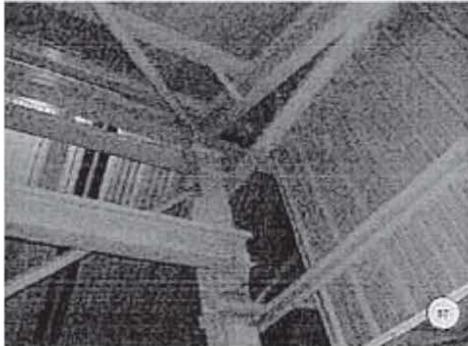
Item # 55 2010 Detail ISS Steel Column, Roof and Beam Details, No visible issues



Item # 56 2010 Details ISS Steel column, roof and Beam Details, No visible issues

D-45

E-98



Item # 57 2010 Details ISS Steel Column, roof and Beam Details, No visible issues



3452 80' elevation. General area detail. No visible issues



Prior roof SE corner from 80' elevation. Clean/Dry No visible issues.

D-46

E-99



3457 General area detail. Clean/Dry. No visible issues.



3458 General area detail Clean/Dry. No visible issues.



3459. General area structure. Clean and Dry. No visible issues.

D-47



3460 Prior Roof SW corner as seen from +80' elevation. No visible issues.



3461. Prior Roof W corner as seen from +80' elevation. No visible issues.



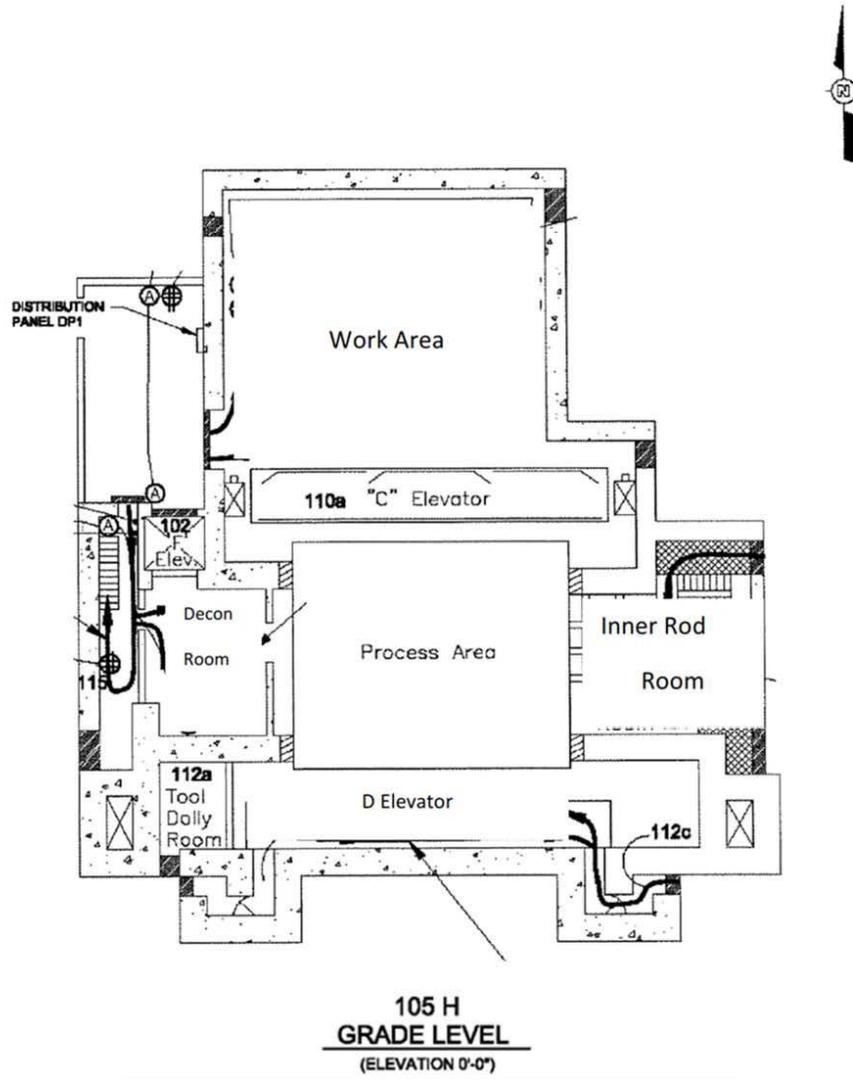
3462 Prior roof W corner as seen from +80' elevation. No visible issues.



3463 General area structure detail. Clean and Dry. No visible issues.



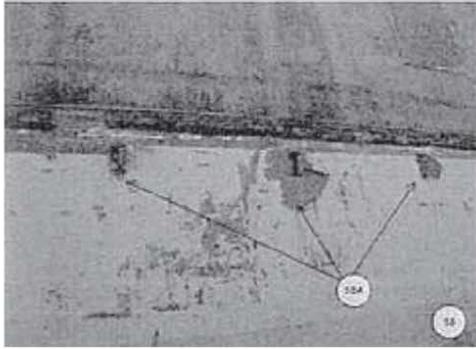
D-9 – Elevation 0' Exterior Map



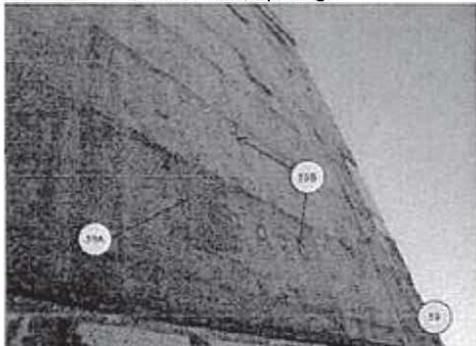


D-9 –Summary Table & Photos Elevation O' Exterior

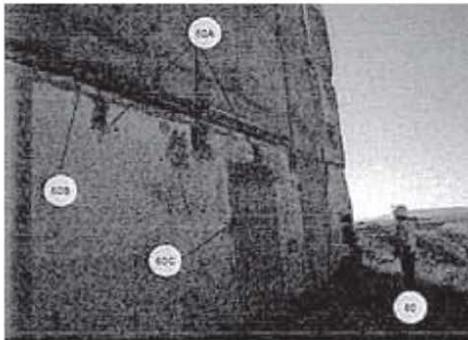
#	New Photo #	Description
Item # 58	No new photo	Wall
Item # 59	No new photo	Metal cover, Grouted wall
Item # 60	No new photo	Metal beam detail, exposed aggregate, pourback
Item # 61	No new photo	Metal cover
Item #62	No new photo	Pourback, Metal details
Item # 63	No new photo	Wall, Metal cover
Item #64	No new photo	Metal cover
Item # 65	No new photo	Pourback
Item # 66	3493 3494	Wall- Existing exposed aggregate, control rod metal Cover, metal beam detail
Item # 67	No new photo	Exposed rebar
Item # 69	No new photo	Corner wall
Item # 70	No new photo	Pourback
Item # 71	3495 3496	ISS Detail
Item # 72	No new photo	Corner wall, ISS metal cover plates
	3480	Broken piece of downspout
	3483	Spalled concrete
	3490	2 nd piece of broken downspout for exterior wall
Item # 73	3487	Possible weather protection issue. Small amount of erosion from downspout runoff..
Item # 74	3488	Possible weather protection issue. Small amount of erosion from downspout runoff..



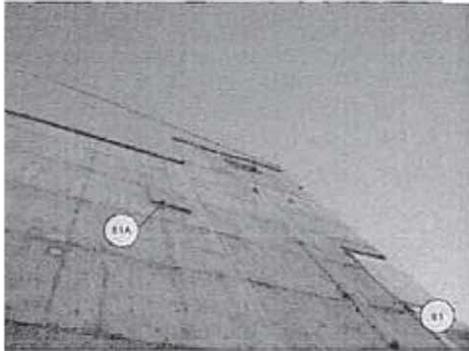
Item # 58 2010 Detail Wall, Spalling



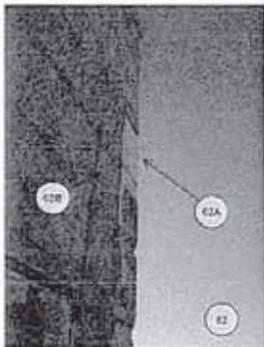
Item # 59 2010 Detail Metal Cove, Grouted Wall, Minor corrosion on metal



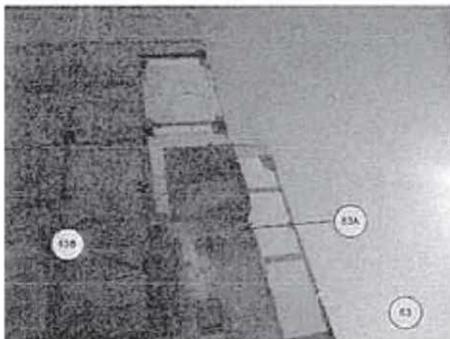
Item # 60 2010 Detail Grouted Wall, Metal Beam, Exposed Aggregate No visible issues



Item # 61 2010 Detail Metal Cover Detail, No visible issues

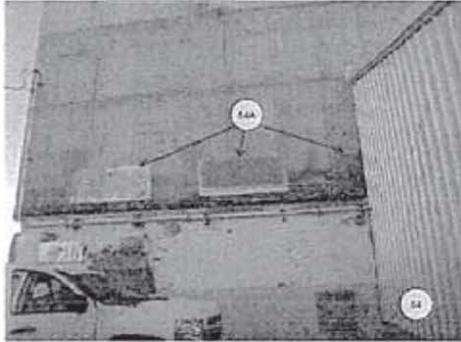


Item # 62 2010 Details Pourback and Metal details, No visible issues, Mild corrosion

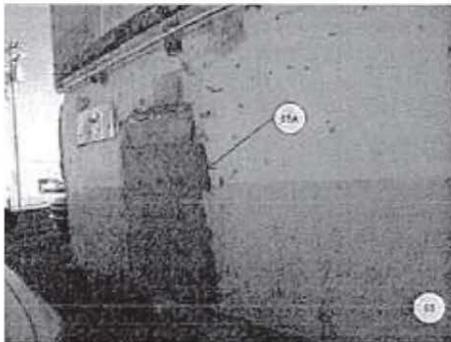


Item # 63 2010 Detail Wall Metal Cover, Existing Edge spalling

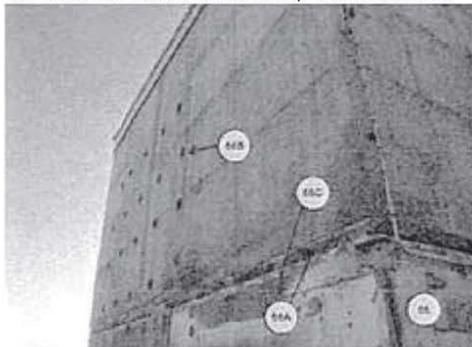
D-53



Item # 64 2010 Detail Metal Cover, No Visible issues



Item # 65 2010 Details Pourback, No visible issues



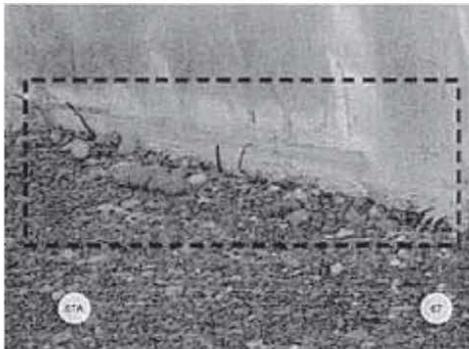
Item # 66 2010 Details, Wall, Control Rod Metal, Metal Beam details, existing aggregate, spalling, mild corrosion on metal



3493 No visible change to condition



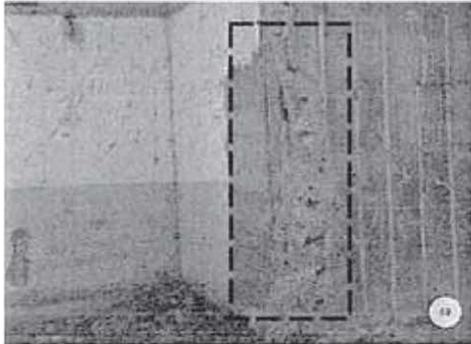
3494 No visible change to condition



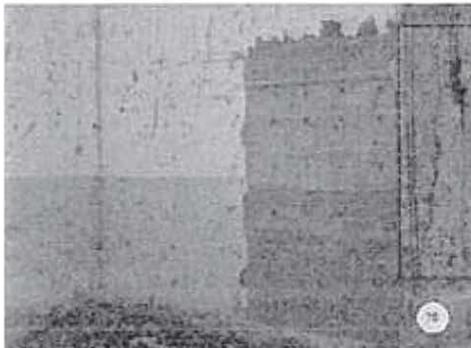
Item # 67 2010 Detail Exposed Rebar, Corrosion

D-55

E-108



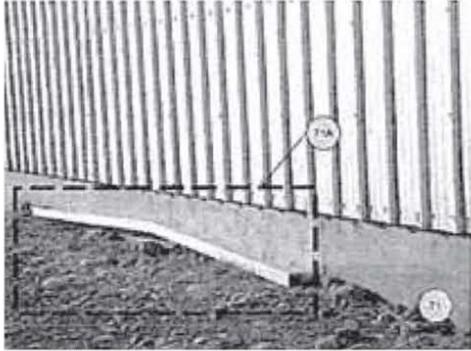
Item # 69 2010 Details corner wall. spalled



Item # 70 2010 Detail Pourback No visible issues

D-56

E-109



Item # 71 2010 Details ISS Detail Dislocated downspout



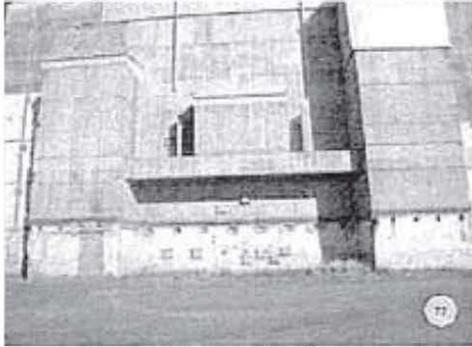
3495 Close up of fallen downspout piece. Connection piece still intact. No visible change



3496 Close up of fallen downspout piece. Connection piece still intact. No visible change

D-57

E-110



Item # 73 2010 Detail General wall area No visible issues



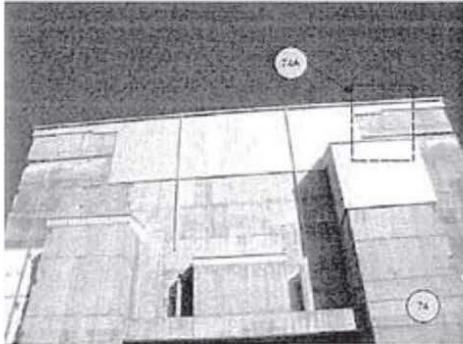
3487 Possible Weather protection issue. Small amount of erosion from downspout runoff



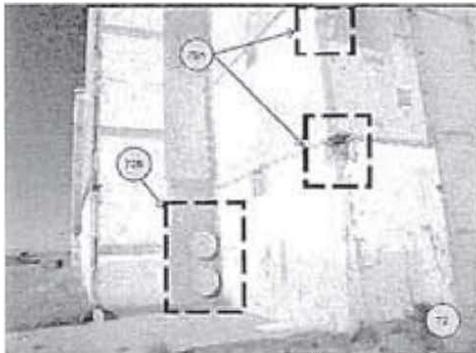
3488 Possible weather protection issue. Small amount of erosion from downspout runoff

D-58

E-111



Item # 74 Original location of fallen downspout. Hole in gutter allowing water to fall onto concrete pad below.



Item # 72 2010 Details Corner wall, ISS Metal Cover plates, spalling, no visible issues



3483 spalled concrete around entire building in very good shape, no noticeable degradation/excessive rebar corrosion since original project.



3490 2nd piece of broken downspout from S exterior wall



4989 shows hole in gutter where downspout was placed on left side of bldg

D-60

E-113



4986 shows hole in gutter where downspout was placed on left side of bldg



4986 shows where downspout should be returned to left side of bldg.



4983 shows hold in gutter where downspout was placed (on right side of bldg)

D-61

E-114

APPENDIX F
S&M ACTIVITIES REPORTS FOR 105-N/109-N SSE ASSESSMENT

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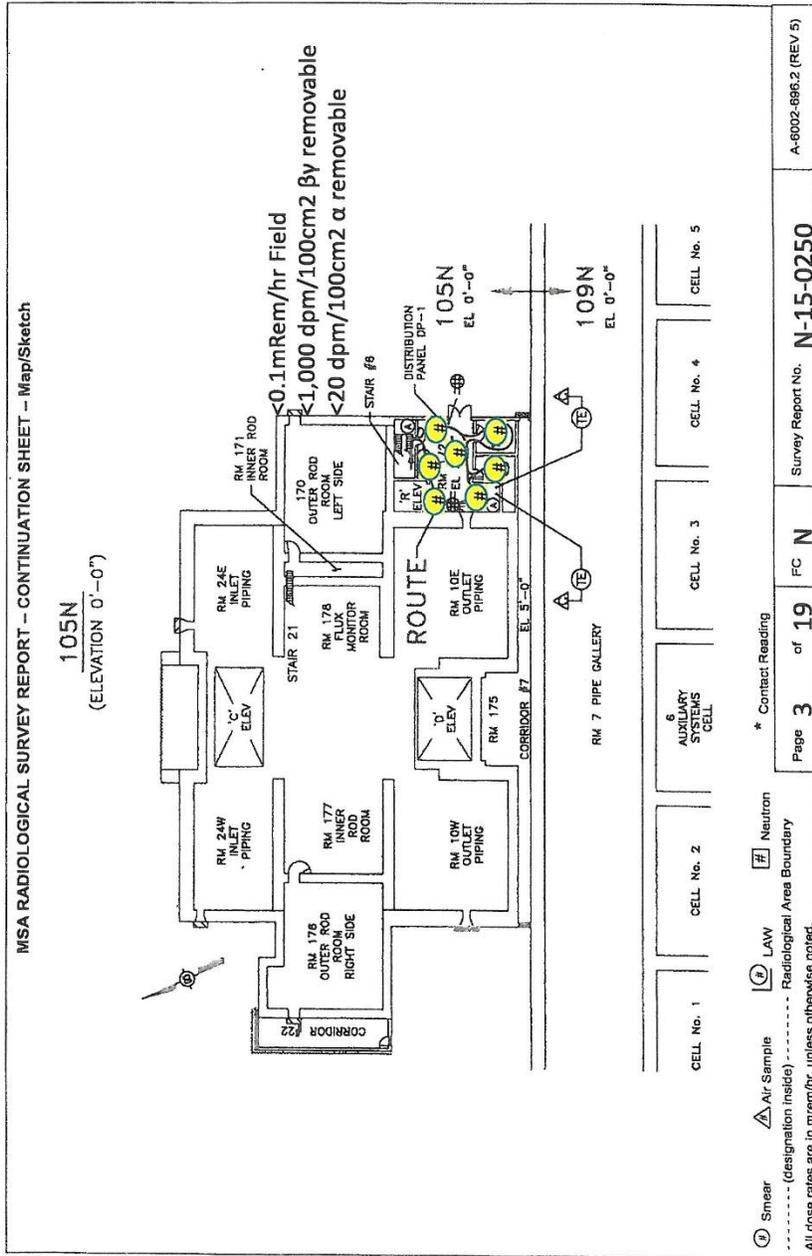
APPENDIX E
S&M ACTIVITIES REPORTS FOR 105-N/109-N SSE ASSESSMENT

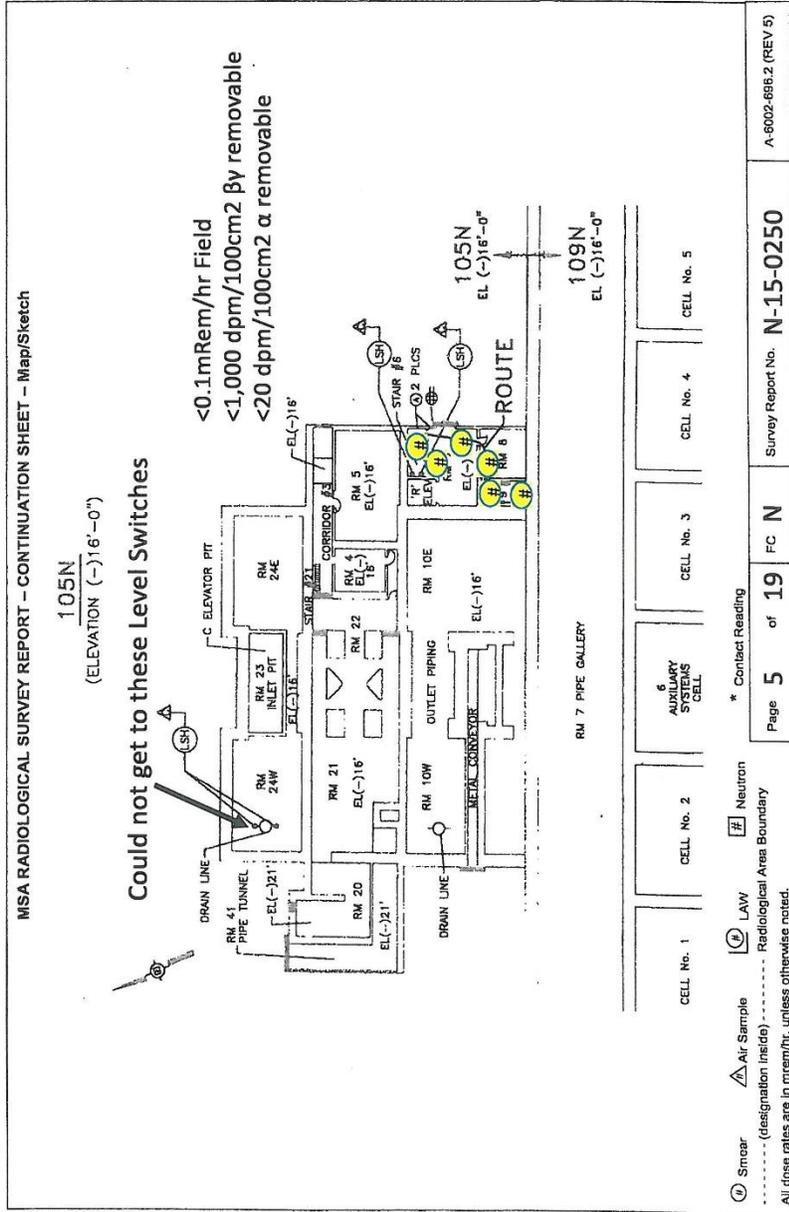
This appendix presents reports associated with following listed activities. These activities inside the 105-N/109-N SSE were conducted along the structural routes identified in DOE/RL-2011-106, *Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure*, Rev 0. These surveillance routes are also included in work package 2M-73252/C.

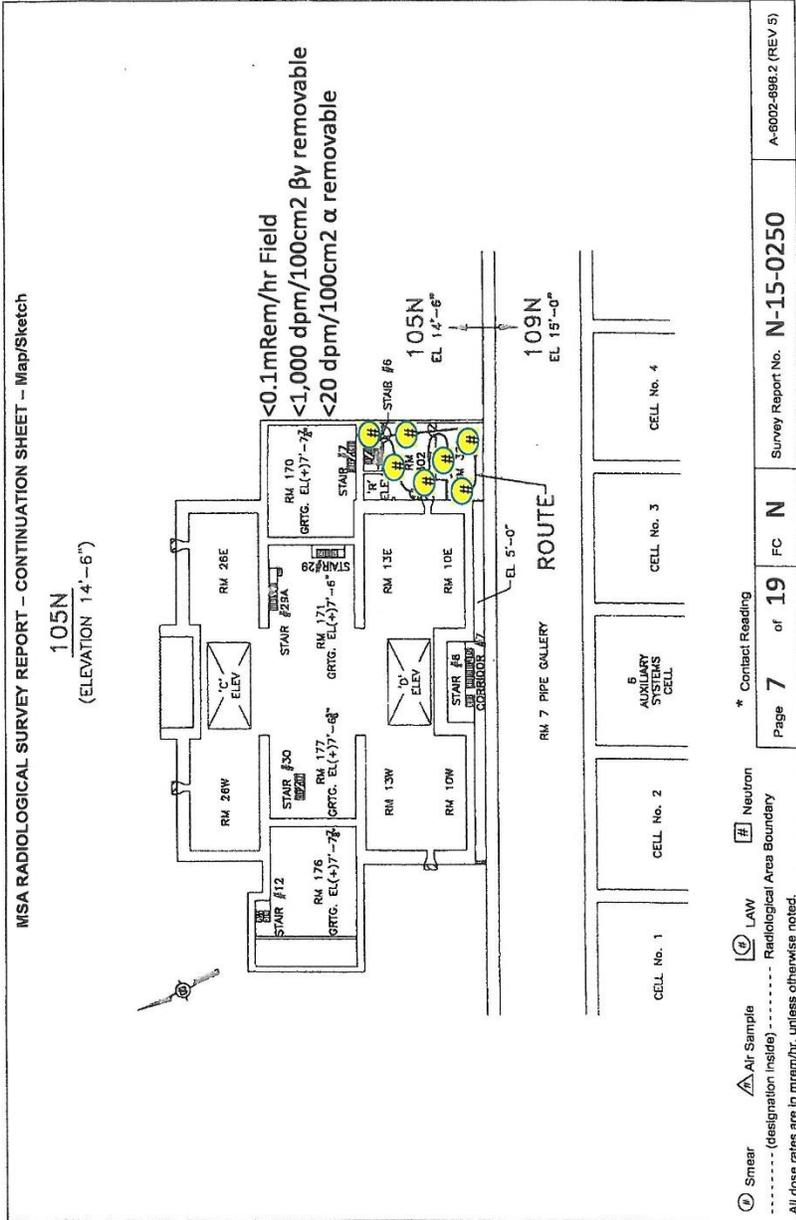
Internal Radiological Survey

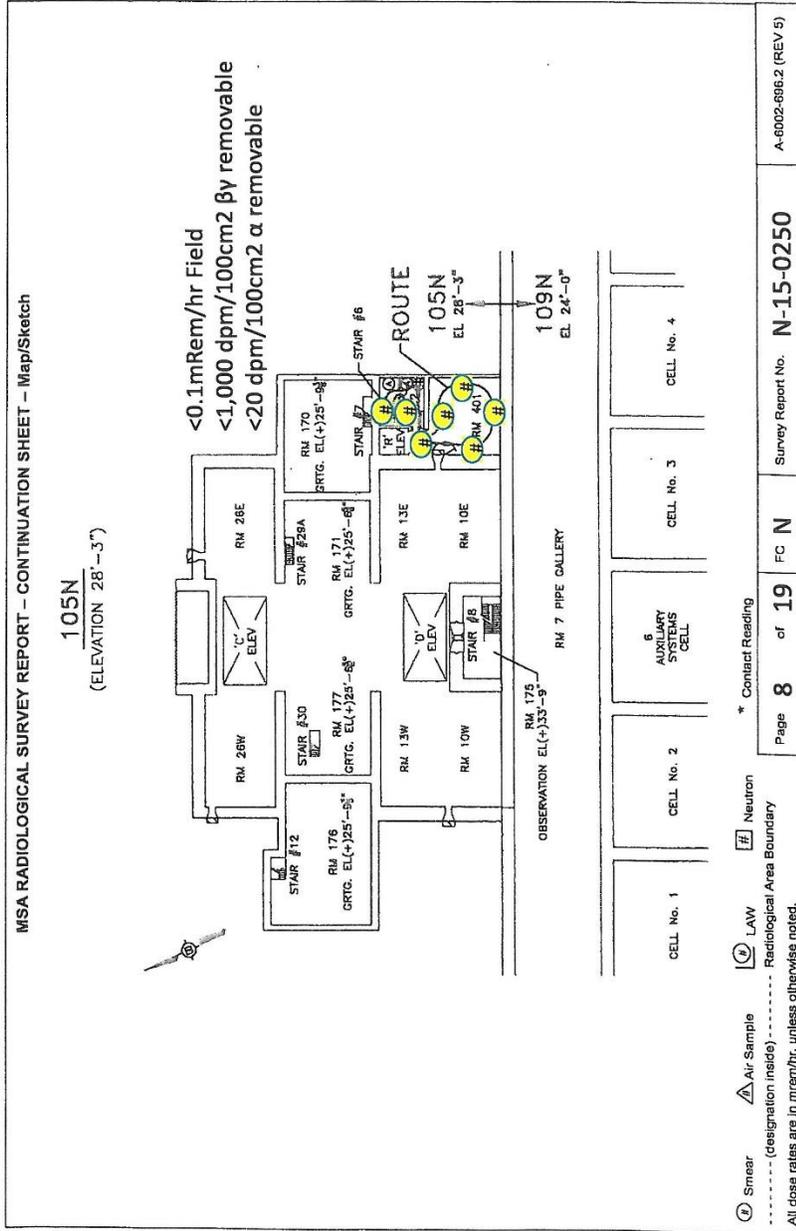
Radiological control technicians performed surveys along the surveillance routes. The internal survey also surveyed an internal high-efficiency particulate air filter.

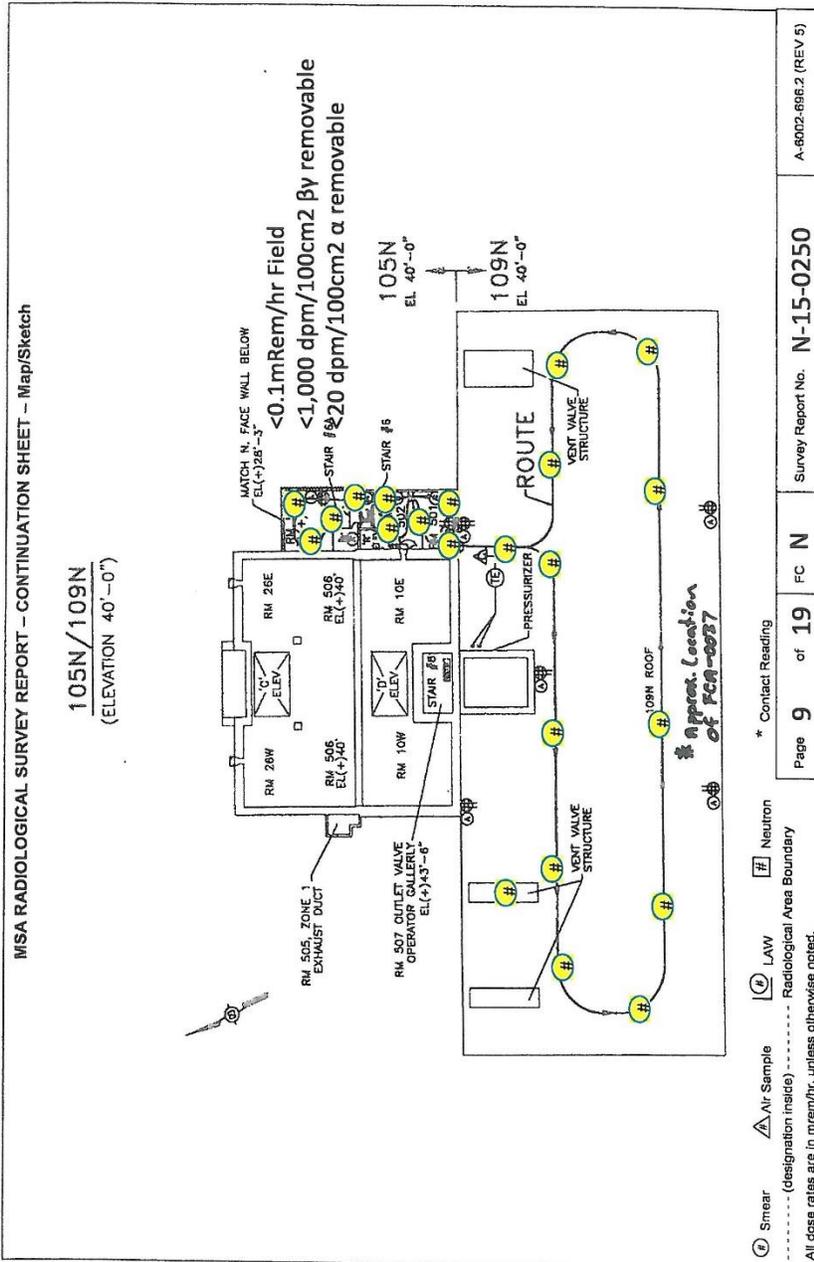
MSA RADIOLOGICAL SURVEY REPORT										DATE (MM/DD/YYYY)	TIME (START/STOP)	0700	/	1500				
No.	Description	CONTAMINATION MEASUREMENTS						DOSE RATE MEASUREMENTS										
		Bkg cpm		Gross Dose rate cpm/PA		Total dpm/100 cm ²		Removable dpm/100 cm ²		Dist. N/A	WC mR/hr	WC mR/hr	CF β	CF γ	Neutron Dose mrem/hr	Equiva. Dose to Skin mrem/hr	Equiva. Dose to Whole Body mrem/hr	Micro Rem μrem/hr
		βγ	α	βγ	α	βγ	α	βγ	α									
1	FCA's encountered on Inspection Path (highest reading)	75	0	8,000	<3	80,000	<100	<1,000	<20	N/A								
2	CA boundaries encountered on Inspection path	75	0	N/A	N/A	N/A	N/A	<1,000	<20	N/A								
3	RA boundaries encountered on Inspection path	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A								
4	All other areas listed on tour route only. see map for detail.	75	0	N/A	N/A	N/A	N/A	<1,000	<20	F	<5.0	3	1		<5.0	<0.1		
5	Passive HEPA filter on 60' level	75	0	75	<3	<5,000	<100	<1,000	<20	C	<0.1	3	1		<0.1	<0.1		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
N/A																		
Comments (Additional information as necessary to interpret results) Entry was made without any anomalies being discovered. Numerous Fixed Contamination Area's were encountered during safety inspection all boundaries were surveyed with negative results. Numerous Contamination Area's were encountered during safety inspection all were verified to be posted correctly. Several High Radiation Area postings were posted on entry doors to Zone 1, all doors were verified to be welded closed. No RWP was used for this work due to the area's being entered not being radiologically posted. Survey was approved to be completed after required date due to continued entries into reactors. JW N/A																		
RWP No.	N/A	Area/Bldg./Room/Location		105N Area		Facility Code	N	Page 2 of	19	Survey Report No.	N-15-0250	A-6002-696R (REV 9)						

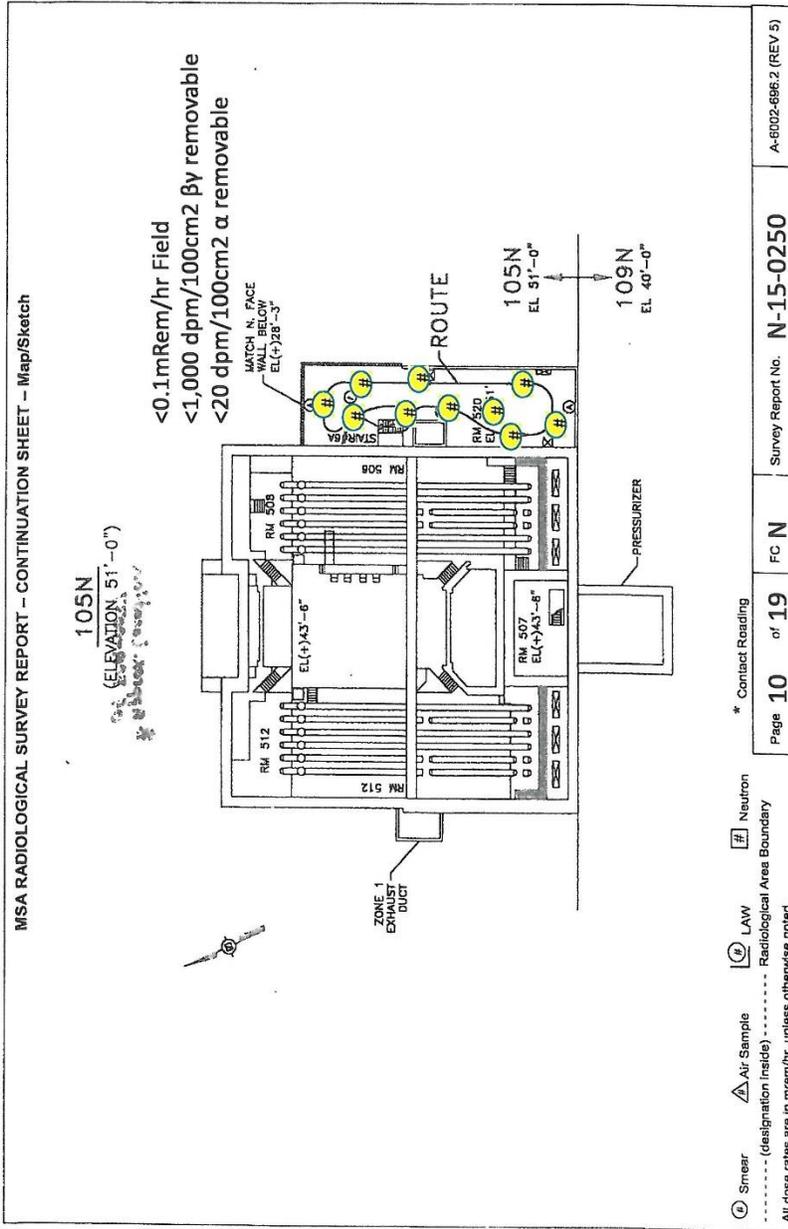


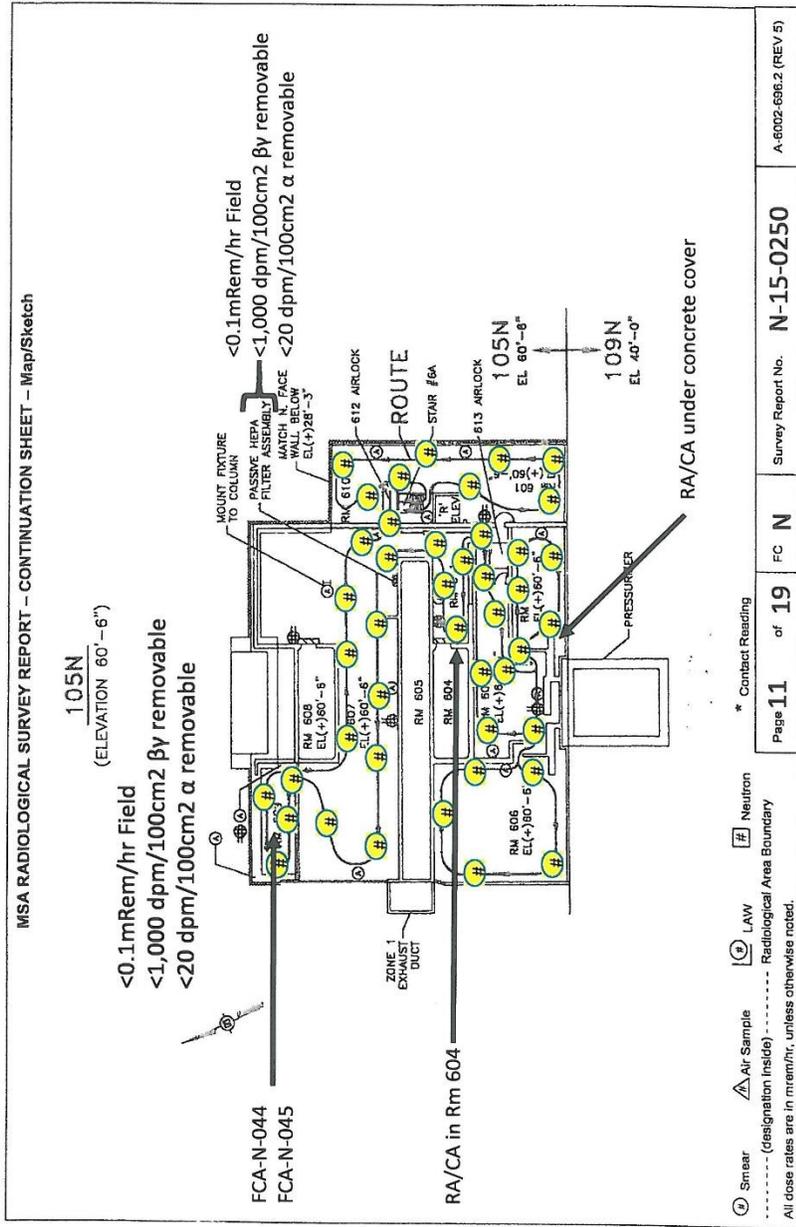


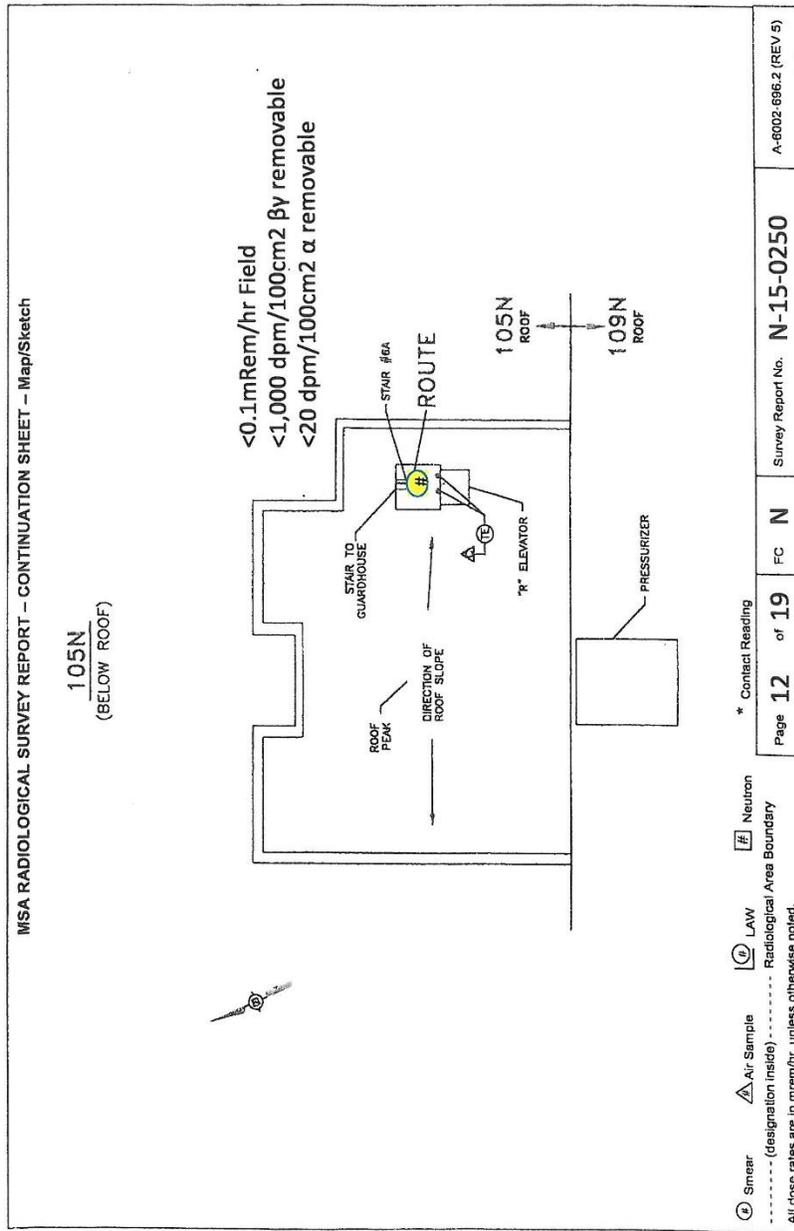


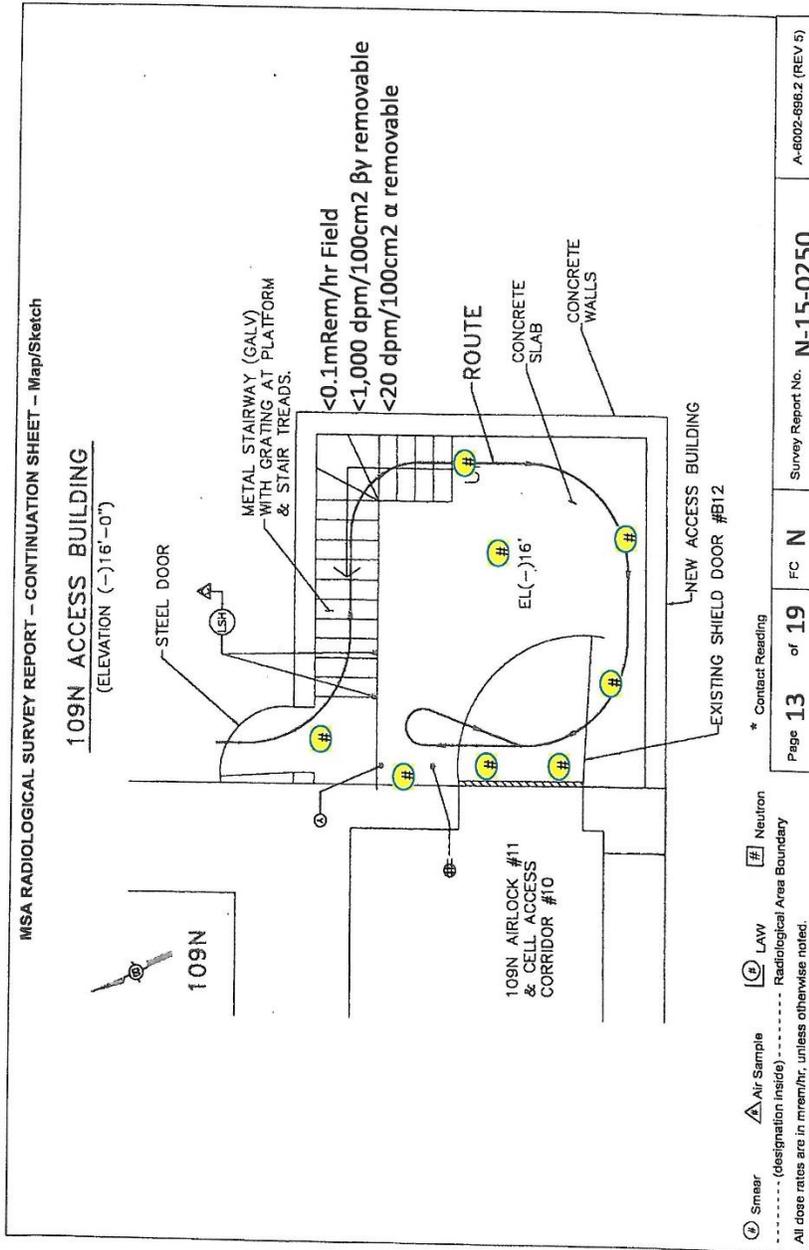


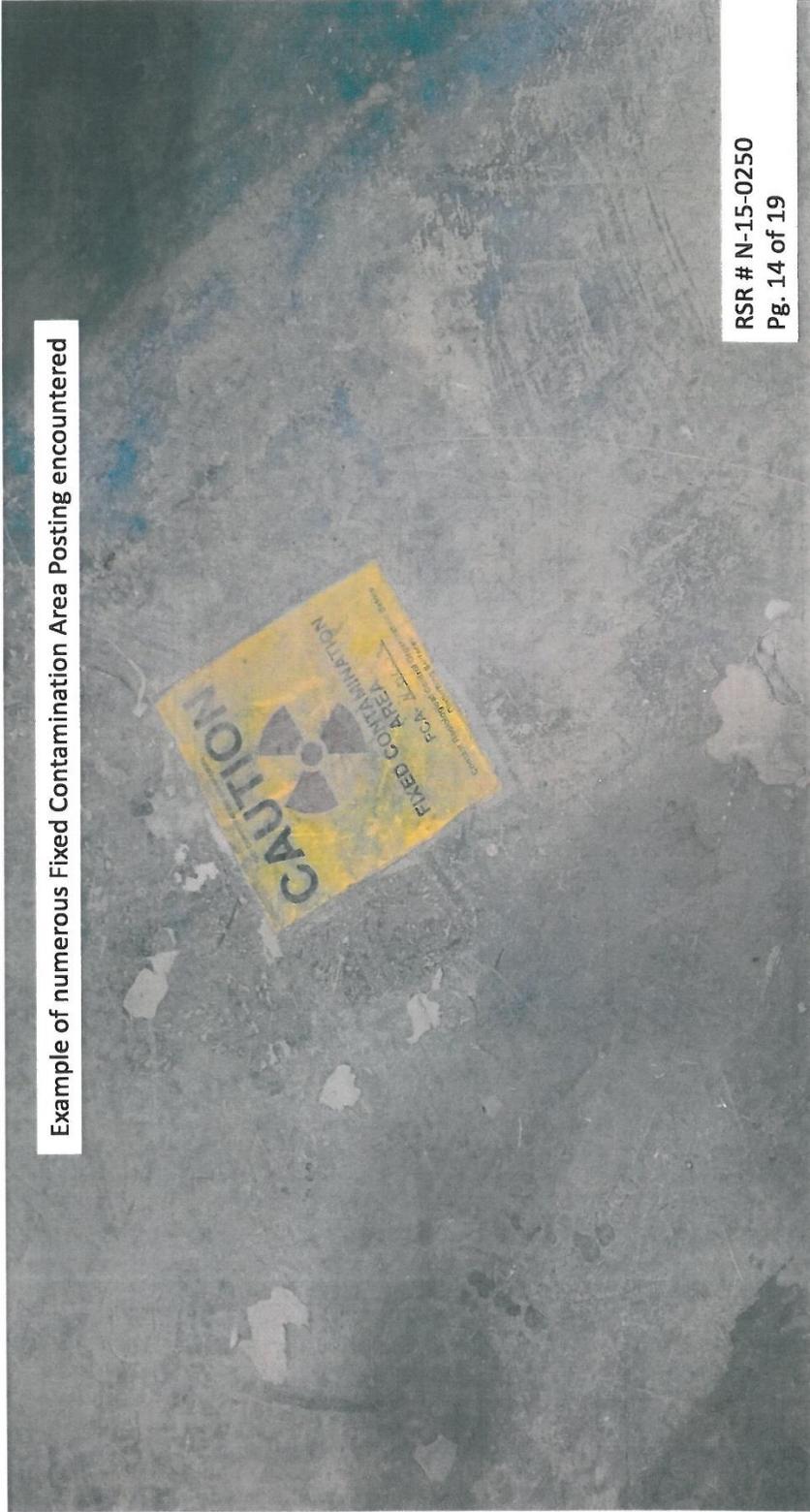






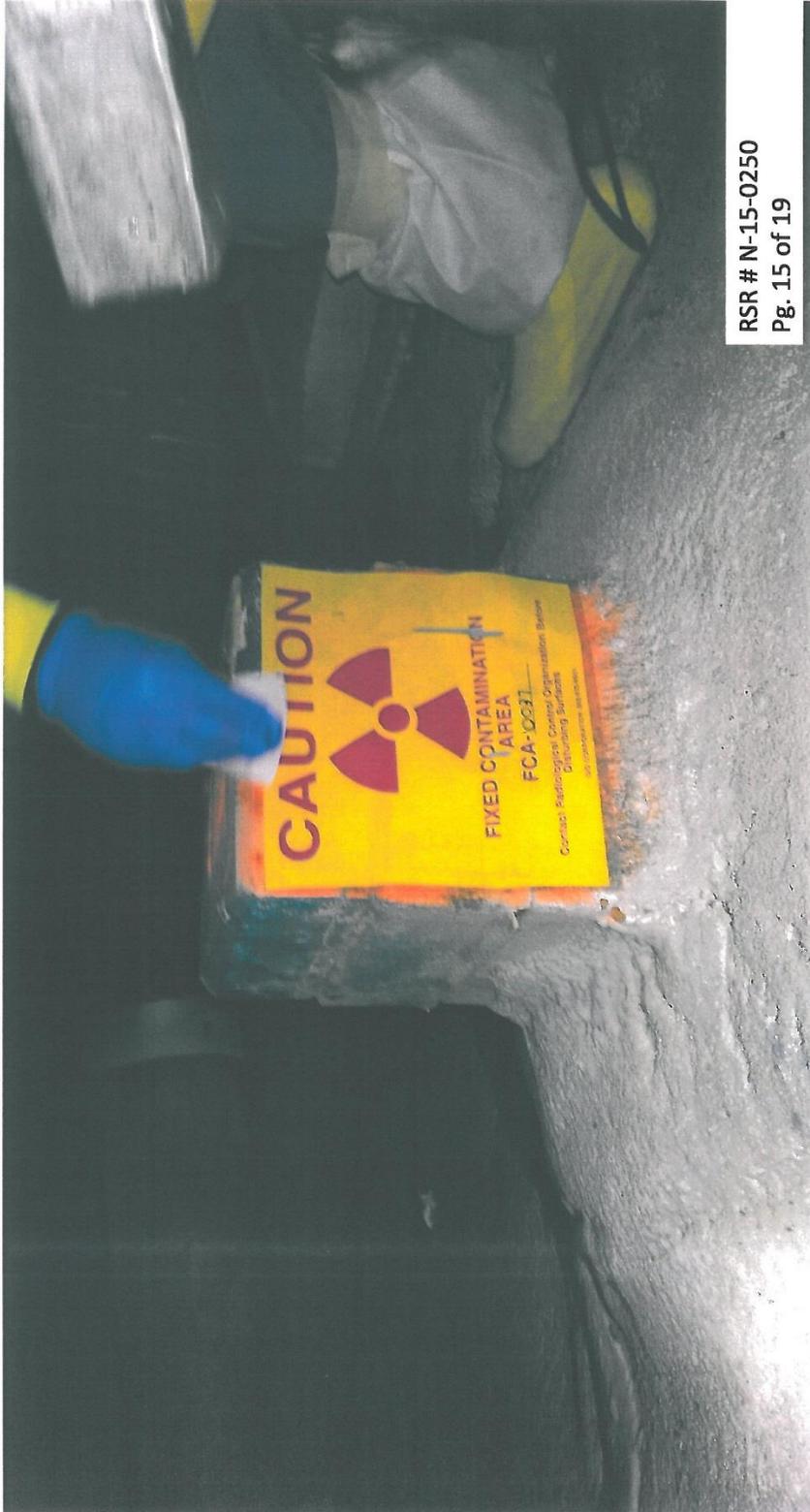


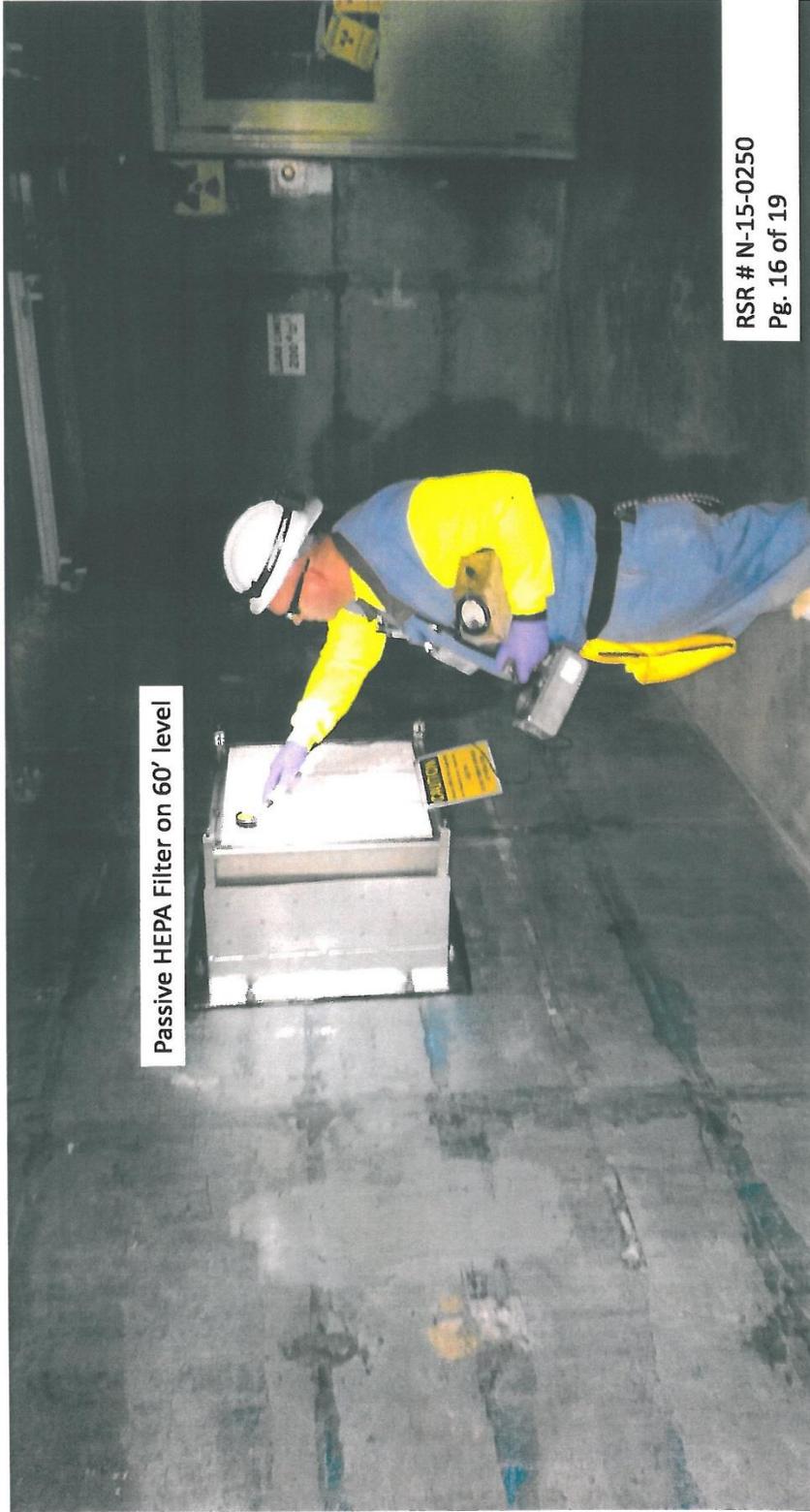




Example of numerous Fixed Contamination Area Posting encountered

RSR # N-15-0250
Pg. 14 of 19

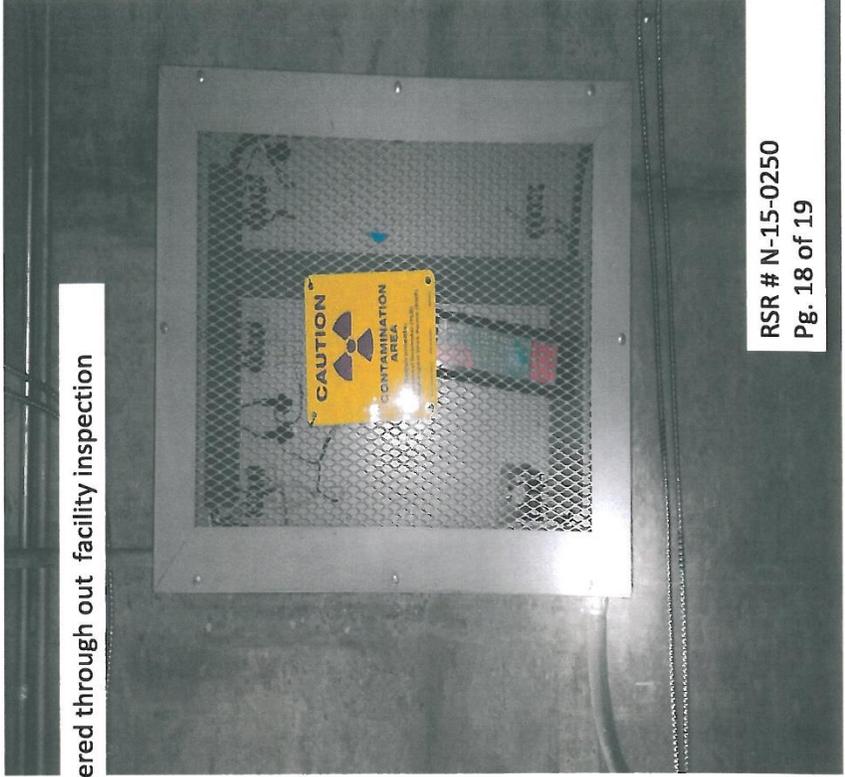




RSR # N-15-0250
Pg. 16 of 19



RSR # N-15-0250
Pg. 17 of 19

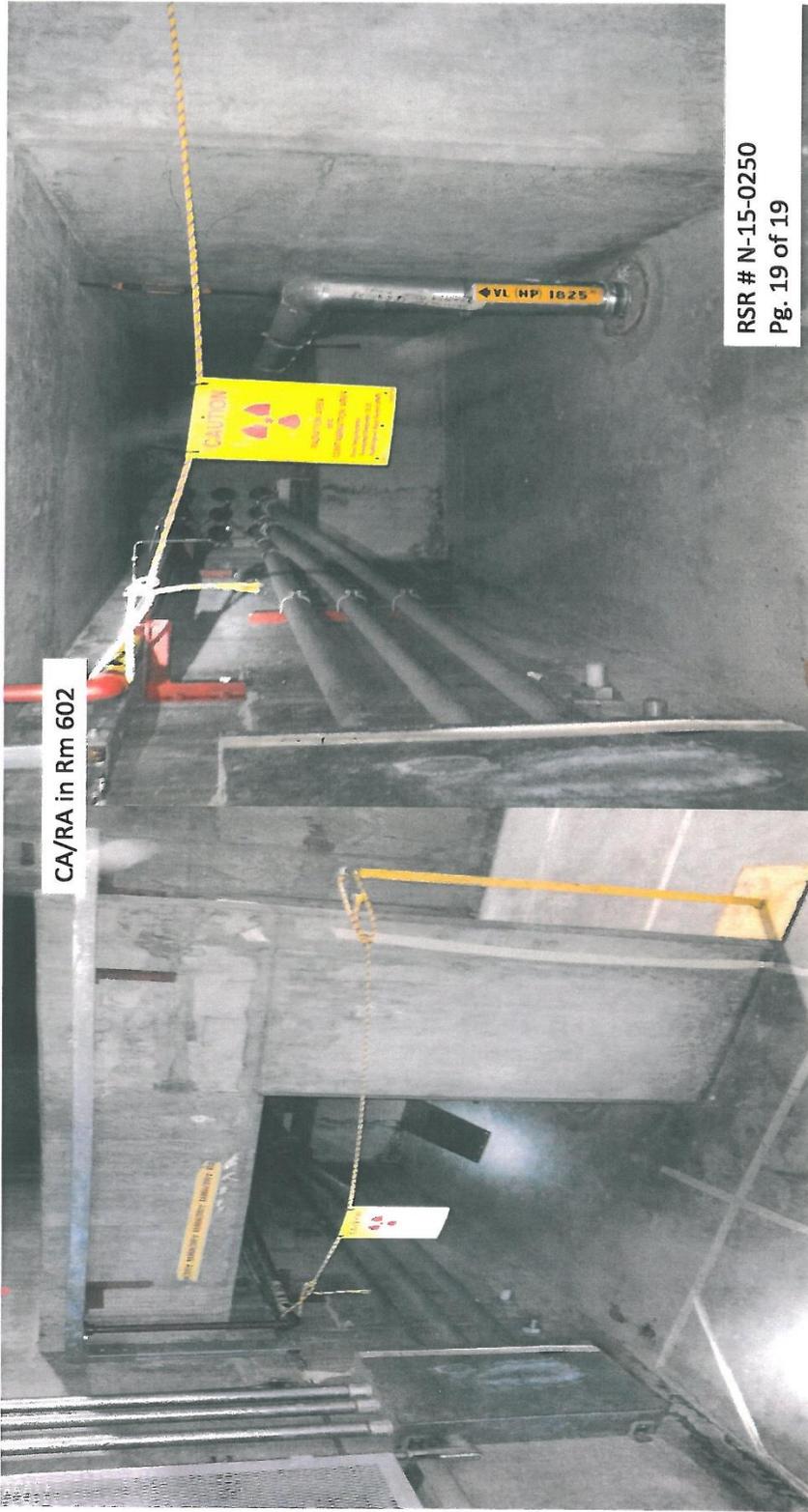


Example of CA's encountered through out facility inspection

RSR # N-15-0250
Pg. 18 of 19



Example of CA's encountered through out facility inspection



Industrial Hygiene Report

The industrial hygienist conducted general area direct reading instruments monitoring of the surveillance routes before additional personnel entered to complete surveillance activities. The monitoring was for carbon monoxide, flammable gas, oxygen, and volatile organic compounds.

**Mission Support Alliance, LLC
IH DRI Monitoring Survey**

Date: 05/06/2015, 04:12 PM

Survey ID: 15-60129 - 105N Reactor Entry

Survey Date: 04/14/2015

Survey ID: 15-60129	Survey Date: 04/14/2015	Survey Status: Complete
Survey Title:	105N Reactor Entry	
Sample Plan:	IHSP-14-00179 - DRI (VOC, Multigas)	
WO/Procedure:	N/A	
BHA:		
Requestor:	Land & Facilities Management	Project IH: Thayn, Paterick P
Surveyor:	Thayn, Paterick P	
Job Contact:	Yount, Jeremiah L	
Contact Phone:	(509)373-4778	Contact Cell Phone: (509)222-9136
Engineering Cntls:	Administrative Cntls: Boundary, Work Package Instructions	

Meteorology Data			
Standard Conditions:	Yes	Weather Date: 04/14/2015	Time:
Pressure:		Humidity:	Wind Speed:
Wind Direction:		Temperature:	

Comments
Approved by E. Hokanson 04/15/2015

Mission Support Alliance, LLC

Date: 05/06/2015, 04:12 PM

Survey ID: 15-60129 - 105N Reactor Entry

Survey Date: 04/14/2015

Calibration

Instrument		Pre Use Function Test	Post Use Function Test
ID:	3919	Date: 04/14/2015	Date: 04/14/2015
Type:	MiniRAE 3000 RAE	Time: 0640	Time: 1415
Last Cal Date:	03/26/2015	Leak Check: Yes	By: Thayn, Paterick P
Next Due Cal Date:	04/26/2015	Battery Check: Yes	Location: Office
Lamp:	11.7 eV	By: Thayn, Paterick P	
Serial Number:	592-902318	Location: Office	
Sensor(s)		Pre Use Function Test	Post Use Function Test
Sensor:	MiniRAE 3000 RAE PID	As Found: 9.5	As Left: 9.5
Calibration Source:	Isobutylene	Adjusted To: N/A	
Lot Number:	5-026-67		
Manufacture Date:	02/16/2015		
Expiration Date:	02/28/2018		
Cal Source Value:	10 ppm		

Mission Support Alliance, LLC

Date: 05/06/2015, 04:12 PM

Survey ID: 15-60129 - 105N Reactor Entry

Survey Date: 04/14/2015

Calibration

Instrument		Pre Use Function Test		Post Use Function Test	
ID:	1521	Date:	04/14/2015	Date:	04/14/2015
Type:	TMX-412 ISC	Time:	0640	Time:	1415
Last Cal Date:	04/01/2015	Leak Check:	Yes	By:	Thayn, Paterick P
Next Due Cal Date:	05/01/2015	Battery Check:	Yes	Location:	Office
Lamp:	N/A	By:	Thayn, Paterick P		
Serial Number:	0004057-154	Location:	Office		
DRI Sampling Pump: 2385 - SP402 ISC					
Last Done Date: 04/01/2015					
Next Due Date: 10/01/2015					
Flow Fault Check: Yes					
Sensor(s)		Pre Use Function Test		Post Use Function Test	
Sensor:	TMX-412 ISC CO	As Found:	69	As Left:	69
Calibration Source:	Tri-Gas (CO)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	70.0 ppm				
Sensor:	TMX-412 ISC H2S NA				
Sensor:	TMX-412 ISC LEL	As Found:	25	As Left:	25
Calibration Source:	Tri-Gas (Isopentane)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	25% LEL				
Sensor:	TMX-412 ISC O2	As Found:	19.1	As Left:	19.1
Calibration Source:	Tri-Gas (O2)	Adjusted To:	N/A		
Lot Number:	4-223-66				
Manufacture Date:	08/12/2014				
Expiration Date:	08/31/2017				
Cal Source Value:	19.0%				

Mission Support Alliance, LLC

Date: 05/06/2015, 04:12 PM

Survey ID: 15-60129 - 105N Reactor Entry

Survey Date: 04/14/2015

Readings

Type:	Area			
Zone - Location:	100N STRU - OTHER (Roads etc.)			
Specific Location:	105N and 109N Surveillance Routes			
Status:	N/A			
Activity:	Safety inspection of surveillance Routes			
Date/Time:	04/14/2015 0930			
Device	Agent	Range	Result	Action Limit
Inst-1521 - CO	Carbon Monoxide	<	0.000 ppm	12 ppm
Inst-1521 - LEL	Flammable Gas	<	0.000 %	25 %
Inst-1521 - O2	Oxygen		21.000 %	23.5 %
Inst-3919 - PID	Volatile Organic Compound	<	0.000 ppm	2 ppm
Reading Details:	General area monitoring of the 105N and 109N surveillance routes was conducted to verify conditions prior to additional personnel entering to complete work. Safety inspection and routes reviewed were per work document 2M-73151/C - C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance. No abnormal readings were observed along the tour of the surveillance routes.			

Field Information Verified By: Thayn, Paterick P

Date: April 14, 2015

Approved By: Thayn, Paterick P

Date: April 27, 2015

(The electronic approval indicated above acts as the authentication of this record on the above date)

Industrial Safety Report

The industrial safety professional conducted safety inspection of the surveillance routes before additional personnel entered to complete surveillance activities.

105 N Reactor Initial Safety Inspection

On 14 Apr. 2015 MSA Safety team made initial entry into the 105 N for a safety inspection prior to any work to be completed for the 5 year reactor surveillance. This safety team consisted of 2 Radcon personnel, 2 Biologist (looking for potential wildlife), a Structural Engineer (for inspection of 109 N roof) an Industrial Hygienist, and an Industrial Safety Professional. This report only covers the Industrial Safety Evaluation, and each item will be in a bullet for ease of understanding the issue and the location.

Below Grade Level (Room 7) (-) 16' Elevation:

- Trip hazard around equipment caused by drip pan. (Photo 1)
- Trip and struck by hazards around piping. (Photo 2)
- Struck by and sharp object hazards from 2 step platform. (Photo 3)

28' Elevation:

- (Room 401)- Tripping hazard caused by trough for door 403. (Photo 4)
- Overhead hazard caused by piping in stair well between 28' and 40' elevations. (Photo 5)

40' Elevation:

- Trip hazard leading into the room 503 (Painted Orange). (Photo 6)
- Numerous trip hazards and sharp edges on roof area above 109 N (many identified with orange paint, but many are not identified). (Photo 7)

Recommend not going on the 40' elevation 109 N roof for tour groups

60' Elevation:

- Lamp burned out in room 610, with mandatory flashlights or head lamps, and other lighting in the area, this does not pose an issue at this time.
- Fire water piping running between rooms 601 and 610 is low hanging causing an overhead hazard.
- Numerous cross bracing throughout room 607 causing struck by and overhead hazards (Identified with Caution Tape). (Photo 8)
- Unexpected step down in room 607 causing a trip hazard (Painted Orange faded). (Photo 9)
- Large cable tray in the path between rooms 607 and 611. (Photo 10)

In summary, this reactor is in pretty good shape as far as Industrial Safety hazards. Stairs are all in good condition and very well lit, they are painted orange on the ends, but it is my opinion that this is more of a visual aid than signifying an issue with the stair as in past reactors, none of the stairs were loose, wiggly and they all appear to be intact. Majority of the rooms were also all well-lit and pretty much big open concrete rooms. The 60' elevation however does have a lot of low hanging overhead hazards, tripping hazards, tight quarters areas etc. for the reasons of overhead (head knock) hazards the hard hat requirement is not being lifted in this reactor.

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Structural Inspection Report

A team of engineers performed an inspection to determine the SSE conditions and structural adequacy. The rear face/discharge elevator was entered for the inspection.



15-MRM-007
June 4, 2015

Mr. Rick Moren
Director of Long-Term Stewardship
Mission Support Alliance, LLC
P.O. Box 650
Richland, WA 99352

Dear Mr. Moren,

SUBJECT: Contract 55534; 105-N/109-N Reactor Structural Engineering Inspection Report

References:

- 1) DOE/RL-2011-106, Rev 0, Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure
- 2) MSA Work Package; 2M-73151/C: 105-C, D, H and N Reactors - Perform 5 Year Surveillance and Maintenance
- 3) CCN 15122; 105N / 109N Roof SDDR #031 re Roof Joists for 109-N, from David Dickson (Wm. Dickson Company) to Dan Bigby (Washington Closure Hanford), Dated May 19, 2010

This letter and report package is provided as deliverable #5 of the subject contract as part of the 105-N/109-N Interim Safe Storage (ISS) Building surveillance / inspections that were performed on April 21 and 22, 2015. In accordance with references 1 and 2, an inspection was performed to determine the Safe Storage Enclosure (SSE) conditions and structural adequacy under ISS. An exterior and interior visual inspection of the SSE was performed. The surveillance routes used were as noted in Reference 1 with some limitations as explained herein. Polestar's evaluation the inspection data is described in Attachment A.

The inspections, assessment and any evaluations were performed by a team consisting of: Jaimie Ryan, Field Engineer; Tom Rodovsky, PE; Mike Custer, PE; and Mark Morton, PE. Not every person participated in each activity, but this team was engaged / available for each SSE inspection. In addition, Mr. David Gutowski, Defense Facility Nuclear Safety Board Hanford Site representative accompanied the inspection team at the 105-N SSE inspection.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in good and stable condition with no significant defects. Some concern was raised about the sealing of the Zone 1 doors – into the high contamination areas in Zone 1 – since air could be felt coming out of Zone 1 on a windy day during the inspection.

Recommendations from the 2015 105-N/109-N SSE inspection are in three categories:

601 Williams Blvd,
Suite 4
Richland, WA 99354

www.polestartechnicalservices.com

Office: 509-946-8279

Page 1



1. SSE Structure – There are a few specific inspection observations noted in Attachments A and C that are recommended to ensure the continued stability and compliant nature of the SSE. To summarize:
 - On a windy day, air flow out of the Zone 1 door into Room 172 was noted (Attachment C, Photo 3737, 3738). While a potential radiological issue - high radiation / high airborne area venting to a buffer area; from an SSE standpoint this indicates that not only is that particular door not sealed, other doors around the SSE structure are not sealed as well allowing wind around the buildings to apply a positive or negative pressure and cause air movements within Zone 1.
 - Two level instruments are in an inaccessible Zone 1 area (-16' in Room 24W) that cannot be checked. Instrument maintenance is only discussed as regards to replacement (last sentence of Section 3.3.2 of Ref 1). It is recommended that these discrepancies be corrected with any S&M Plan revisions with direction as to entry options or simply abandoning these particular instruments if they should fail.
 - Swallow nesting at concrete / siding junction point and in some cases (Attachment C, Photo 3682) directly on the steel plate / boxes installed as closures.
 - A representative sampling of the roof joist tears noted in Ref 1 Section 3.1 and Appendix A were inspected and found to not have changed. Our independent reviews would indicate that the vendor and builder analysis noted in Ref 3 was quite acceptable and very conservative. As a result, we would recommend that the 109-N roof joist tear discussion in Ref 1 be revised to maintain the history, but to remove these items from specific concern / inspection in the future.
2. No portion of the interior of the 109-N building was accessed, nor is it required by Ref 1. However, this is seen as a program turnover issue since there is no evidence that the cell areas of 109-N have been entered since the mid – 1990's. It is recommended that a full interior inspection (or as full as possible given the as found radiological conditions) be made to establish a baseline condition of the entire structure on the next 5 year inspection or prior to any S&M frequency extension.
3. There are a number of posting and operator aids throughout the accessible portions of the SSE (e.g., the Caution and Warning signs around a Zone 1 door shown in Attachment D-4 photo 3719) that no longer apply, but there is no indication in the field or in Ref 1 discussions about when, how or what rationale should be used to obey or ignore these postings. In general, radiological postings were obeyed, but operator aid or directions such as "Hearing Protection Required" or "Contact Shift Supervisor prior to Entry" were bypassed by the inspection team.

Since the conditions noted in the inspected areas around and through the 105-N and 109-N are in general very good, it is reasonable to reach a conclusion that the interiors of the spaces not inspected are acceptable at this point in time.



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ATTACHMENTS – Attachment A is an assessment of the data collected and results of the SSE inspections completed in April 2015. Attachment B condenses the Attachment A information in a format suitable for direct inclusion into the MSA 2015 105-N/109-N SSE Inspection document.

New photos from this inspection and some photos from the Washington Closure / MSA turnover walk downs are contained in Attachments C and D. The outcome from the April 2015 inspection, as detailed in Attachment C and D, fall into two categories that are recommended to form the basis for the next 105-N/109-N SSE inspection.

- (a) Attachment C includes newly identified items from April 2015 that require future inspection or maintenance action
- (b) Attachment D includes new photos and turnover photos that were observed either specifically or generally in April 2015 and are not required for future inspections but are preserved herein for possible comparisons in future 105-N/109-N SSE inspections.

We are pleased to provide these inspection and reporting services to MSA and request that you contact me at 509-946-8279 if you have any questions concerning this report letter and attachments.

Kind regards,

A handwritten signature in black ink that reads "Mark R. Morton".

Mark R Morton PE

ISS Support Project Manager

cc: Finney, S – MSA Procurement
Bailey, P;
Miller, K;
Morton, M;
File / LB

Enclosure(s)

Attachment A – ASSESSMENT OF INSPECTION DATA
Attachment B - 105-N/109-N BUILDING INSPECTION REPORT INSERT FOR MSA
Attachment C – 105-N/109-N SSE INSPECTION RESULTS – For further consideration
Attachment D – 105-N/109-N SSE INSPECTION RESULTS – Historic record

601 Williams Blvd,
Suite 4
Richland, WA 99354

www.polestartechnicalservices.com

Office: 509-946-8279

Page 3



Attachment A – ASSESSMENT OF INSPECTION DATA

The interior and exterior inspection of the 105-N/109-N SSE was conducted by Mark Morton and Jaimie Ryan of Polestar Technical Services on April 21st and 22nd, 2015. The interior inspection team also included MSA RCT Joe Wiley and Defense Nuclear Safety Board local representative - David Gutowski. The weather on those days was approximately 55 - 60 degrees, slight overcast with gusty winds, there were a few rain showers on the few days prior but no rain on the days of the inspection work.

- A. **Interior Conditions** – noteworthy items from the interior SSE inspection are discussed below.
1. On a windy day, air flow out of the Zone 1 door into Room 172 was noted – see Attachment C photo 3737 and 3738. While a potential radiological issue - high radiation / high airborne area venting to a buffer area; from an SSE standpoint this indicates that not only is this particular door not sealed, but that other doors around the SSE structure are not sealed either, allowing wind around the buildings to apply a positive or negative pressure and cause air movements within Zone 1. This very effectively negates any passive venting of Zone 1 that was to be provided by the HEPA filter installed at the +60' elevation as shown on Ref 1, Figure 3-10.
 2. Experience with the other SSE's indicate that air in-leakage, as noted in item 1 above, brings very fine sand into the structure as a minimum, and some openings could allow bats or insects into the Zone 1 SSE areas.
 3. Areas visited as part of this inspection were noted as being exceptionally dry and free of dirt, demolition debris and any notable defects. Although a significant amount of spiders webs were present throughout (more than any other SSE inspected), the concrete floors, walls and ceiling above and below grade showed no signs of water in-leakage during the ISS period.
 4. Observation of SSE metal sheathing showed little or no evidence of openings at junction points where outside light could be seen.
 5. Operator aids and postings remain that don't apply; which might be covered under Ref 1 Section 3.3.2, but identification of unneeded postings is not specifically listed. This condition leaves the inspection team to decide what posting to observe and which to ignore.

NOTE – In addition to the Supplier Deviation Disposition Request within the title of Reference 3, that document includes Washington Closure Hanford Non-Conformance Report NCR-10-008 with photographs of a sampling with torn members with Attachments A and B including an evaluation performed by NUCOR (Vulcraft Group) and a review provided by 109-N SSE designer Meier Engineering.



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6. The Polestar team's structural engineer (Michael Custer PE) completed the review of the Ref 1 Appendix A and Ref 3 information concerning the tears in the diagonal members of the truss assemblies at the 109N Safe Storage Enclosure.

The information provided in the above references (particularly the evaluation performed by Vulcraft - Attachment A to the NCR included in Ref 3), conservatively demonstrates the capacities of the joints through an enveloping analysis considering a maximum tear length of 3 inches. In addition, the tears are located at the joints in the diagonal members, consistently occurring between the horizontal truss chords. In this location the diagonal members are confined and will experience only direct tension or compressive loadings. The welds provided at each joint are oriented on each of the tears symmetric about the tear location. The fillet weld configuration connecting the diagonal members to the horizontal chords of the truss is in an "L" configuration, which is approximately 1 1/2" x 2" with an estimated weld size of 1/8" to 3/16". This weld has a capacity in tension or compression exceeding the member capacity and I conclude that the design of the existing joints and members are structurally adequate, as is to provide the required service.

Michael R Custer, P.E

- B. **Exterior Conditions** – Several areas of cracked beam pocket and corner concrete breaks are evident but are not seen as a concern in the April 2015 inspection. In addition, there are two other items of note which were observed and investigated;
1. Some of the backfill has been placed above the lower edge of a number of Zone 1 doors around the 105-N building. This could introduce more rapid steel corrosion at these areas as well as possible water in leakage under the right rain / snow drift location and wind directions.
 2. Zone 1 doors on the SSE exterior could provide interior access for dust and bats / insects as discussed in Item A.1 and A.2 above.
- C. **Surveillance Routes**
1. No portion of the interior of 109N was accessed nor is it required by Ref 1. This is seen as a DOE program turnover issue since there is no evidence that the cell areas of 109-N have been entered since the mid – 1990's.
 - i. The man door noted in Figure 3-12 of Ref 1 was inspected but not opened per the Ref 1 requirements. Exterior inspection of the roof, attic space at +40', attic siding, other closures and flashings above and around the visible 3 sides and top of 109N showed no signs for concern.
 - ii. Since 109-N is so very large an area and there is no documented evidence of any entry into the steam generator cell areas in 20+ years, there is a strong argument to be made that some entry in the next 5+ years be made while some people remain who were on-site during the N Reactor operation / deactivation / shutdown periods. Without a documented entry, all process knowledge of how even to open the door will be lost and the "skeletons" that grow in areas such as this just continue to grow. Hearsay evidence indicates that the worst we'll find there is failed asbestos lagging and some nominal or low dose and



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contamination issues – failure to enter this structure in the 2020 timeframe will only make the current situation much worse. It is therefore recommended that a full interior inspection (or as full as possible given the as found radiological conditions) be made to establish a baseline condition of the entire 109-N structure on the next 5 year inspection or prior to any S&M frequency extension.

2. The Ref 1 language and maps are vague as to the access to the 105-N “below roof areas” which is actually the volume between the original 105-N roof and the new SSE roof. This area is shown in Figure 3-11 of Ref 1. There is no access to this space as there is a steel plate in the stairwell covering the access at the +60’ elevation roof.



Attachment B - 105-N/109-N BUILDING INSPECTION REPORT INSERT FOR MSA

Engineering Inspection – Appendices X and X+1 provides the record of the inspection, discussion, pictures, and checklist of the structural inspection of the interior and exterior of the structure. Appendix X contains those items with a maintenance and or continued monitoring recommendation, while Appendix X+1 photos and notes are provided as a general record of the condition of the Safe Storage Enclosure.

Conclusion - In general, the new steel and siding were found to be in very good condition, and the concrete and flashings to be in good and stable condition with no significant defects.

The roof joists tears noted in Ref 1 Section 3.1 were inspected, and although more rust spots which may indicate a tear were noted, thorough independent review of the vendor / constructor assessment of this item showed that these previous assessments were very conservative and no changes were visible during the 2015 visual inspections of a representative portion of these joists.

There is some airflow through the 105-N Zone 1 areas when the wind blows that is of concern since Zone 1 is supposed to be passively vented through a HEPA filter.

Many postings and operator aids were noted in and around SSE which no longer apply and may cause confusion to future staff entering the SSE.

Recommendations - Recommendations from the 2015 105-N SSE inspection amount to four items for consideration of future action:

1. SSE Structure – Evaluation and maintenance recommendation is needed for the exterior sealing of the Zone 1 doors to eliminate or minimize the observed air flow through the SSE.
2. SSE Structure – Define a process to remove or cover postings / operator aids that no longer apply.
3. S&M Plan revision should be considered to:
 - i. Provide guidance when and how instruments in Room 24W should be addressed if they were to alarm or fail since there is no access to this Room planned for the ISS period
 - ii. Clarify that no access is possible in the 105-N under roof area
4. Consideration should be given to removing the details of the joist tears in the S&M Plan – not to remove the discussion entirely, but acknowledge that the vendor, constructor, and an independent review after 5 years of use found these tears to be of no consequence.



Attachment C – 105-N/109-N SSE INSPECTION RESULTS – For Further Consideration

This was the first internal inspection of the 105-N/109-N Safe Storage Enclosure (N SSE). This inspection was completed in accordance with and to meet the requirements of DOE-RL-2011-106; Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure.

This attachment presents the photos for areas which were inspected in the April 2015 SSE entry using the surveillance routes noted in Ref 1. Some of the N SSE Turnover photos from the 2011 and 2012 timeframe (from CCN Document # 0635319) are also included that will be used as a baseline for comparison for these initial periodic 2015 N SSE inspection efforts.

Each elevation of the building with concerns is a separate section of this attachment and includes:

1. A map showing the photo locations
2. A portion of the inspection table that applies to that elevation and
3. Comparison photos from pre turnover to 2015 (when available)

When an area of concern is identified within the area covered in a particular section, the item will be listed in the location table and photo(s) will be provided. NOTE that the picture numbers listed herein are the file numbers for that photo in the master file of all the photos taken for this inspection effort.

If there is no particular area/item for concern on any given elevation, no map or table will be included in this section

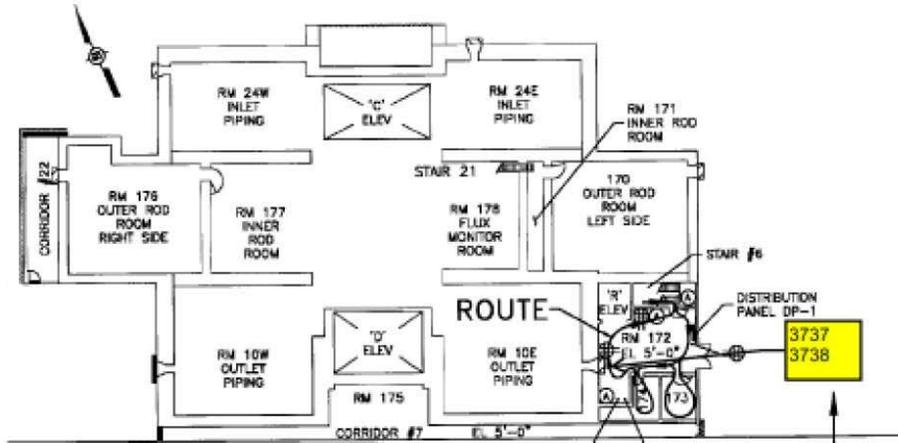
Contents

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C-1 - 105N 0' and +5' Elevation Map



C-2



C-1 - Summary Table & Photos Elevation 0' and +5'

Turnover Photo #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3738	Zone 1 door, welded closed yet breeze coming through	105N +5'	Need to evaluate if this type of leakage is acceptable from a radiological and environmental (inside the SSE and external "release").
	3737	Zone 1 door, welded closed yet breeze coming through	105N +5'	



3738 Zone 1 door. welded closed yet breeze coming through



Notice piece of maslin cloth, presumable placed here at some time past to indicate air flow.

3737 Zone 1 door. welded closed yet breeze coming through



C-2 - Summary Table & Photos Elevation +16

Turnover Photo #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3716	Sign on wall at stairwell entrance to floor	+14'	S&M Plan calls this elevation +14'. Not a critical item, but suggest changing S&M plan to match field observations.
	3721	Picture of possible calcium on ceiling in room 302	+16	No source identified above, continue observation in the future.
	3722	Picture of possible calcium on ceiling in room 302	+16	



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3716 S& M plan labeled 14'6" level. Needs to be changed with next S&M Plan revision



3721 Picture of possible calcium carbonate bleeding on ceiling in room 302



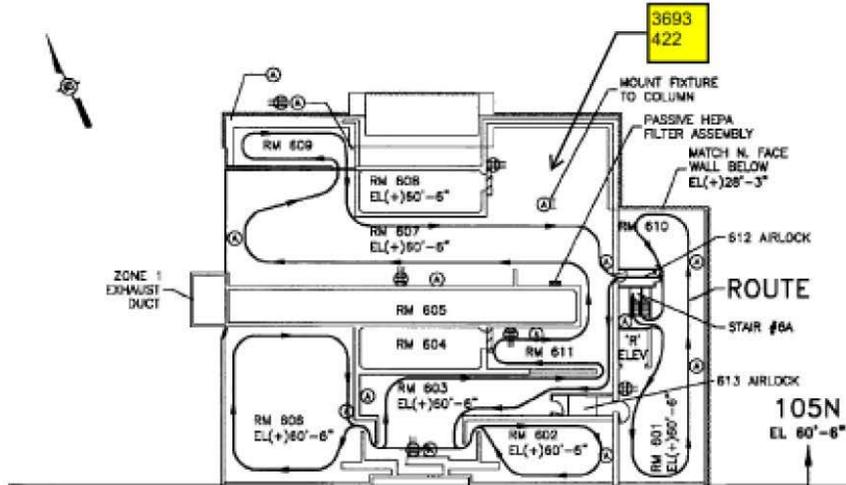
3722 Same as above

C-7



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C-3 - 105N +60' Elevation Map



C-8



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C-3 - Summary Table & Photo Elevation +60'

Turnover Photo #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
422	3693	105N: Rm.#607- NE Corner at El.+60'- 6" dated 02-07-2012	105N +60'	Continue observation, good practice recommended for other weeping hydraulic / oil lines shown in photo 3693.



422 - 105N: Rm.#607-NE Corner at El.+60'-6" dated 02-07-2012

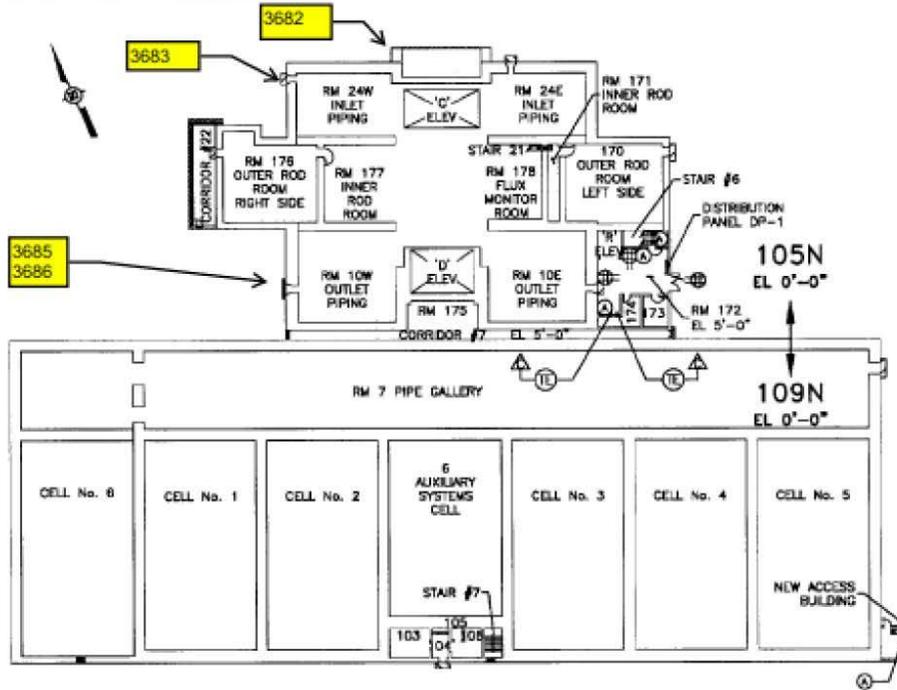


3693 Old fluid stains on floor next to containers of kitty litter. Good practice for weeping hydraulic fluids



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C-4 - N SSE Exterior Map





C-4 - Summary Table & Photos N SSE Exterior

Turnover Photo #	New Photo #	Description	Area / Location	Future Inspection/Maintenance Recommendations
	3682	Swallows nesting directly on metal caps/closures	Exterior	Continue observation for damage to any steel surfaces.
	3683	Possible water intrusion/corrosion with backfill @ door	Exterior	Consider moving soil from adjacent to doors and grading away from door sill to ensure no in-leakage and prevent accelerated corrosion of the Zone 1 doors.
	3685	Possible water intrusion/corrosion with backfill @ door	Exterior	
	3686	Possible water intrusion/corrosion with backfill @ door	Exterior	



3682 Swallow nesting directly on metal caps/closures



3683 Possible water intrusion/corrosion issue w backfill over bottom sill of door



3685 Possible water intrusion/corrosion issue with backfill at door

Same location as photo
3686 below



3686 Possible water intrusion/corrosion issue with backfill over the sill at this Zone 1 door



Attachment D – 105-N/109-N SSE INSPECTION RESULTS – Historic record

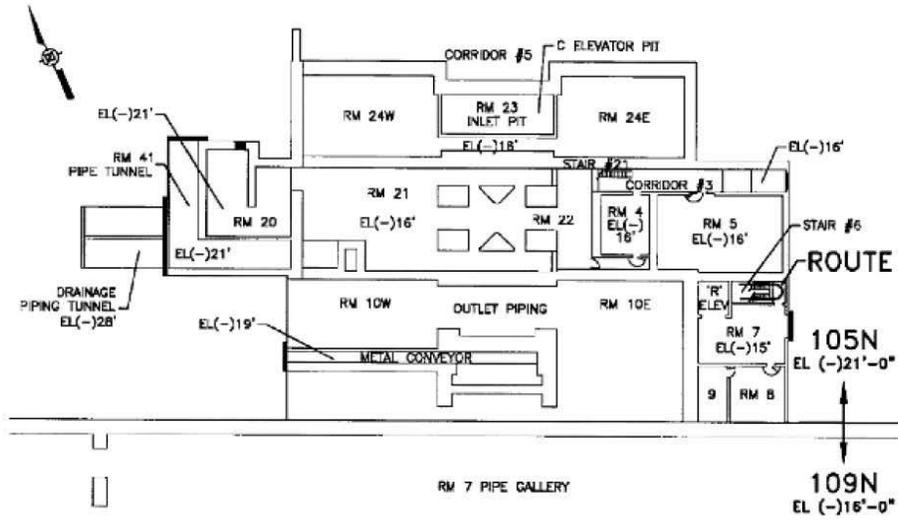
This was the first internal inspection of the 105-N/109-N Safe Storage Enclosure (SSE). This inspection was completed to meet the requirements of References 1 and 2. Photos from both the facility turnover in 2011/2012 and the April 2015 inspection are included as an historic record and not intended to require specific re-inspection in the future. These photos are organized by building elevation and a map of each elevation and a table with itemized description is included when significant.

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D-1 - 105N -21' Elevation Map

Surveillance and Inspection Route (105-N, Elevation (-)21'-0").



D-2



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D-1 Summary Table & Photos Elevation -21'

Turnover Photo #	New Photo #	Description
428	3729	R Elevator Pit-Looking SW at El.(-)24' dated 02-15-2012
429	3728	Stair#6 Level Switches-Bottom of Stair at El.(-)24' dated 02-15-2012



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428 -105N / R Elevator Pit-Looking SW at El.(-)24' dated 02-15-2012



3729 No visible change to condition



429 - 105N / Stair#6 Level Switches-Bottom of Stair at El.(-)24' dated 02-15-2012



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3728 4/15 - Interior pour back framing remains

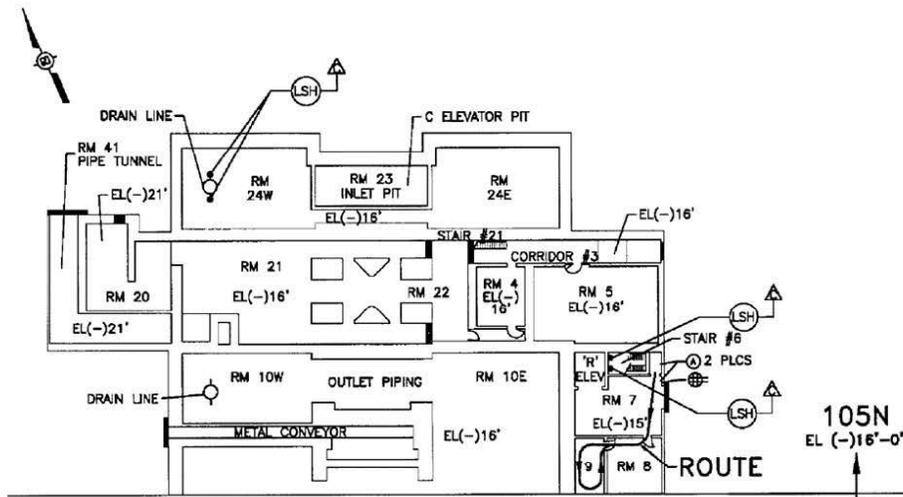
D-5

F-57



D-2 - 105N -16' Elevation Map

Surveillance and Inspection Route (105-N, Elevation (-)16'-0").





D-2 Summary Table & Photos Elevation -16'

Turnover Photo #	New Photo #	Description
251	No new photo	Rm.#8-SE Corner at El.(-)15' dated 02-15-2012
	3723	Interior Pour back framing remains
	3724	Interior Pour back framing remains
	3725	Interior Pour back framing remains
	3727	Interior Pour back framing remains



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251 - 105N / Rm.#8-SE Corner at El.(-)15' dated 02-15-2012

No Turnover Photo - 105N / Rm.#7-Looking East at Pourback / El.(-)15'



3723 Interior pour back framing remains



3724 Interior pour back framing remains

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3725 Interior pour back framing remains



3727 Interior pour back framing remains

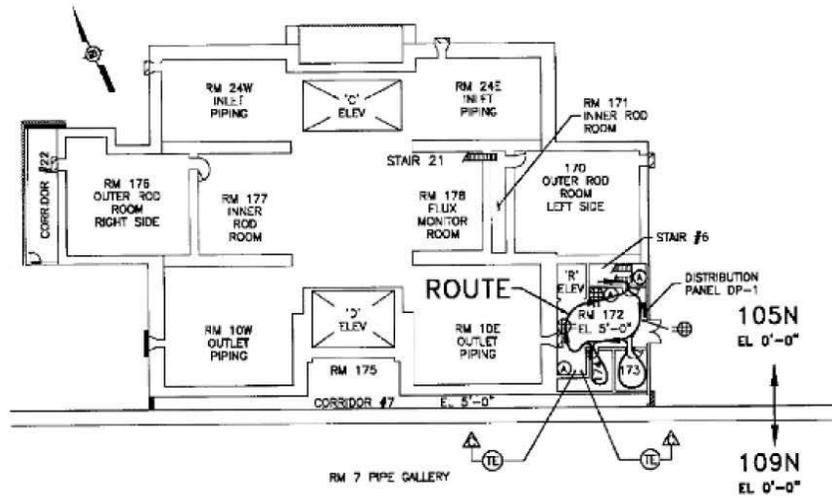
D-9



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D-3 - 105N 0' and +5' Elevation Map

Surveillance and Inspection Route (105-N, Elevation 0'-0").



D-3 Summary Table & Photos Elevation 0' and +5'

Turnover Photo #	New Photo #	Description
357	No new photo	Rm.#172-East Wall Access Door at El.+5' dated 02-15-2012
366	3739	Rm.#173-Looking South at El.+5' dated 02-15-2012



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357 - 105N/Rm.#172-East Wall Access Door at El.+5' dated 02-15-2012



366 - 105N/Rm.#173-Looking South at El.+5' dated 02-15-2012



3739 No visible change to condition

D-11

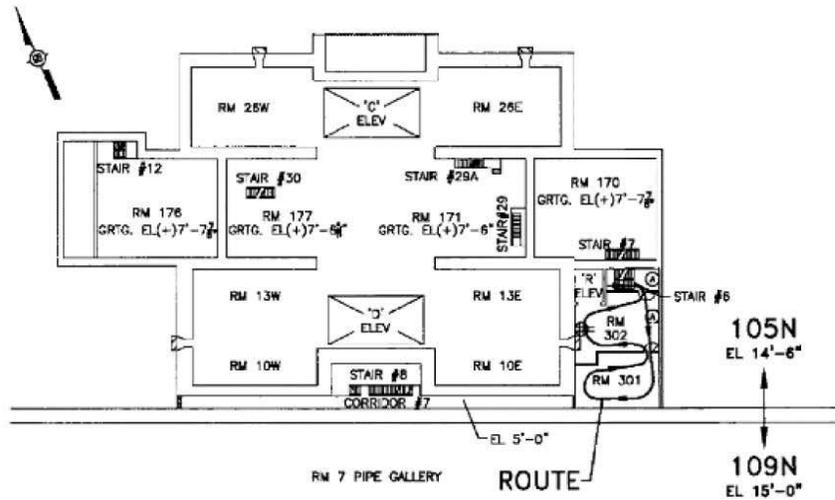
F-63



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D-4 - 105N +14' Elevation Map

Surveillance and Inspection Route (105-N, Elevation 14'-6").





D-4 Summary Table & Photo Elevation +14

Turnover Photo #	New Photo #	Description
377	No new photo	Rm.#301 Cover Plate Over Doorway-East Wall at El.+16'-6" dated 02-15-2012
378	No new photo	Rm.#301-Looking West at El.+16'-6" dated 02-15-2012
	3717	General area detail
	3718	General area detail
	3719	General area detail



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377 105N/Rm.#301 Cover Plate Over Doorway-East Wall at El.+16'-6" dated 02-15-2012



378 - 105N/Rm.#301-Looking West at El.+16'-6" dated 02-15-2012

Confirmed that this "hole" in the photo above is in a drywall partition and goes to an adjacent room on this floor.



3717



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3718



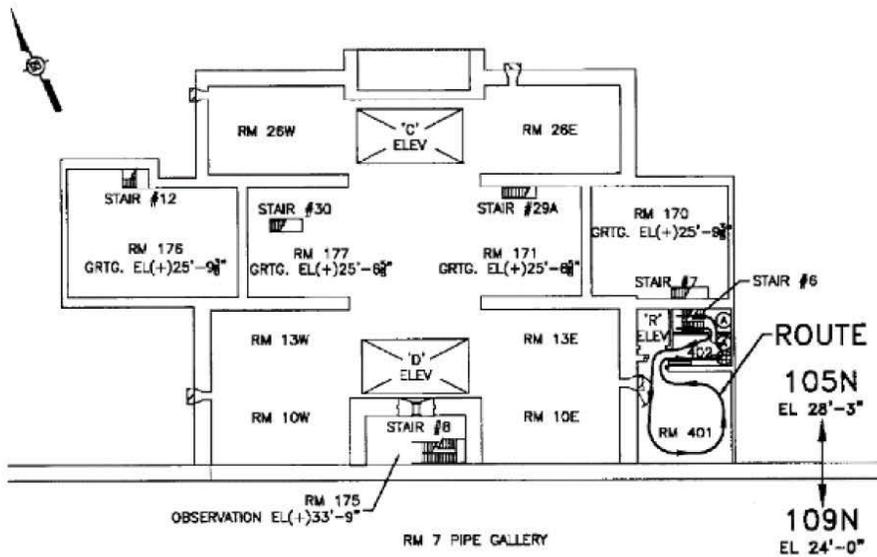
3719

D-15

F-67

D-5 - 105N + 28' Elevation Map

Figure 3-7. Surveillance and Inspection Route (105-N, Elevation 28'-3").





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D-5 Summary Table & Photos Elevation +28'

Turnover Photo #	New Photo #	Description
386	3714	Rm.#401-Looking East at El.+28'-3" dated 02-15-2012
388	3715	Rm.#401-Looking West at El.+28'-3" dated 02-15-2012
	3711	General area detail
	3712	
	3713	



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386 - 105N/Rm.#401-Looking East at El.+28'-3" dated 02-15-2012



3714



388 - 105N/Rm.#401-Looking West at El.+28'-3" dated 02-15-2012

D-18

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3715



3711 Sign on wall at door entrance from stairwell



3712



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3713

D-20

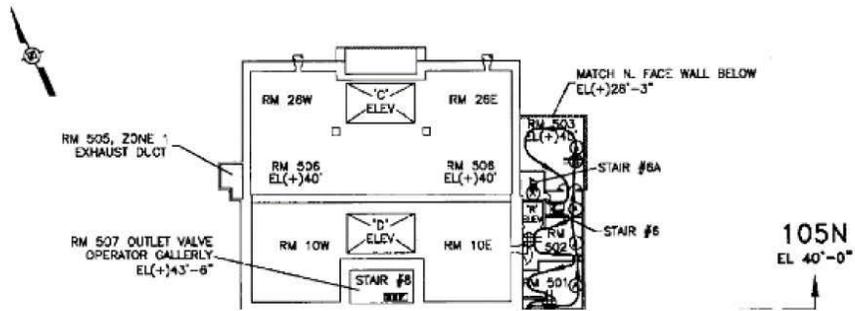
F-72



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D-6 - 105N +40' Elevation Map

Surveillance and Inspection Route (105-N/109-N, Elevation 40'-0").





D-6 Summary Table & Photos Elevation +40'

Turnover Photo #	New Photo #	Description
392	3708	Rm.502-East Wall Looking South at El.+40' dated 02-07-2011
395	No new photo	Rm.#501-East Wall at El.+40' dated 02-07-2012
399	No new photo	Rm.#503-East Wall Looking North at El.+40' dated 02-07-2012
	3704	General area detail
	3705	General area detail
	3707	General area detail
	3709	General area detail



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392 - 105N / Rm.502-East Wall Looking South at El.+40' dated 02-07-2011



3708



395 - Rm.#501-East Wall at El.+40' dated 02-07-2012

D-23

F-75



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399 - 105N / Rm.#503-East Wall Looking North at El.+40' dated 02-07-2012



3704



3705 in stairwell to adjacent / accessible room at this elevation

D-24

F-76



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3707



3709

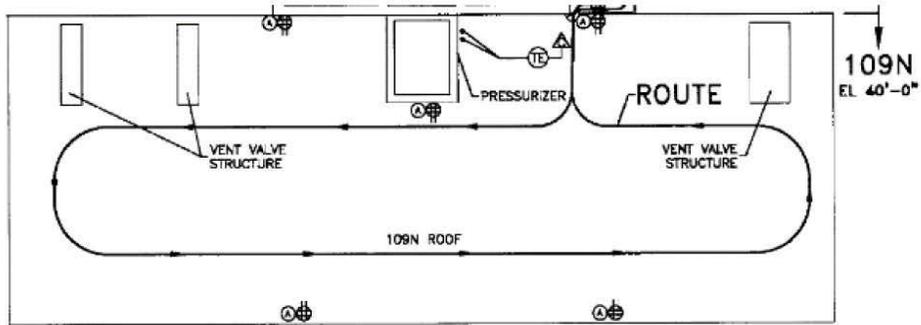
D-25

F-77



D-7 - 109N +40' Elevation Under Roof Map

Figure 3-8. Surveillance and Inspection Route (105-N/109-N, Elevation 40'-0").





D-7 Summary Table & Photos Elevation +40'

Turnover Photo #	New Photo #	Description
105	No new photo	109N: Area under SSE Roof-East Wall Ctr. At El.40' dated 02-07-2012
110	No new photo	109N: Area under SSE Roof-West ½ Roof at El.40' dated 02-07-2012
112	No new photo	109N: Area under SSE Roof-North Wall, West of Press. at El.40' dated 02-07-2012
116	No new photo	109N: Area under SSE Roof-South Wall, West End at El.40' dated 02-07-2012
	3740	Photos from roof joist inspection per Section 3 of Ref 1. No issues noted, see evaluation discussion in Attachment A.
	3741	
	3742	
	3743	
	3744	
	3745	
	3746	
	3747	



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105 - 109N: Area under SSE Roof-East Wall Ctr. At El.40' dated 02-07-2012



110 - 109N: Area under SSE Roof-West 1/2 Roof at El.40' dated 02-07-2012



112 - 109N: Area under SSE Roof-North Wall, West of Press. at El.40' dated 02-07-2012



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116 - 109N: Area under SSE Roof-South Wall, West End at El.40' dated 02-07-2012

NOTE - No roof leaks were noticed during inspection. It was a dry day and had not rained for several days previous.

The following several photos were taken during the inspection efforts in the 109-N "attic" space for the joist tears as called out in Ref 1 Section 3 and Appendix A. As noted in Attachment A of this report, structural evaluation of the 2015 as found conditions and with review the previous evaluation documented in Ref 3, recommend this item not be continued for further inspections.



3740



3741



3742



3743

D-30

F-82



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3744



3745



3746

D-31

F-83



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3747

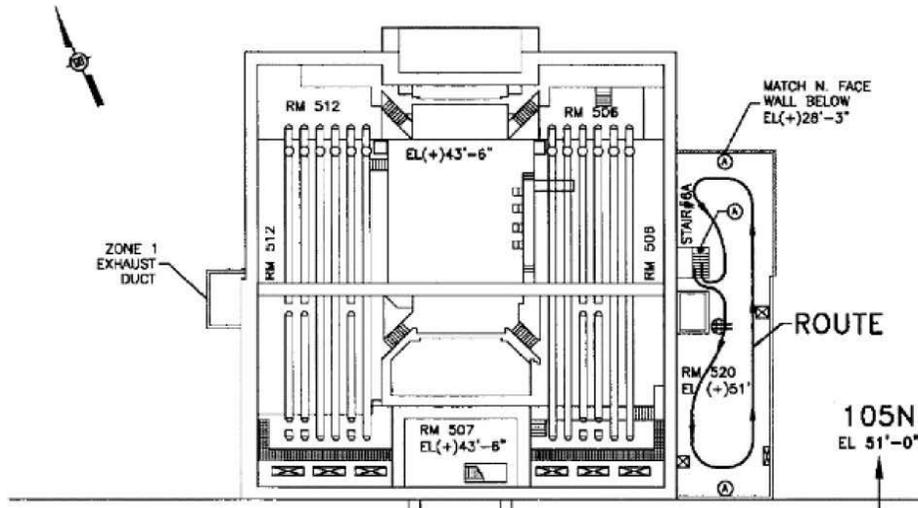
D-32

F-84



D-8 - 105N +51' Elevation Map

Surveillance and Inspection Route (105-N, Elevation 51'-0").





D-8 Summary Table & Photos Elevation +51'

Turnover Photo #	New Photo #	Description
402	No new photo	105N: Rm.#520-North End Looking North at El.+51' dated 02-07-2012
	3700	Elevation sign in stairwell
	3701	Other aspects of the rooms at +51'
	3702	
	3703	



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402 -105N: Rm.#520-North End Looking North at El.+51' dated 02-07-2012



3700



3701

D-35

F-87



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June 4, 2015



3702

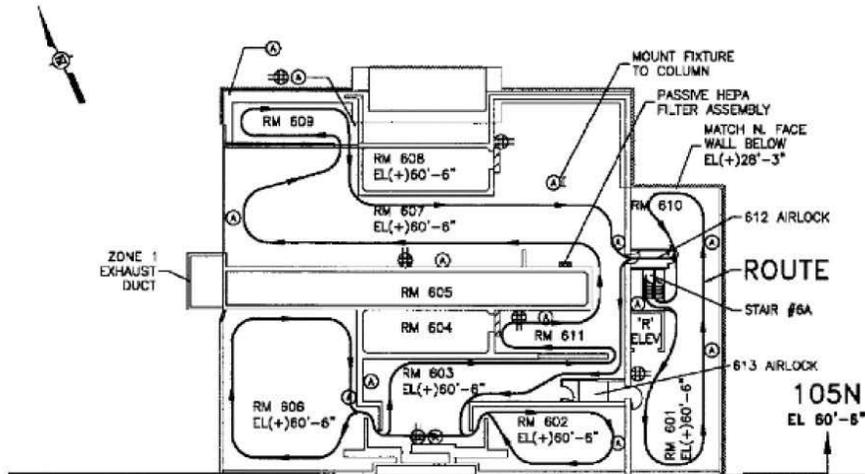


3703



D-9 - 105N +60' Elevation Map

Figure 3-10. Surveillance and Inspection Route (105-N, Elevation 60'-6").





D-9 Summary Table & Photos Elevation +60'

Turnover Photo #	New Photo #	Description
404	3689	105N: Rm.#610-Looking North at El.60'-6" dated 02-07-2012
405	No new photo	105N: Rm.#601-Looking South at El.+60'-6" dated 02-07-2012
407	3697 3698	105N: Rm.#602-Looking East at El.+60'-6" dated 02-07-2012
414	No new photo	105N: Rm.#606-NW Corner at El.+60'-6" dated 02-07-2012
415	No new photo	105N: Rm.#606 Cover Plate at Door Opening-NW Corner at El.+60'-6" dated 02-07-2012
419	No new photo	105N: Rm.#607 Passive HEPA Filter-South Side Looking West at El.+60'-6" dated 02-07-2012
425	No new photo	105N: Rm.#609 NW Corner-Looking West at El.+60'-6" dated 02-07-2012
	3699	General area detail
	3690	
	3691	
	3692	
	3695	
	3696	



15-MRM-007
June 4, 2015



404 - 105N: Rm.#610-Looking North at El.60'-6" dated 02-07-2012



3689



405 -105N: Rm.#601-Looking South at El.+60'-6" dated 02-07-2012



15-MRM-007
June 4, 2015



407- 105N: Rm.#602-Looking East at El.+60'-6" dated 02-07-2012



3697 – This photo and the one below shows the “hole” in photo 407 above is actually an open ventilation duct.



3698 – duct on the opposite side of wall from photo 3697 above

D-40



414 - 105N: Rm.#606-NW Corner at El.+60'-6" dated 02-07-2012



415 - 105N: Rm.#606 Cover Plate at Door Opening-NW Corner at El.+60'-6" dated 02-07-2012



419 - 105N: Rm.#607 Passive HEPA Filter-South Side Looking West at El.+60'-6" dated 02-07-2012



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June 4, 2015



425 - 105N: Rm.#609 NW Corner-Looking West at El.+60'-6" dated 02-07-2012



3699 Sign on wall between door to room and stairwell



3690 Typical old roof corrosion

D-42

F-94



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3691



3692

D-43

F-95



15-MRM-007
June 4, 2015



3695



3696

D-44

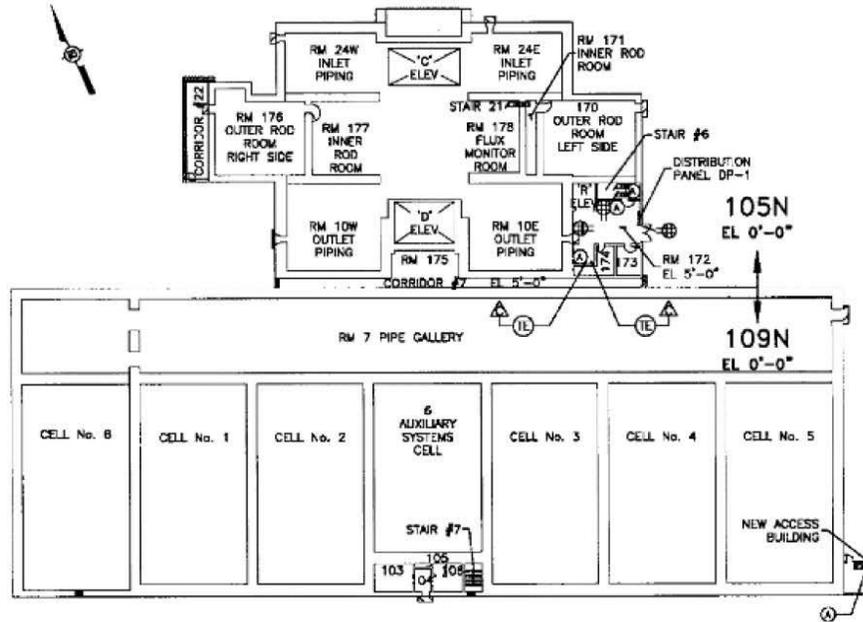
F-96



15-MRM-007
June 4, 2015

D-10 - N SSE Exterior Map

Surveillance and Inspection Route (105-N/109-N Plan View, Elevation 0'-0").





D-10 Summary Table & Photos N SSE Exterior

Turnover Photo #	New Photo #	Description
356	No new photo	105N: Rm.#172 Exterior View Access Door With Awning at El.+5' dated 07-26-2012
321	3680 3681	105N: Rm.#29 Front Face-Siding Enclosure (Exterior) dated 09-21-2011
331	No new photo	105N: Rm.#35 Pipe Tunnel-Concrete Pourback at N. End at grade to El.(-)21' dated 08-03-2011
	3677	General area detail
	3678	General area detail
	3679	General area detail Good clearance at door sill no concern about water intrusion
	3684	NE corner of SSE general area detail
	3687	109-N Access Building entry point
	3731	View of -16' pit that provides access to 109-N sub-grade Zone 1 door. Confirmed to be clean and dry in the pit area.
	3732	



356 -105N: Rm.#172 Exterior View Access Door With Awning at El.+5' dated 07-26-2012

D-46



15-MRM-007
June 4, 2015



321 - 105N: Rm.#29 Front Face-Siding Enclosure (Exterior) dated 09-21-2011



3680



3681

D-47

F-99



15-MRM-007
June 4, 2015



331 - 105N: Rm.#35 Pipe Tunnel-Concrete Pourback at N.End at grade to El.(-)21' dated 08-03-2011



3677



3678

D-48

F-100



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June 4, 2015



3679 Good clearance at door sill. No concern about water intrusion.



3684



3687

D-49



15-MRM-007
June 4, 2015



3731 109N Entrance Pit Clean and Dry



3732 109N Entrance Pit Clean and Dry

D-50

F-102

ADDENDUM 1
CONTRACT 55534; 105-N REACTOR STRUCTURAL
ENGINEERING INSPECTION REPORT

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Mr. Rick Moren
Director of Long-Term Stewardship
Mission Support Alliance, LLC
P.O. Box 650
Richland, WA 99352

Dear Mr. Moren,

SUBJECT: Contract 55534; 105-N Reactor Structural Engineering Inspection Report – Addendum 1

References:

- 1) DOE/RL-2011-106, Rev 0, Surveillance and Maintenance Plan for the 105-N/109-N Reactor Safe Storage Enclosure

This letter and report package is provided as an addendum within deliverable #5 of the subject contract as part of the 105-N/ 109-N Interim Safe Storage (ISS) Building surveillance / inspections that were performed on April 21 and 22, 2015. In accordance with references 1, an inspection was performed to determine the Safe Storage Enclosure (SSE) conditions and structural adequacy under ISS. This addendum is provided to address some observations made by others on November 19, 2015. Polestar's evaluation of this new data is described in Attachment A.

We are pleased to provide this evaluation to MSA and request that you contact me at 509-946-8279 if you have any questions concerning this report letter and attachments.

Kind regards,

Mark R Morton PE

ISS Support Project Manager

cc: Finney, S – MSA Procurement
Bailey, P;
Miller, K;
Morton, M;
File / LB

Enclosure(s) Attachment A – Assessment of Photos from 11/19/2015



Assessment of Photos from 11/19/2015

An interior inspection of the 105-N SSE was conducted by MSA RCT Joe Wiley on November 19, 2015 as part of set up and performance of a tour for DOE representatives that day. The weather that day was very wet (by Hanford standards) and approximately 40 to 45 degrees.

A. Evaluation of Photo 1, 2, and 3 – Water leaks

These photos, wall / floor below / SSE roof above, show both an active and historic leakage from an area of the new SSE roof construction. It appears that the source of the leakage are some screw holes (with no screws) in the roof sheeting. Given the location, a probable assumption would be that there were a few (failed) attempts put screws into the adjacent structural member, and the resulting holes were never plugged with rubber washer screws or any patch material. Two very important items in this evaluation are:

- (a) radiological condition of roof / ceiling / floor – which is a buffer area where no personal protective clothing is required, and
- (b) amount and frequency of the leak – while clearly leaking that day, a small amount of liquid is involved and very likely comes in only when (Hanford) significant rain occurs and presumably only from a required direction to hit this point right next to the building.

B. Evaluation of Photos 4, 5, 6, and 7 – Ceiling corrosion

A common element in these photos is the original 105-N 60' Elevation ceiling sheet metal is corroding and there is both staining and evidence of debris on the floor below. It must be noted that there is no access to the space above this ceiling as there is a steel plate in Stairwell #6 at the same elevation as the ceiling in photos 4 and 6 removing the access at the +60' elevation roof. The source of the moisture / corrosion / staining is obvious in Photo 4 and 5, the valve leakage, but not apparent in the ceiling above the hallway.

During operations, while these spaces are presumed to have been very warm from operating equipment, it appears that leakage was abundant as well (brown stains on the large valve and floor below). This amount of moisture constantly spraying or condensing on the ceiling immediately above the valve most assuredly caused the corrosion there. A thought on the hallway location – preferentially corroding when other parts of the ceiling show no evidence – may be an original crack or flaw in the galvanize layer or thin or missing insulation above this location where the available moisture preferentially condensed causing this area to constantly or routinely wetted. This in turn caused the corrosion similar to above the valve.

C. Conclusion / Recommendation

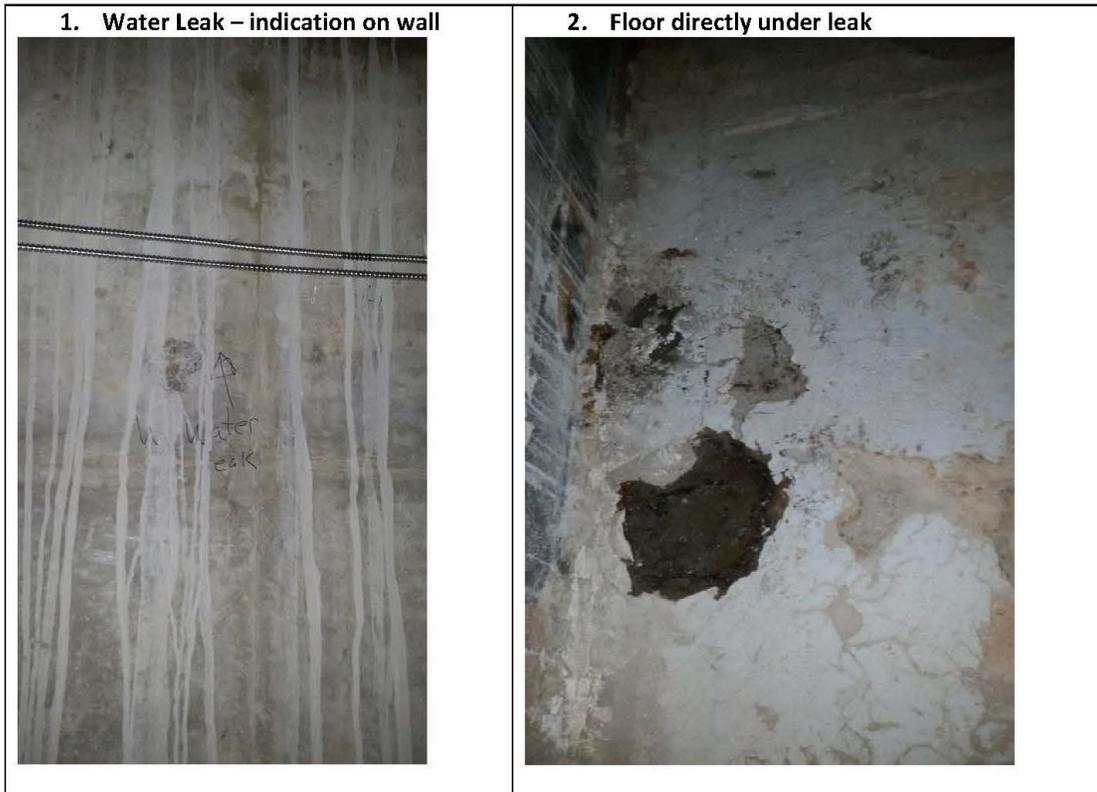
1. **Roof Leak** – This and similar leaks don't present a concern for 3 complimentary reasons;
 - (a) it doesn't happen often given Hanford semi-arid climate,
 - (b) there is not a great volume for the same climate condition, and
 - (c) there is very little or no contamination to become mobile

While no corrective action is recommended, an action that could be implemented as a best management practice would be a roof sealing tar or caulking placed in these holes wherever found. External application would be most effectively, however, internal

application would be much easier and probably as effective given frequency and intensity of rain that must be held back.

2. **Ceiling Corrosion** – Since the large moisture element has been removed from the space below these ceilings (that is seen to have started this corrosion) and the space above is covered by the SSE roof, these appears to be no moisture available to support the corrosion mechanism to continue in these locations.

In addition, since there is no access to the attic space above the 60' elevation, "roof" safety concerns are not applicable. One future item, should the steel plates at the top of Stairwell #6 be removed to access the attic space, these corroded areas would need to be evaluated from above and below per roof access procedures. Otherwise, no action is recommended at this time.





3. Roof above water leak



4. Ceiling Corrosion at RW Valve – 60'



5. Floor under RW Valve – 60'





6. Ceiling in Hallway – 60'



7. Floor in Hallway under Photo #6



**APPENDIX G
WASHINGTON CLOSURE HANFORD
INSPECTION CHECKLISTS FOR 2011 THROUGH 2014**

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**APPENDIX G
WASHINGTON CLOSURE HANFORD
INSPECTION CHECKLISTS FOR 2011 THROUGH 2014**

This appendix presents the checklists that Washington Closure Hanford used for their surveillance and maintenance activities for the 105-C, 105-D, 105-F, 105-H, and 105-N safe storage enclosures from 2011 through 2014.

Work Package Number: SM-650-08-2011

POC for questions about this work package: Patty Lichy / 392-9465
Printed or typed name/telephone number

**INSTRUCTIONS FOR SUBMITTING CLOSED/COMPLETED WORK
PACKAGES TO WCH DOCUMENT CONTROL**

- Write the work package number in the space provided above.
- Complete the checklist below.
- Attach the completed checklist to the closed/completed work package.
- Forward to Document Control (2620 Fermi, B129), H4-11. Please use envelope if sending through plant mail.

Type of Work Package:

- Type I
- Type II _____ Base Work Package, or
_____ A-Pack letter (e.g., a, b, c, d)
(Complete a checklist for each A-Pack)
- Craft
- Emergency Action
- Other Preventive Maintenance(PM) Work Packages

Hazard Grouping (please check all that apply):

- Radiological
- Asbestos
- Beryllium
- Air Quality
- Not applicable to any of the above

Subcontract Number (when applicable): N/A

NOTE: Please print or copy on green paper. This checklist is available in Content Management (UCM) as number 1868571 **OR** send a request for copies to ^WCH Document Control.

Changes to this form must be authorized by the IWCP Director or designee.

SM-650-08-2011

8/11 PM

Acrobat 8.0

PREVENTATIVE MAINTENANCE PACKAGE COVER SHEET				
PM Package No.: <u>SM-650</u>		Rev No.: <u>3</u>		
Title: <u>Annual Surveillance 100B, C, D, DR, NE, N, F & H Inactive Facilities</u>				
Procedure No. (if applicable): <u>Task Instruction</u>				
Work Supervisor: <u>Dean Humphrys</u>		Technical:	Planner: <u>Patty Lichy</u>	
Freq <u>Annual</u>		Grace/Lead <u>25%</u> days	Active Date <u>08/01/11</u>	
RWP # (or N/A) <u>N/A</u>		Air Quality <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Due Date <u>08/31/11</u>	
LOCATION:				
Area <u>N/A</u>		Bldg/Fac <u>Various</u>	Room <u>N/A</u>	
Equip Tag <u>N/A</u>		Model <u>N/A</u>	Serial # <u>N/A</u>	
Equip # <u>N/A</u>		Description <u>Annual Surveillances of Inactive Facilities</u>		
COA <u>H100SM2222</u>				
RESOURCES:				
<u>CODE</u>		<u>CRAFT NAME</u>	<u>NO.</u>	<u>EST. MHRS</u>
<u>D&D</u>		<u>D&D Worker</u>	<u>2</u>	<u>40.00</u>
<u>RCT</u>		<u>RAD. Con. Tech</u>	<u>1</u>	<u>40.00</u>
Brief Description, Reference Documents:				
PERFORM THE ANNUAL SURVEILLANCE ON THE 100 B, C, D, DR, NE, N, F AND H INACTIVE FACILITIES PER THE TASK INSTRUCTIONS. RECORD RESULTS FOR EACH FACILITY ON A DATA SHEET.				
Lockout Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If Lockout required, check one: <input type="checkbox"/> TAF <input type="checkbox"/> Eight-Criteria Checklist		
USQ Screening <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If no, Project Engineer print name, sign and date: <u>MARK ALLEN PER TELECON</u>		
If yes, Screening/Determination/CX No.:				
USQ Evaluator(s) print name, sign, date:		<u>PA Lichy 8-17-11</u>		
FHC Evaluation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If yes, FHC Evaluation No.:		
Project Engineer print name, sign, date:		<u>PA Lichy 8-17-11</u>		
AUTHORIZATION				
Based on my personal review, I agree that the work described in this package meets technical requirements, can be performed safely, and contains the controls from the JHA and is authorized for work release.				
Responsible Manager: <u>Bill Hooper</u>		Signature: <u>Bill Hooper</u>	Date: <u>8-17-11</u>	
PM PACKAGE CLOSURE RECOMMENDATION				
Based on my personal review of this work package and inspection of the work site, I recommend closure of this preventative maintenance work package.				
Work Supervisor: <u>Dean Humphrys</u>		Signature: <u>Dean Humphrys</u>	Date: <u>5/10/12</u>	
(or designee) Name		Signature	Date	
Technical: <u>Steve Garnett</u>		Signature: <u>Steve Garnett</u>	Date: <u>05/10/2012</u>	
(if applicable) Name		Signature	Date	
PM PACKAGE CLOSURE APPROVAL				
Responsible Manager: <u>Bill Hooper</u>		Signature: <u>Bill Hooper</u>	Date: <u>5/10/2012</u>	
Name		Signature	Date	

PREVENTATIVE MAINTENANCE WORK PACKAGE APPROVAL FORM											
PM Package No.: <u>SM-650</u>	Rev. No.: <u>4</u>										
Title: <u>Annual Surveillance of 100 B, C, D, DR, F, H Area Inactive Facilities</u>											
CONCURRENCE											
Based on my personal review, I agree all work described in this package meets technical requirements under my cognizance, and contains the controls from the JHA.											
Work Supervisor:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><u>Dean Humphrys</u> <i>Dean Humphrys</i></td> <td style="width: 30%;"><u>8/16/11</u></td> </tr> <tr> <td style="font-size: small;">Name and Signature</td> <td style="font-size: small;">Date</td> </tr> </table>	<u>Dean Humphrys</u> <i>Dean Humphrys</i>	<u>8/16/11</u>	Name and Signature	Date						
<u>Dean Humphrys</u> <i>Dean Humphrys</i>	<u>8/16/11</u>										
Name and Signature	Date										
PSR:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Morgan Spaman <u>Nick Smith</u> <i>Nick Smith</i></td> <td style="width: 30%;"><u>8-16-11</u></td> </tr> <tr> <td style="font-size: small;">Name and Signature</td> <td style="font-size: small;">Date</td> </tr> </table>	Morgan Spaman <u>Nick Smith</u> <i>Nick Smith</i>	<u>8-16-11</u>	Name and Signature	Date						
Morgan Spaman <u>Nick Smith</u> <i>Nick Smith</i>	<u>8-16-11</u>										
Name and Signature	Date										
EPL:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><u>Dave Warren</u> <i>per telecon PA Lichy</i></td> <td style="width: 30%;"><u>8-10-11</u></td> </tr> <tr> <td style="font-size: small;">Name and Signature</td> <td style="font-size: small;">Date</td> </tr> </table>	<u>Dave Warren</u> <i>per telecon PA Lichy</i>	<u>8-10-11</u>	Name and Signature	Date						
<u>Dave Warren</u> <i>per telecon PA Lichy</i>	<u>8-10-11</u>										
Name and Signature	Date										
Engineering	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><u>Mark Allen</u> <i>per telecon PA Lichy</i></td> <td style="width: 30%;"><u>8-10-11</u></td> </tr> <tr> <td style="font-size: small;">Name and Signature</td> <td style="font-size: small;">Date</td> </tr> <tr> <td style="border-top: 1px solid black;">:</td> <td style="border-top: 1px solid black;">Date</td> </tr> <tr> <td style="border-top: 1px solid black;">:</td> <td style="border-top: 1px solid black;">Date</td> </tr> <tr> <td style="border-top: 1px solid black;">:</td> <td style="border-top: 1px solid black;">Date</td> </tr> </table>	<u>Mark Allen</u> <i>per telecon PA Lichy</i>	<u>8-10-11</u>	Name and Signature	Date	:	Date	:	Date	:	Date
<u>Mark Allen</u> <i>per telecon PA Lichy</i>	<u>8-10-11</u>										
Name and Signature	Date										
:	Date										
:	Date										
:	Date										
USQ Screening	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If no, Project Engineer print name, sign and date: <u>MARK ALLEN</u>										
If yes, Screening/Determination/CX No.: <u>PER TELECON PA Lichy 8-10-11</u>											
USQ Evaluator(s) print name, sign, date:											
FHC Evaluation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No										
If yes, FHC Evaluation No.: <u>MARK ALLEN PER TELECON PA Lichy 8-10-11</u>											
Project Engineer print name, sign, date:											
APPROVAL											
Based on my personal review, and the concurrence of the above technical experts, I agree that the work described in this package meets technical requirements under my cognizance, can be performed safely and contains the controls from the JHA.											
Responsible Manager:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><u>Bill Hooper</u> <i>Bill Hooper</i></td> <td style="width: 30%;"><u>8/16/11</u></td> </tr> <tr> <td style="font-size: small;">Name and Signature</td> <td style="font-size: small;">Date</td> </tr> </table>	<u>Bill Hooper</u> <i>Bill Hooper</i>	<u>8/16/11</u>	Name and Signature	Date						
<u>Bill Hooper</u> <i>Bill Hooper</i>	<u>8/16/11</u>										
Name and Signature	Date										

Status Log for FY-11 Annual Surveillance of Inactive Facilities

This surveillance was started in August of FY-11 and completed in May of FY-12. The lengthy duration was due to the inclusion of the exterior repairs to the SSE reactors that had been identified in the 5 year surveillances but not completed. The following work associated with those reactors has been completed and where possible documented with pictures. The non-italicized words are excerpts from the 5 year surveillance reports the italicized words are the actions that have been performed to complete the repairs identified.

105C

1. Consider applying a sealant over the spalled areas that have exposed rebar for corrosion protection. *Complete and documented in the FY-11 Annual Inspection PM SM-650.*
2. Remove soil/aggregate at the six locations identified on the building exterior that are in contact with the metal siding or doorways. *Complete and documented in the FY-11 Annual Inspection PM SM-650.*
3. Add specific inspection of flashing at the eave during the annual external SSE inspection routine to determine if additional damage is noted or if corrective action is needed. *The annual inspection PM SM-650 was revised prior to the FY-11 performance to include inspection of flashing. The inspection was performed and is documented on the FY-11 performance of the PM*

105D

1. Application of a sealant to external exposed rebar: A sealant or rust preventative coating will be applied to all of the exposed rebar that can be safely accessed. All other occurrences of exposed rebar and the metal plates will be coated once the excavation has been filled in. *All exposed rebar that could be safely accessed was coated with a rust preventative.*
2. Perform and annual external inspection of the facility. *105D is part of this annual inspection PM - SM-650, it was inspected for the same criteria that all SSE reactors were inspected for with no problems found.*

105DR

1. Consider applying a sealant over the spalled areas that have exposed rebar for corrosion protection. *Complete and documented in the FY-11 Annual Inspection PM SM-650.*
2. Remove soil/aggregate at the north side of the building exterior that is in contact with the metal siding. *Complete and documented in the FY-11 Annual Inspection PM SM-650*
3. Add the specific inspection of flashing at the eave of the rear-face observation room to the annual external SSE inspection routine to determine if additional damage is noted or if corrective action is needed. *The annual inspection PM SM-650 was revised prior to the FY-11 performance to include inspection of flashing. The inspection was performed and is documented on the FY-11 performance of the PM.*
4. Visit the utility rooms of the other four SSE buildings and verify that the surveillance lighting circuits are in the "Off" position. *This was performed and documented on the FY-11 Annual Inspection PM SM-650.*
5. Begin discussions with the U>S> Department of Energy to determine if the internal surveillance of the 105-DR SSE may be changed from the current 5-year intervals to ten-year intervals. *In Progress*

6. Prepare a change to the S&M Plan to show that the remote monitoring system data for the 105-F SSE will be recorded on a monthly basis, since the structure and systems have demonstrated a very stable condition with only seasonal fluctuations expected in temperature and no water issues noted. References to the Bechtel Hanford, Inc. procedures should be updated to reflect the current Washington Closure Hanford procedures when this revision is made. *This is not complete and currently no work is being done to revise these procedures. Given the potential for the shift in performance frequency and the upcoming transition of this work to MSA suggests the revisions should be delayed until both issues are completed. If you have a different position on this please let us know.*
7. The analog data transmission modem from the remote monitoring system should be replaced with a digital system in the near future. *This was completed a long time ago with no work document so written proof is not available.*

105-F

1. Apply structural epoxy sealant to several significant cracks in the interior and exterior concrete structures of the building - *The two exterior cracks have been repaired and documented on the FY11 Annual Inspection SM-650. The interior cracks will be repaired during the FY13- 5 year inspection.*
2. Consider applying a sealant over the spalled areas that have exposed rebar for corrosion protection - *This is complete and documented on the FY11 Annual Inspection SM-650.*
3. Remove soil/aggregate at the four locations identified on the building exterior that is in contact with the metal siding or doorways - *This is complete and documented on the FY11 Annual Inspection SM-650.*

105H

1. *Exposed rebar was coated with a sealant*
2. *Any soil/aggregate in contact with sheetmetal portions of the structure was removed.*

Signature  Date: 5/10/12

ROUTINE WORK DETERMINATION FORM

Title: 105C Repairs

Task Description

Perform the following external repairs to the 105C reactor in response to issues identified in the 105C 5 Year Inspection. Apply a sealant to rebar located in areas of spalled concrete. Remove soil away from metal portions of the building to prevent corrosion.

1. Based on the location, environmental conditions and personnel assigned to the task, answer the following questions.

Yes	No	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the workers familiar with the location?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the environmental conditions acceptable for calling this task routine?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the timing of the work (with relation to other work activities) acceptable for this task to be routine?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Do the workers have sufficient experience with this task to consider this work routine?

If any of the above questions are answered **NO**, the task cannot be **PERFORMED** as Routine.

Yes No Does the task require a critical resource per PAS-2-1.1?

Yes No Is the task intrusive HCA work?

If any of the above questions are answered **YES** the task cannot be performed as Routine. If the answer is **NO** proceed to Section 2.

2. Check all potential hazards and activities associated with this task.

<input type="checkbox"/> Fall Hazard Prevention Analysis	<input type="checkbox"/> Hot Work
<input type="checkbox"/> Work in a Permit Controlled Area (BWP, RWP, etc.)	<input type="checkbox"/> Work in Confined Space
<input type="checkbox"/> Potential exposure to hazardous energy	<input type="checkbox"/> Potential Respiratory hazard requiring specific PPE
<input type="checkbox"/> Potential exposure to hazardous substance above the PEL	

Based on the checked boxes above, complete the following:

Yes No Are there more than TWO potential hazards and activities?

If the above question is answered YES, the task CANNOT be performed as Routine. Initiate a Work Process Form.

3. USQ Evaluation

Affect Important To Safety equipment and/or configuration of Hazard Category 2 or 3 Facility? Yes No

If yes, Screening/Determination Number or Categorical Exclusion Number and signature by USQ evaluator is required.

Review # _____

USQ Evaluator(s): _____

Name(s)	Signature(s)	Date
---------	--------------	------

4. Approval

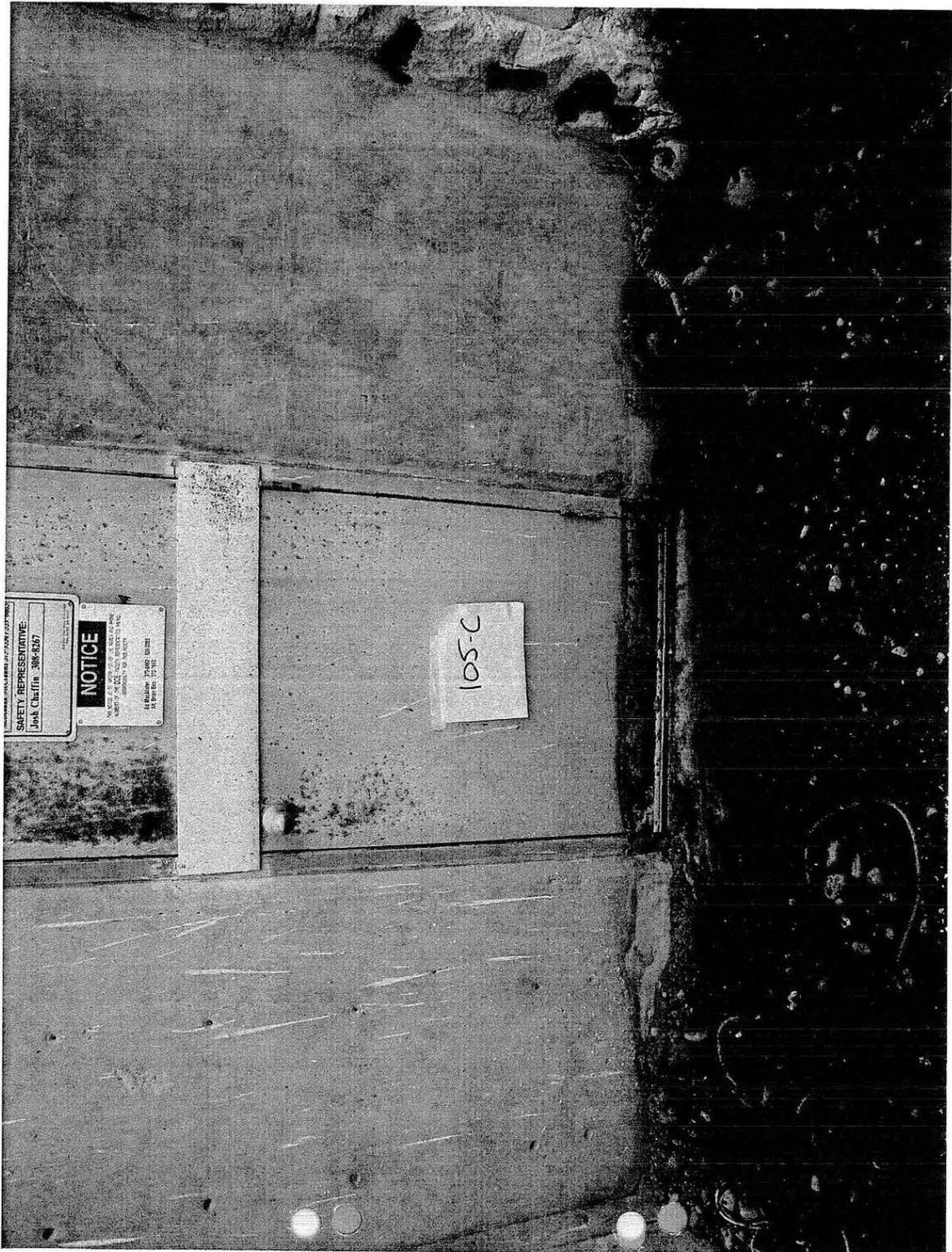
Based on the results of this form and my professional judgement, the associated task may be performed as Routine.

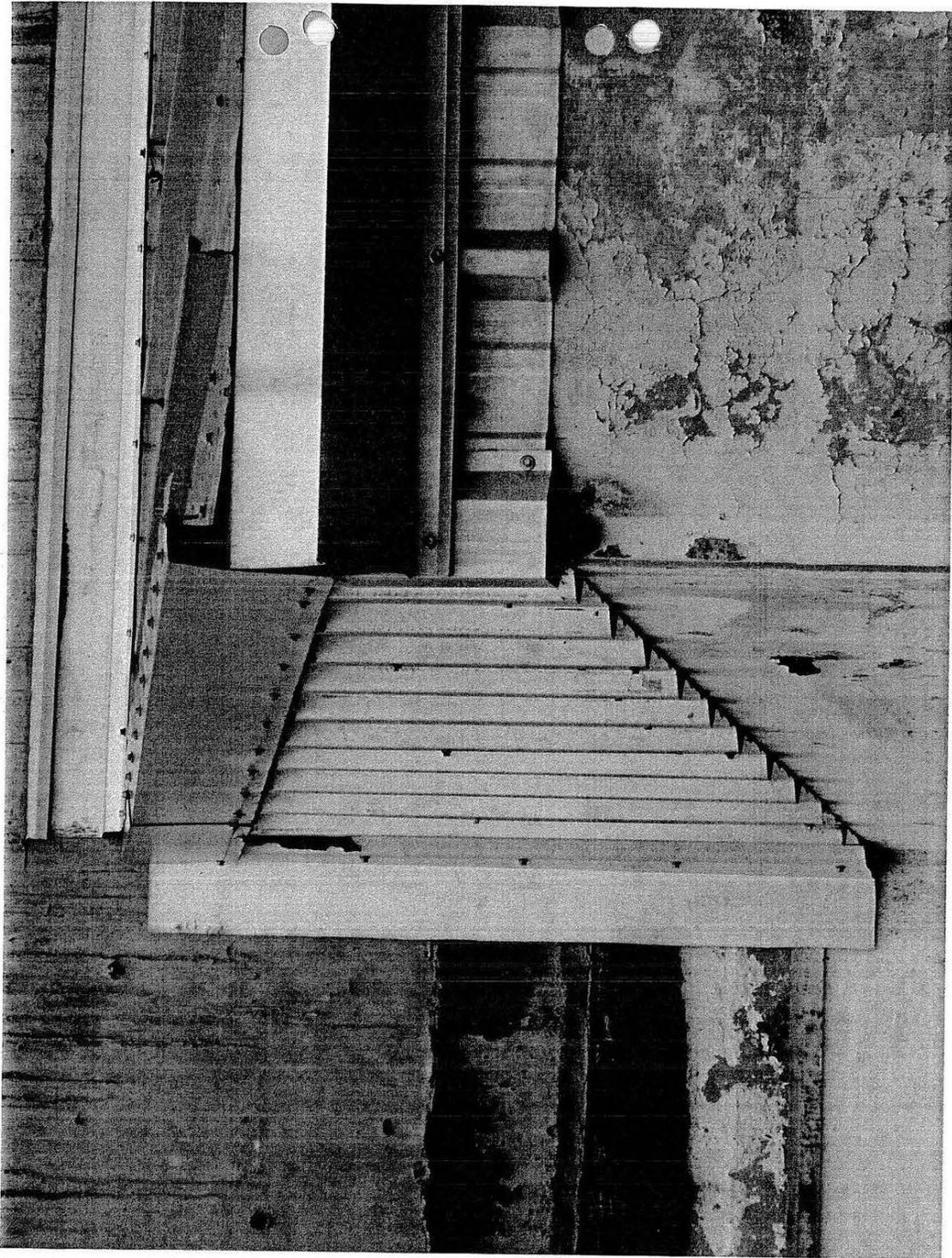
Responsible Manager: _____

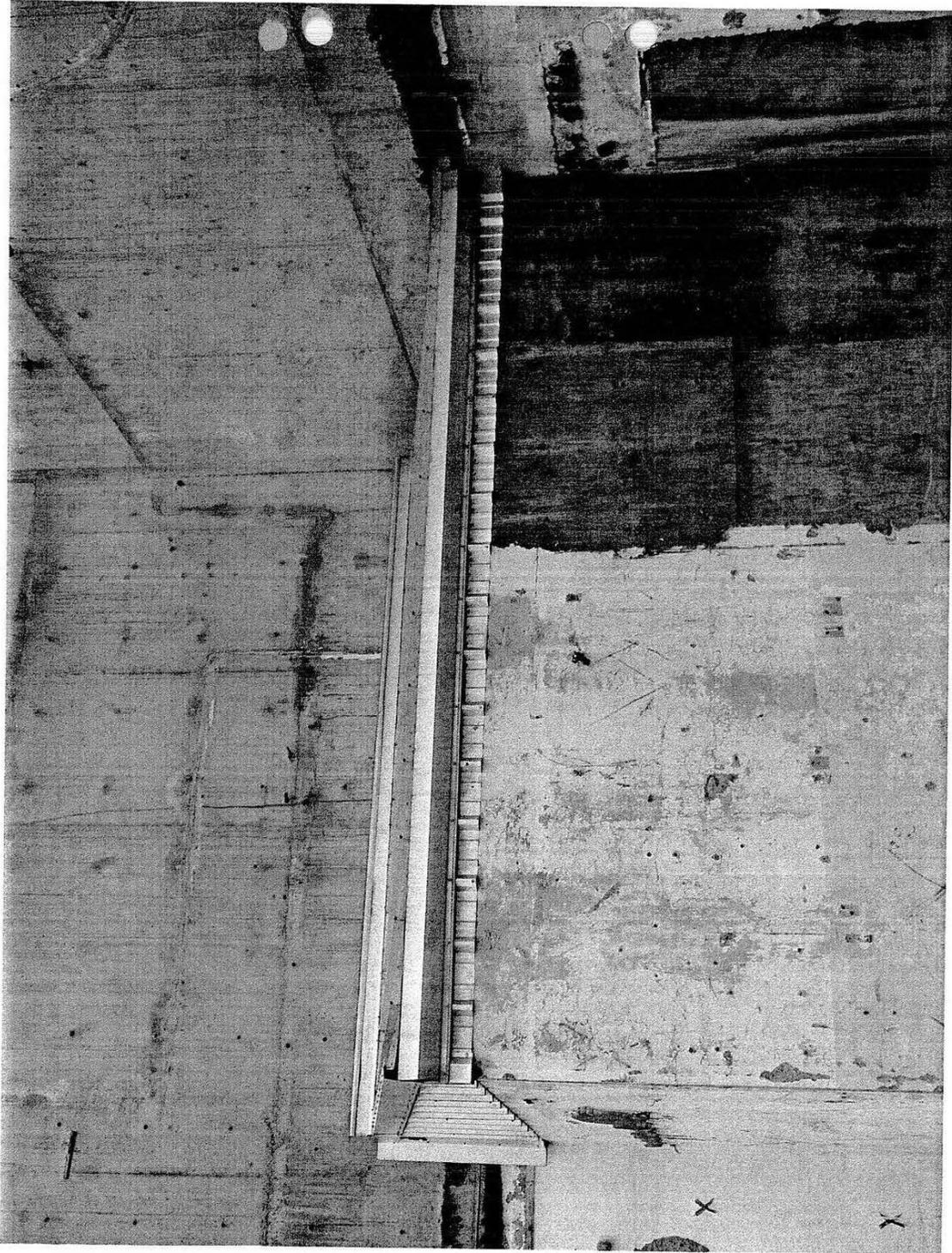
Name	Signature	Date
Bill Hooper	<i>Bill Hooper</i>	8-15-11

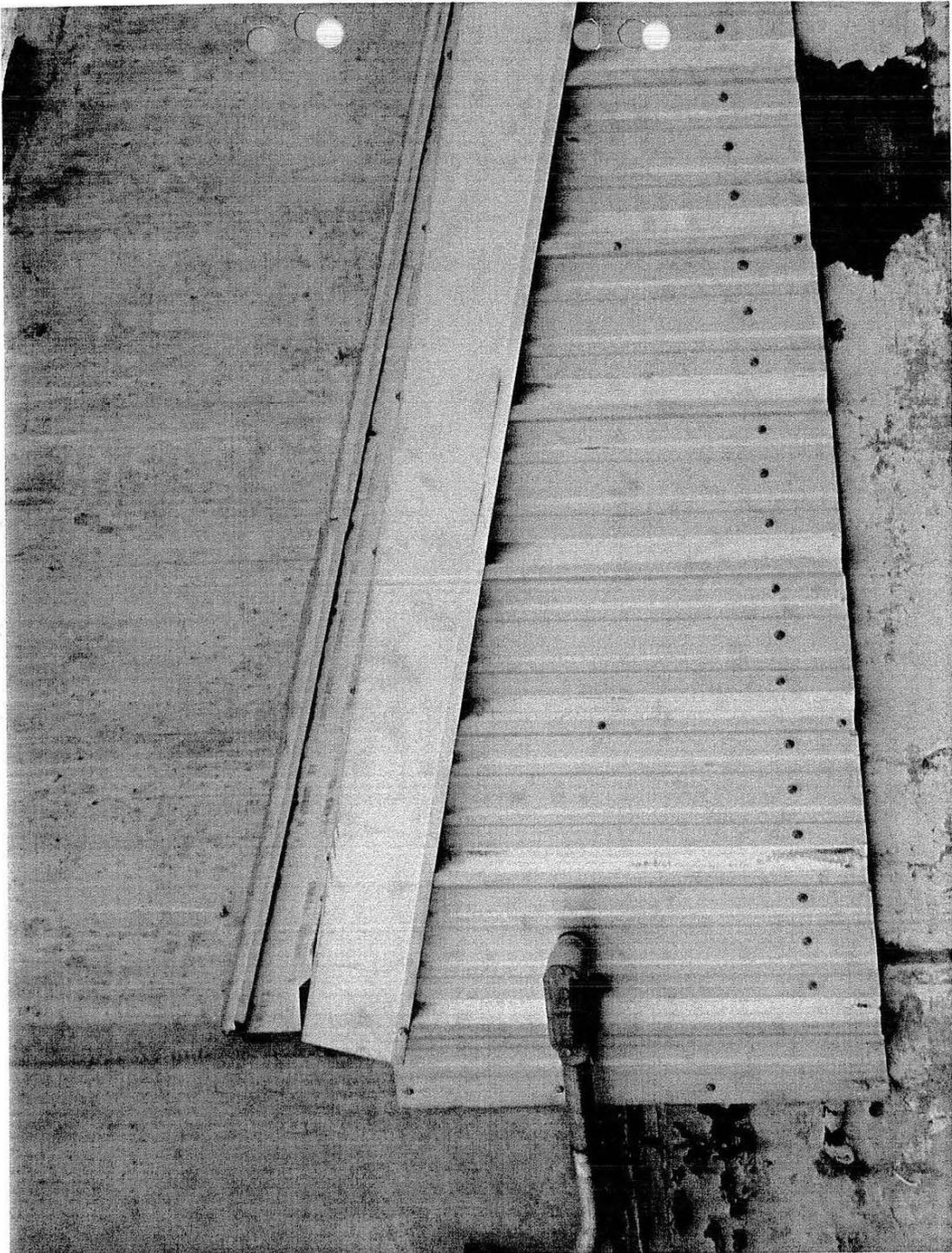
SEND COMPLETED RWDFs TO DOCUMENT CONTROL AT MSIN H4-11

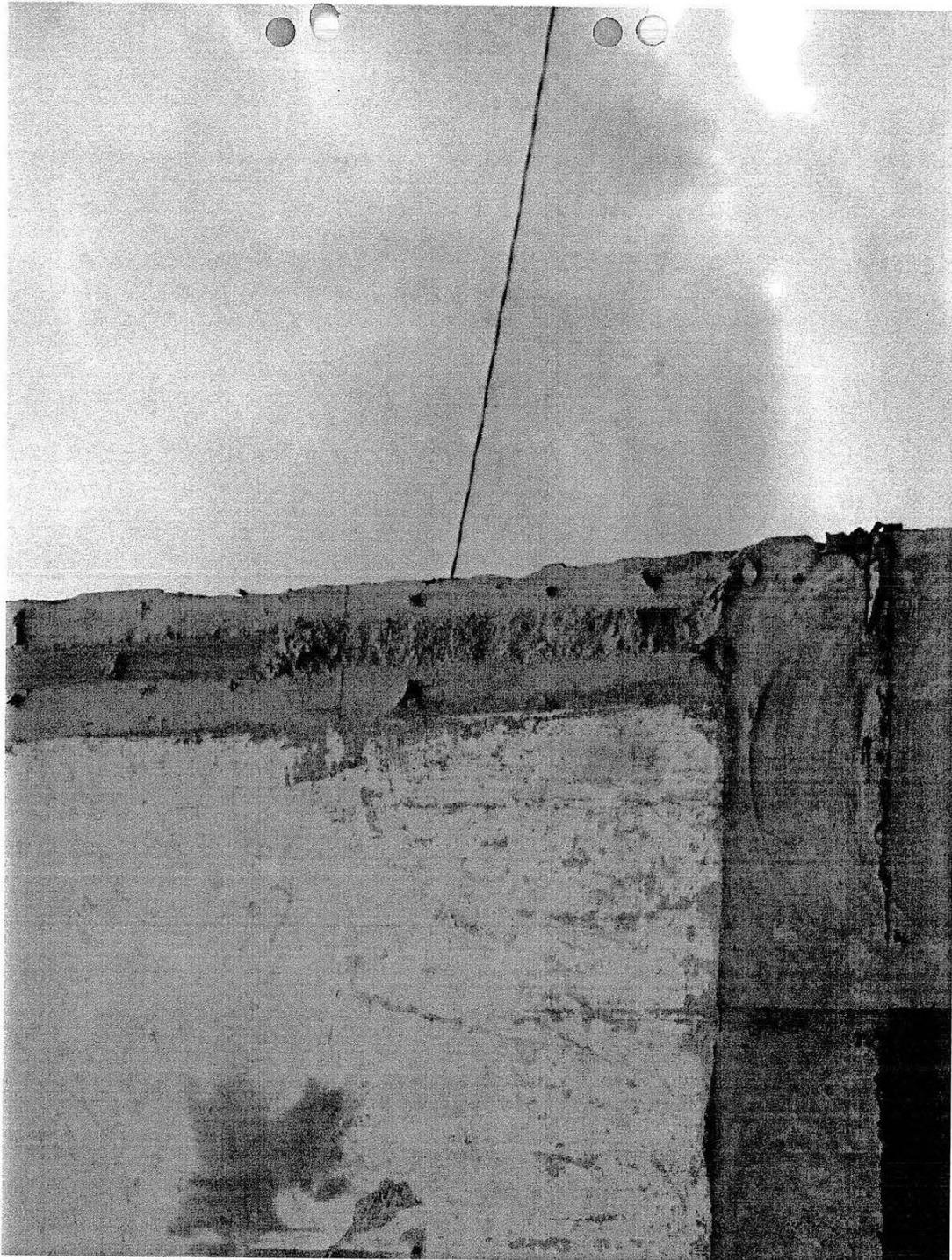


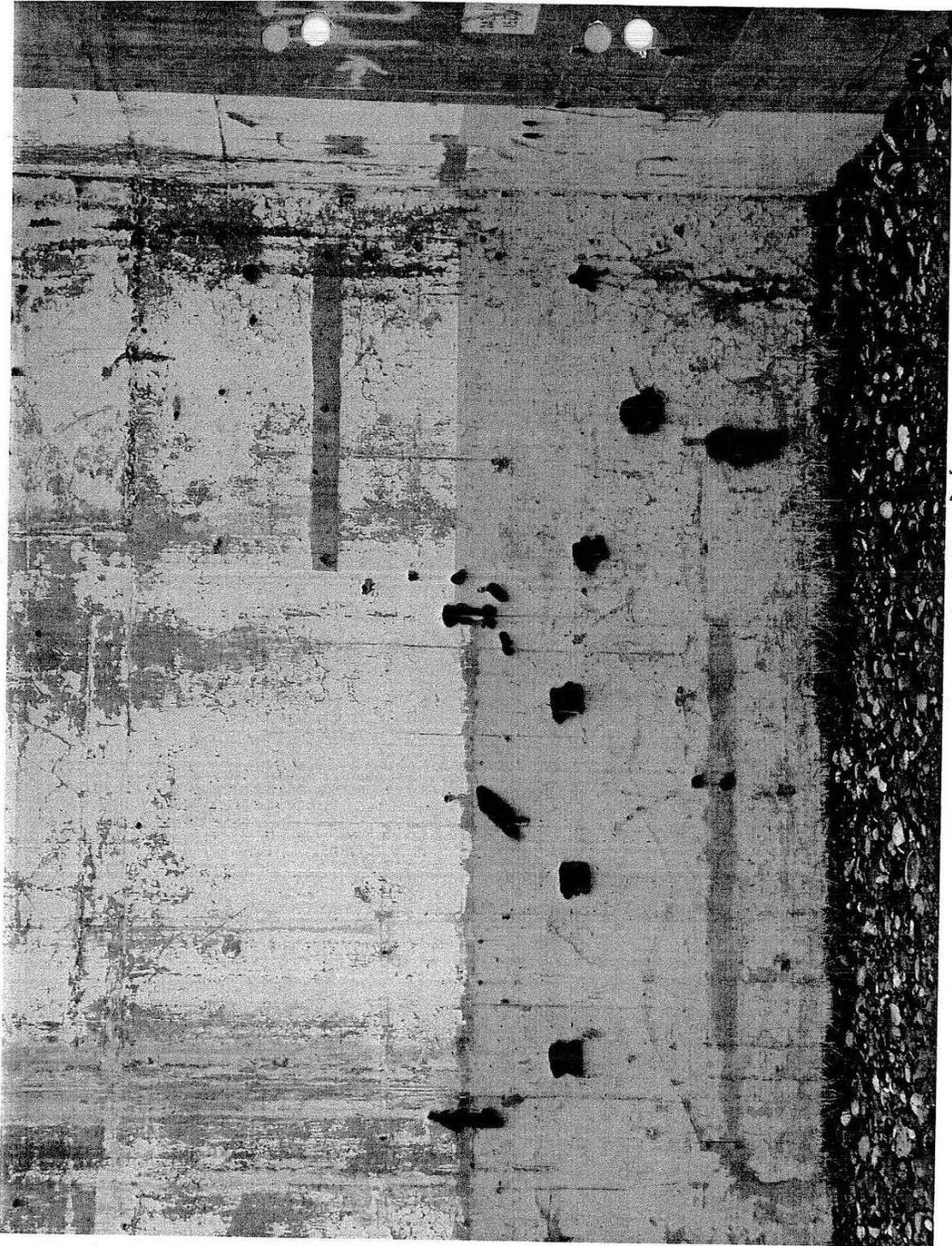














WCH Task Instruction

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Surveillance of 100 Area Inactive Facilities

**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. 105-DR	
People Performing Surveillance	Sign/Initial <i>[Signature]</i> 1 SP Date 8/14/11 Sign/Initial <i>[Signature]</i> 1 JW Date 8/22/11
5.2 Walk down	
Inspect for structural damage	N/A
No signs missing	NO
No water leaks	NO
No ground subsidence (Possible pipe failure)	NO
Doors locked	Yes
No excess combustible	no
No excess equipment	no
No electrical hazards	NO
No asbestos concerns	NO
No unidentified containers or suspect hazardous material	NO
No occupational hazards	NO
Housekeeping needed	NO
REMARKS <i>Applied sealant to rebar at spalled concrete at 0' level. Removed soil that was in contact with metal siding. Inspected flashing at rear face of observation tower. Verified utility lighting for other 4 sectors is off position. Applied sealant to exposed rebar > 8'</i>	
SUPERVISOR REVIEW: <i>[Signature]</i>	DATE 5/10/12

WCH Task Instruction

PM# SM-650
 Rev 4
 Page 7 of 8

Surveillance of 100 Area Inactive Facilities

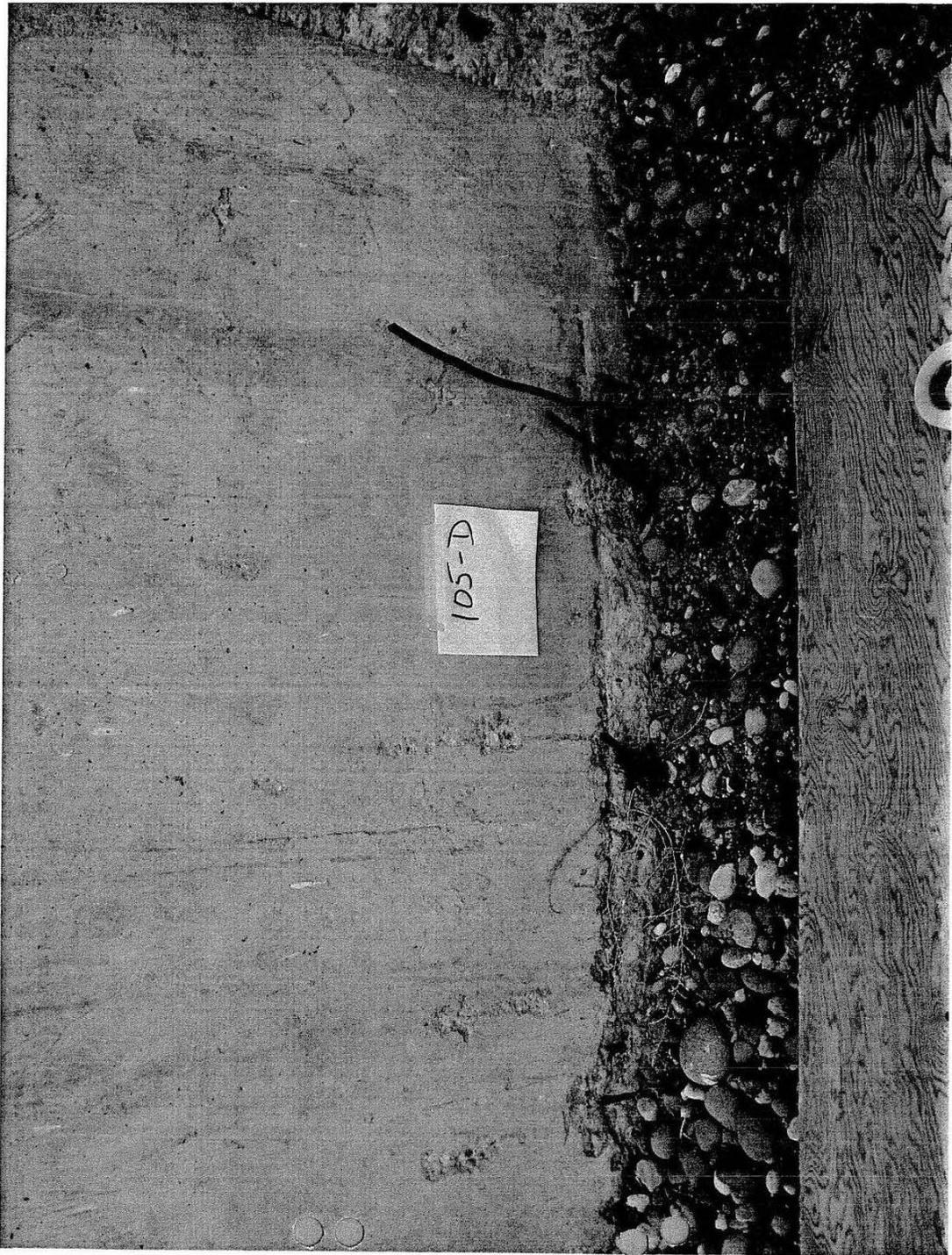
**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. 105-D	
People Performing Surveillance	Sign/Initial <u>[Signature]</u> Date <u>8/22/11</u> Sign/Initial <u>[Signature]</u> Date <u>8/22/11</u>
5.2 Walk down	
Inspect for structural damage	n/a
No signs missing	no
No water leaks	no
No ground subsidence (Possible pipe failure)	no
Doors locked	Yes
No excess combustible	no
No excess equipment	no
No electrical hazards	no
No asbestos concerns	no
No unidentified containers or suspect hazardous material	no
No occupational hazards	no
Housekeeping needed	no
REMARKS	
<p>Applied sealant to exposed rebar @ 0' level where we could reach. Removed soil from contact with metal portions of structure. Some areas of structure not accessible due to excavations. Applied sealant to rebar > 8'</p>	
<p>SUPERVISOR REVIEW: <u>[Signature]</u> DATE <u>5/10/12</u></p>	

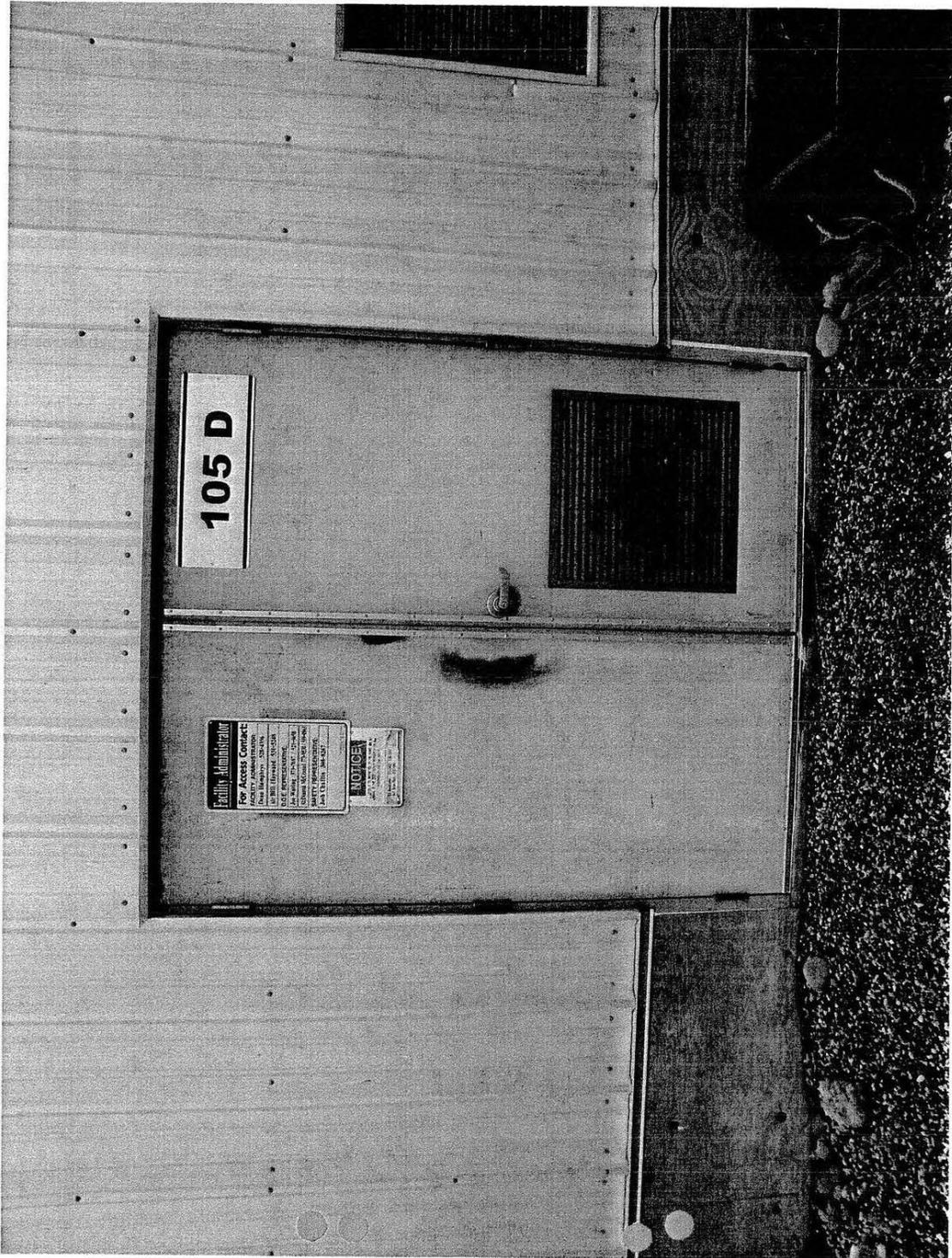
ROUTINE WORK DETERMINATION FORM

Title: 105-D Repairs	
Task Description	
Perform the following external repairs to the 105 D reactor in response to issues identified in the 105-D 5 Year inspection. Apply a sealant to rebar where accessible. Remove any soil that is contacting metal portions of the building.	
1. Based on the location, environmental conditions and personnel assigned to the task, answer the following questions.	
Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are the workers familiar with the location?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are the environmental conditions acceptable for calling this task routine?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is the timing of the work (with relation to other work activities) acceptable for this task to be routine?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Do the workers have sufficient experience with this task to consider this work routine?	
If any of the above questions are answered NO , the task cannot be PERFORMED as Routine.	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Does the task require a critical resource per PAS-2-1.1?	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is the task intrusive HCA work?	
If any of the above questions are answered YES the task cannot be performed as Routine. If the answer is NO proceed to Section 2.	
2. Check all potential hazards and activities associated with this task.	
<input type="checkbox"/> Fall Hazard Prevention Analysis	<input type="checkbox"/> Hot Work
<input type="checkbox"/> Work in a Permit Controlled Area (BWP, RWP, etc.)	<input type="checkbox"/> Work in Confined Space
<input type="checkbox"/> Potential exposure to hazardous energy	<input type="checkbox"/> Potential Respiratory hazard requiring specific PPE
<input type="checkbox"/> Potential exposure to hazardous substance above the PEL	
Based on the checked boxes above, complete the following:	
Yes <input type="checkbox"/> No <input type="checkbox"/> Are there more than TWO potential hazards and activities?	
If the above question is answered YES, the task CANNOT be performed as Routine. Initiate a Work Process Form.	
3. USQ Evaluation	
Affect Important To Safety equipment and/or configuration of Hazard Category 2 or 3 Facility? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
If yes, Screening/Determination Number or Categorical Exclusion Number and signature by USQ evaluator is required.	
Review # _____	
USQ Evaluator(s): _____	
Name(s)	Signature(s)
Date	
4. Approval	
Based on the results of this form and my professional judgement, the associated task may be performed as Routine.	
Responsible Manager: _____	_____
Name	Signature
Date	Date

SEND COMPLETED RWDFs TO DOCUMENT CONTROL AT MSIN H4-11

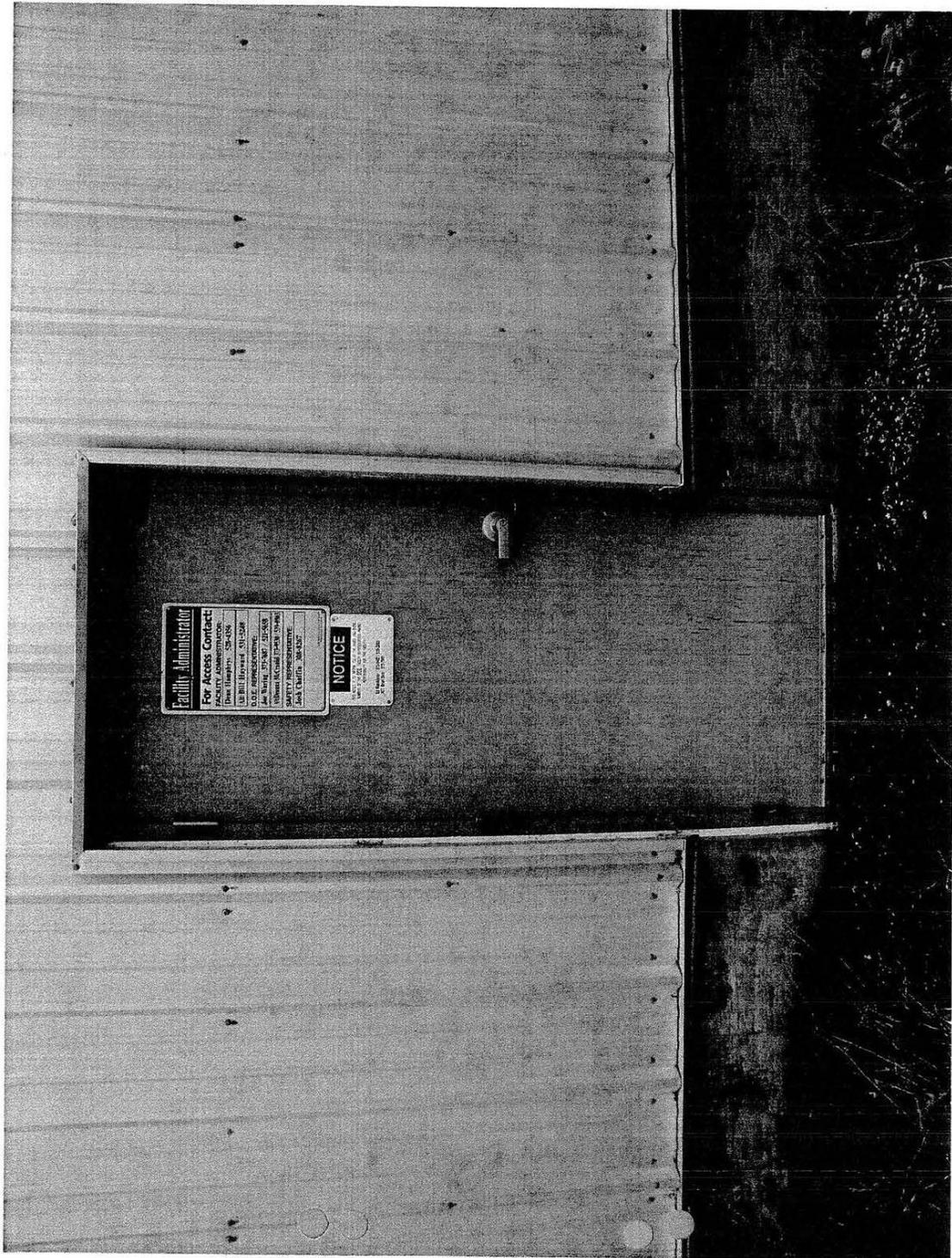




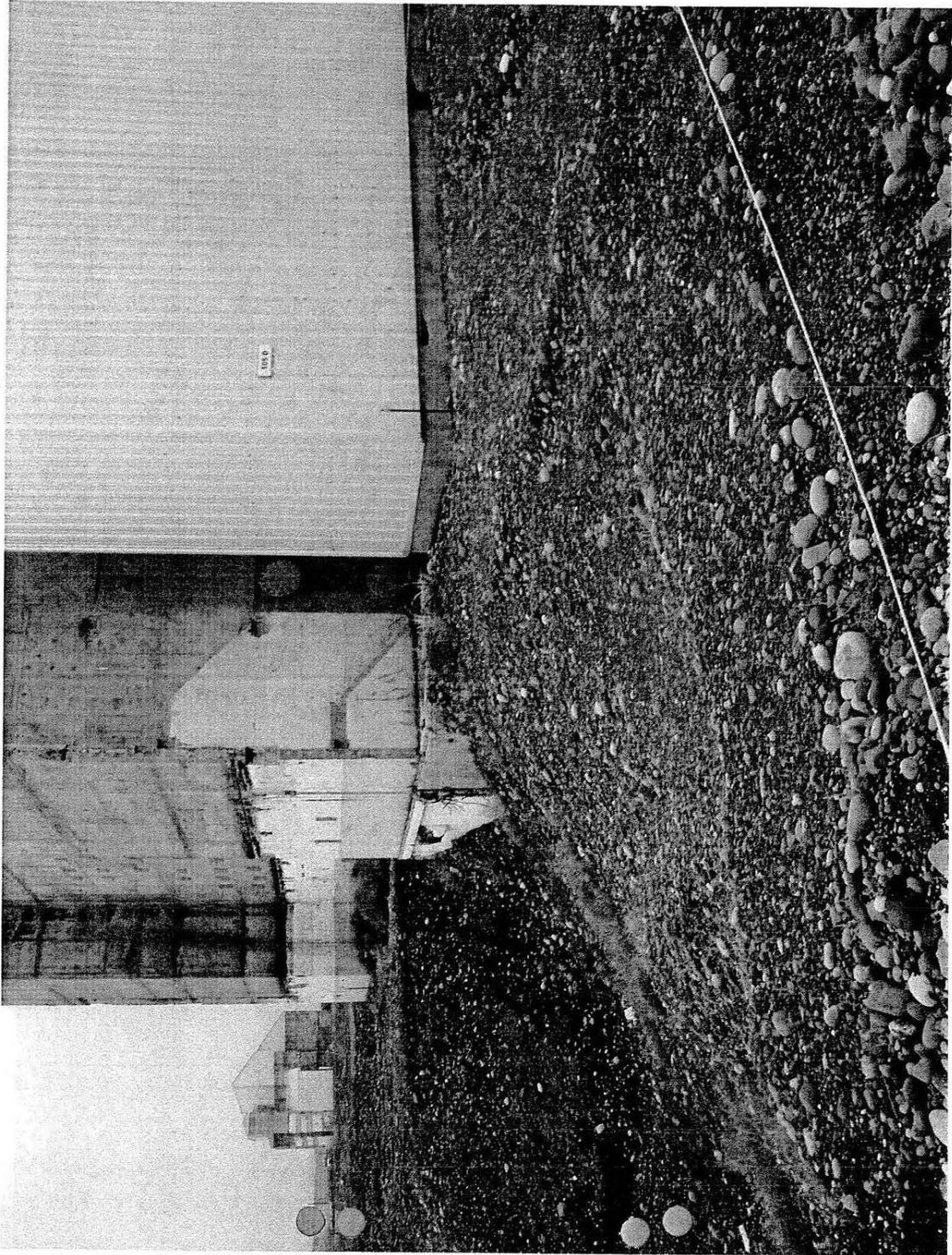












ROUTINE WORK DETERMINATION FORM

Title: 105-H Repairs

Task Description
 Perform the following external repairs to the 105 H reactor in response to issues identified in the 105-H 5 Year Inspection. Apply a sealant to rebar located in areas of spalled concrete.

1. Based on the location, environmental conditions and personnel assigned to the task, answer the following questions.

Yes	No	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the workers familiar with the location?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the environmental conditions acceptable for calling this task routine?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the timing of the work (with relation to other work activities) acceptable for this task to be routine?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Do the workers have sufficient experience with this task to consider this work routine?

If any of the above questions are answered **NO**, the task cannot be **PERFORMED** as Routine.

Yes No Does the task require a critical resource per PAS-2-1.1?

Yes No Is the task intrusive HCA work?

If any of the above questions are answered **YES** the task cannot be performed as Routine. If the answer is **NO** proceed to Section 2.

2. Check all potential hazards and activities associated with this task.

<input type="checkbox"/> Fall Hazard Prevention Analysis	<input type="checkbox"/> Hot Work
<input type="checkbox"/> Work in a Permit Controlled Area (BWP, RWP, etc.)	<input type="checkbox"/> Work in Confined Space
<input type="checkbox"/> Potential exposure to hazardous energy	<input type="checkbox"/> Potential Respiratory hazard requiring specific PPE
<input type="checkbox"/> Potential exposure to hazardous substance above the FEL	

Based on the checked boxes above, complete the following:

Yes No Are there more than TWO potential hazards and activities?

If the above question is answered YES, the task CANNOT be performed as Routine. Initiate a Work Process Form.

3. USQ Evaluation

Affect Important To Safety equipment and/or configuration of Hazard Category 2 or 3 Facility? Yes No

If yes, Screening/Determination Number or Categorical Exclusion Number and signature by USQ evaluator is required.

Review # _____

USQ Evaluator(s): _____

Name(s)	Signature(s)	Date
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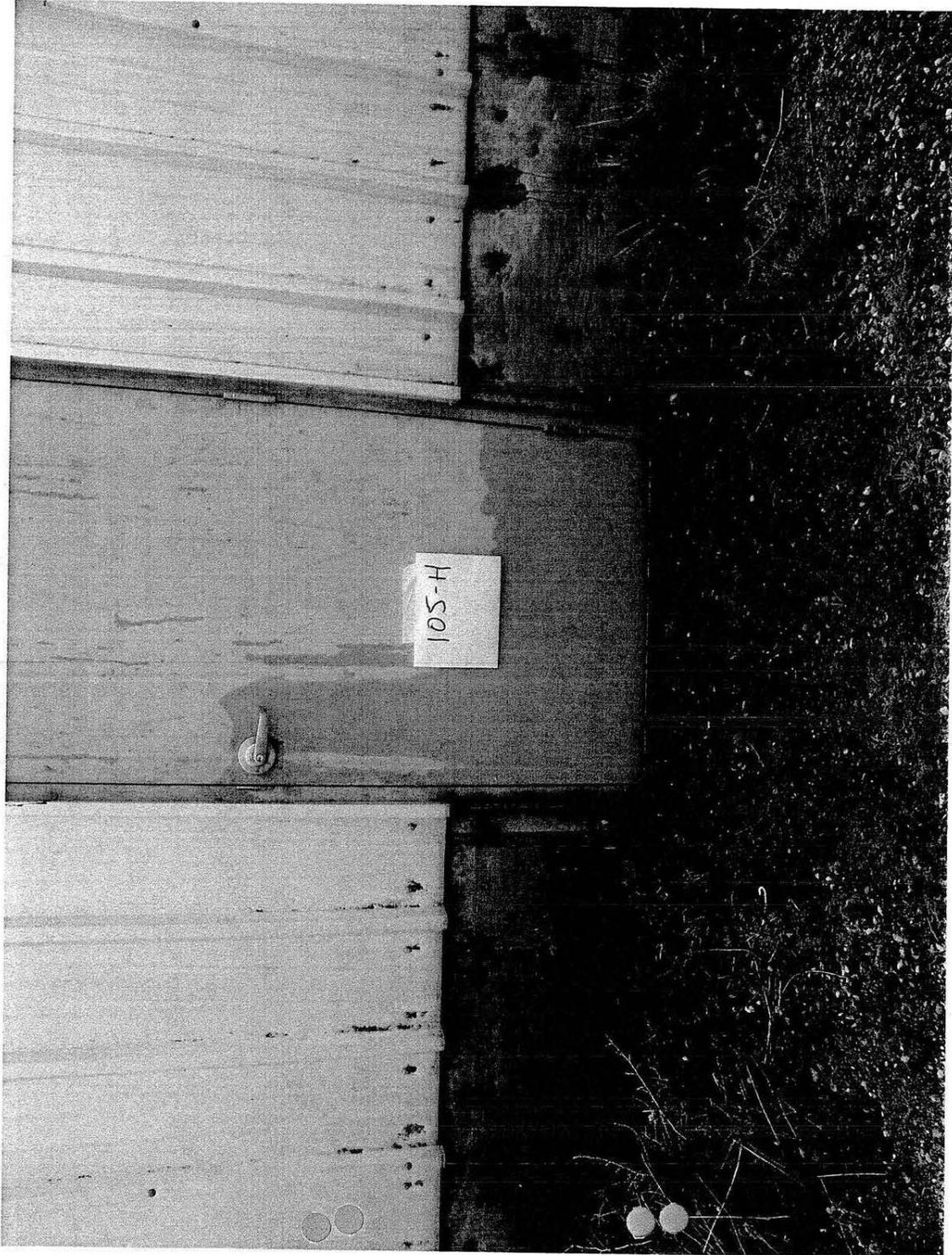
4. Approval

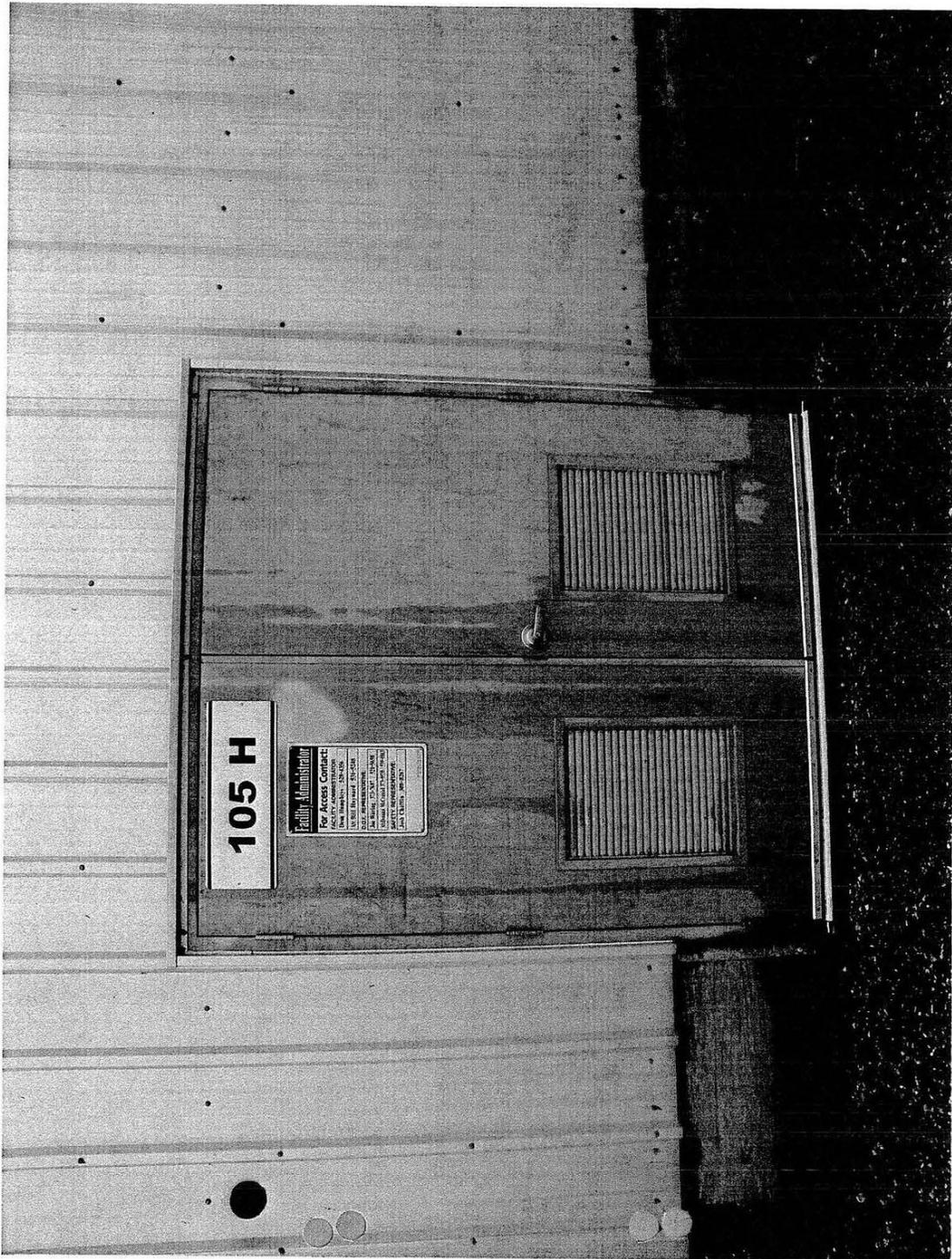
Based on the results of this form and my professional judgement, the associated task may be performed as Routine.

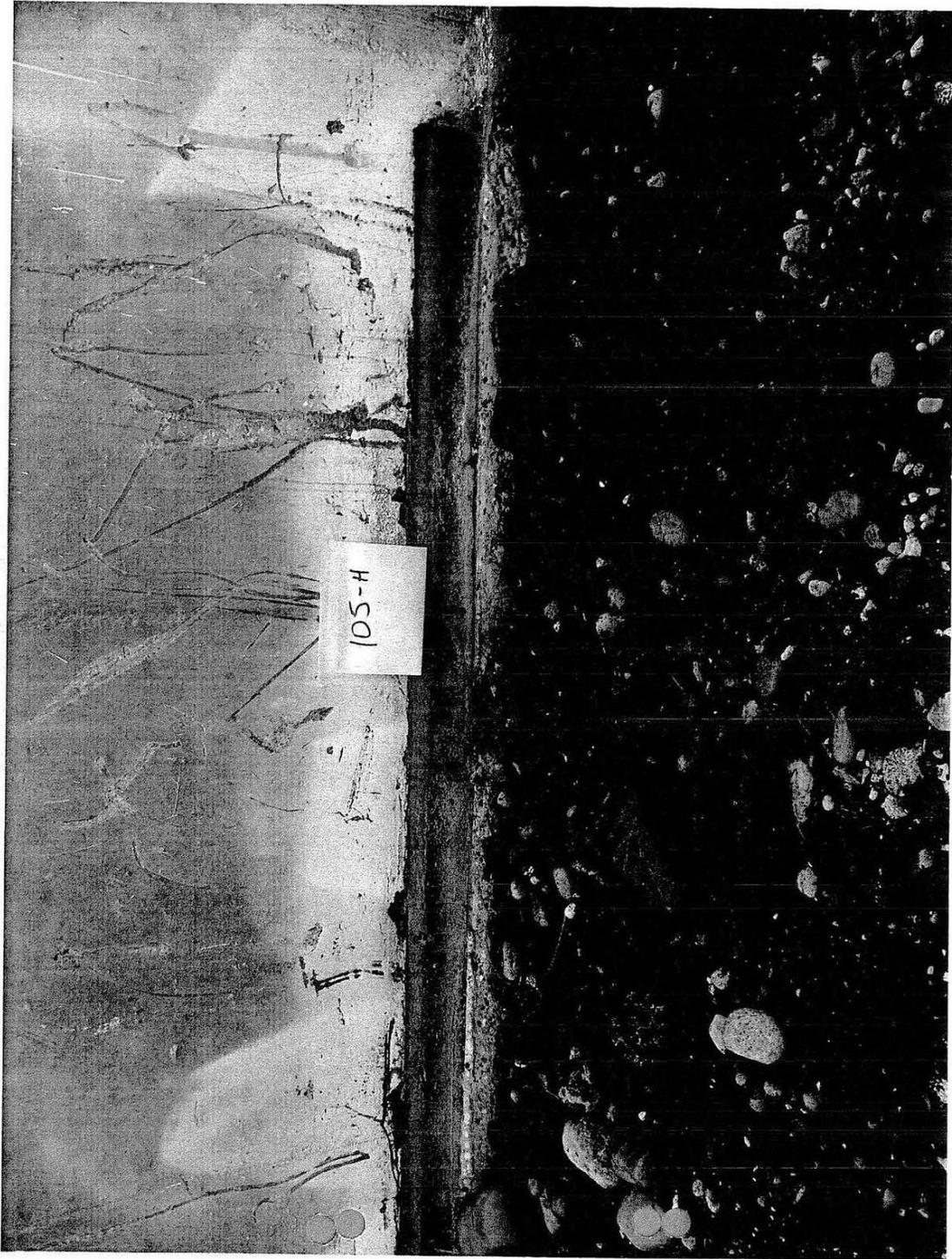
Responsible Manager: _____

Bill Hooper Name	<i>Bill Hooper</i> Signature	3-15-17 Date
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SEND COMPLETED RWDFs TO DOCUMENT CONTROL AT MSIN H4-11







WCH Task Instruction

Surveillance of 100 Area Inactive Facilities

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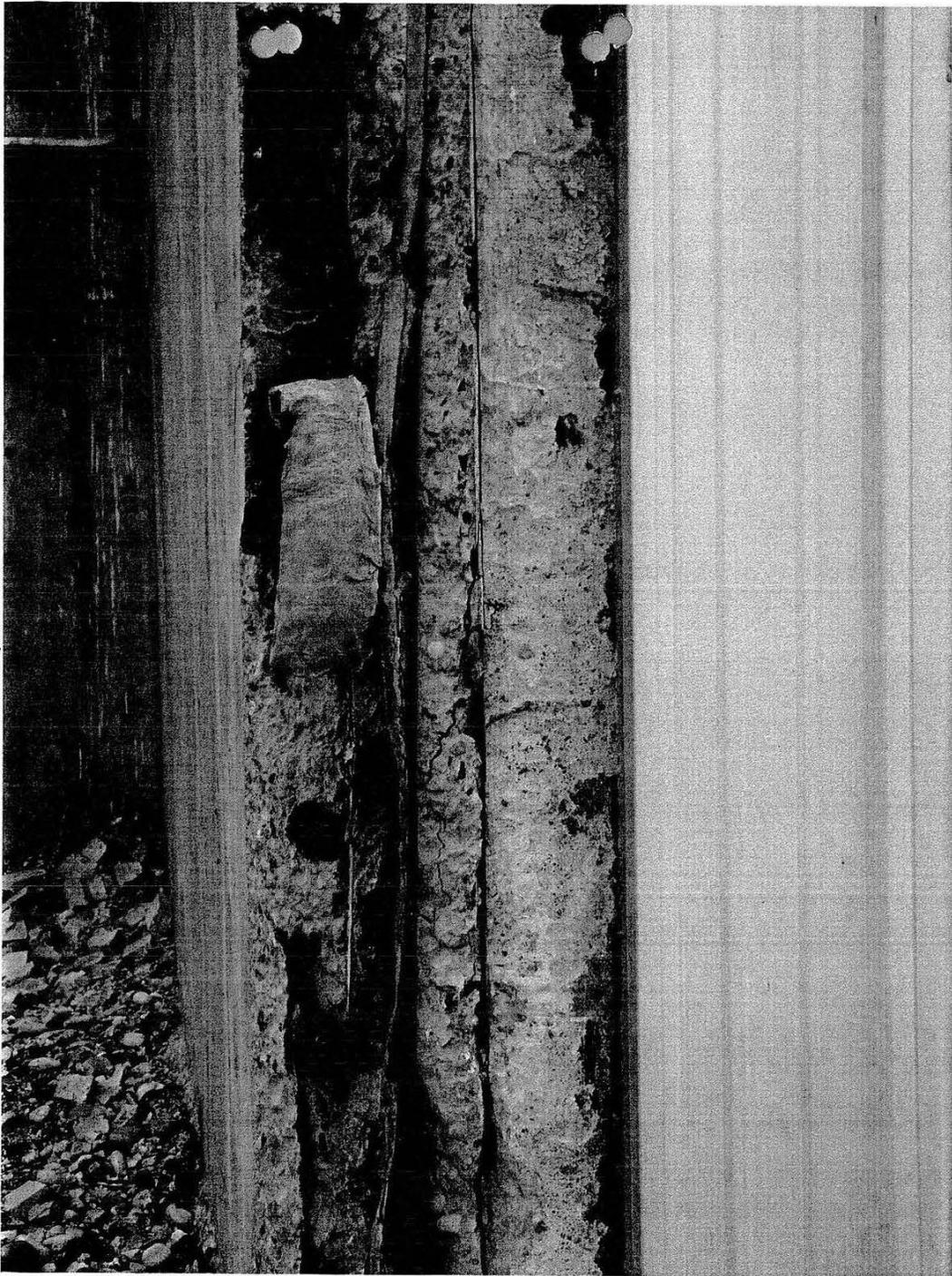
**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. 105-f	
People Performing Surveillance	Sign/Initial <i>[Signature]</i> 109 Date 8/22/11 Sign/Initial <i>[Signature]</i> 138 Date 8/22/11
5.2 Walk down	
Inspect for structural damage	na
No signs missing	no
No water leaks	no
No ground subsidence (Possible pipe failure)	no
Doors locked	Yes
No excess combustible	no
No excess equipment	no
No electrical hazards	no
No asbestos concerns	no
No unidentified containers or suspect hazardous material	no
No occupational hazards	no
Housekeeping needed	no
REMARKS	
<p><i>Applied sealant to exposed rebar @ 0 level. Awaiting lift to finish spalled areas. Awaiting for epoxy sealant recommendation from structural eng. to seal structural cracks. Removed soil from contact with metal portions of old building. Performed a pour back on concrete near utility room. Performed a grade repair on ~NE corner. Applied sealant to rebar > 8'.</i></p>	
SUPERVISOR REVIEW: <i>[Signature]</i>	DATE 5/8/12

ROUTINE WORK DETERMINATION FORM

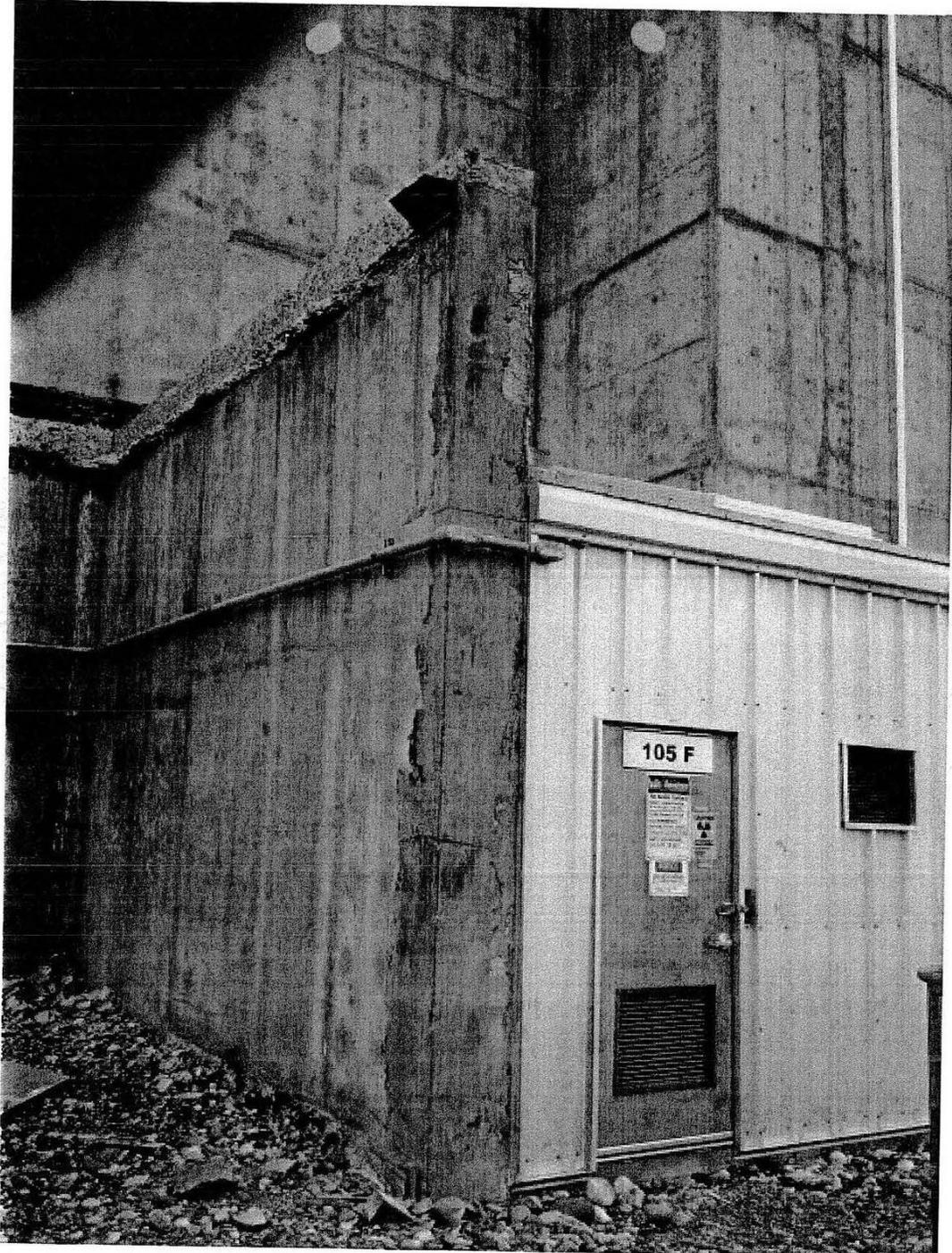
Title: 105F Repairs	
Task Description	
Perform the following external repairs to the 105F reactor in response to issues identified in the 105F 5 Year Inspection. Apply epoxy sealant to the cracks on the exterior of the building located on the West side on the left side of the entry door and on the East side of the Northeast corner. Apply a sealant to rebar located in areas of spalled concrete. Remove soil away from metal portions of the building to prevent corrosion.	
1. Based on the location, environmental conditions and personnel assigned to the task, answer the following questions.	
Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are the workers familiar with the location?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are the environmental conditions acceptable for calling this task routine?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is the timing of the work (with relation to other work activities) acceptable for this task to be routine?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Do the workers have sufficient experience with this task to consider this work routine?	
If any of the above questions are answered NO , the task cannot be PERFORMED as Routine.	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does the task require a critical resource per PAS-2-1.1?	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Is the task intrusive HCA work?	
If any of the above questions are answered YES the task cannot be performed as Routine. If the answer is NO proceed to Section 2.	
2. Check all potential hazards and activities associated with this task.	
<input type="checkbox"/> Fall Hazard Prevention Analysis	<input type="checkbox"/> Hot Work
<input type="checkbox"/> Work in a Permit Controlled Area (BWP, RWP, etc.)	<input type="checkbox"/> Work in Confined Space
<input type="checkbox"/> Potential exposure to hazardous energy	<input type="checkbox"/> Potential Respiratory hazard requiring specific PPE
<input type="checkbox"/> Potential exposure to hazardous substance above the PEL	
Based on the checked boxes above, complete the following:	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there more than TWO potential hazards and activities?	
If the above question is answered YES, the task CANNOT be performed as Routine. Initiate a Work Process Form.	
3. USQ Evaluation	
Affect Important To Safety equipment and/or configuration of Hazard Category 2 or 3 Facility? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
If yes, Screening/Determination Number or Categorical Exclusion Number and signature by USQ evaluator is required.	
Review # _____	
USQ Evaluator(s): _____	
Name(s)	Signature(s)
Date	
4. Approval	
Based on the results of this form and my professional judgement, the associated task may be performed as Routine.	
Responsible Manager: _____	_____
Name	Signature
	Date

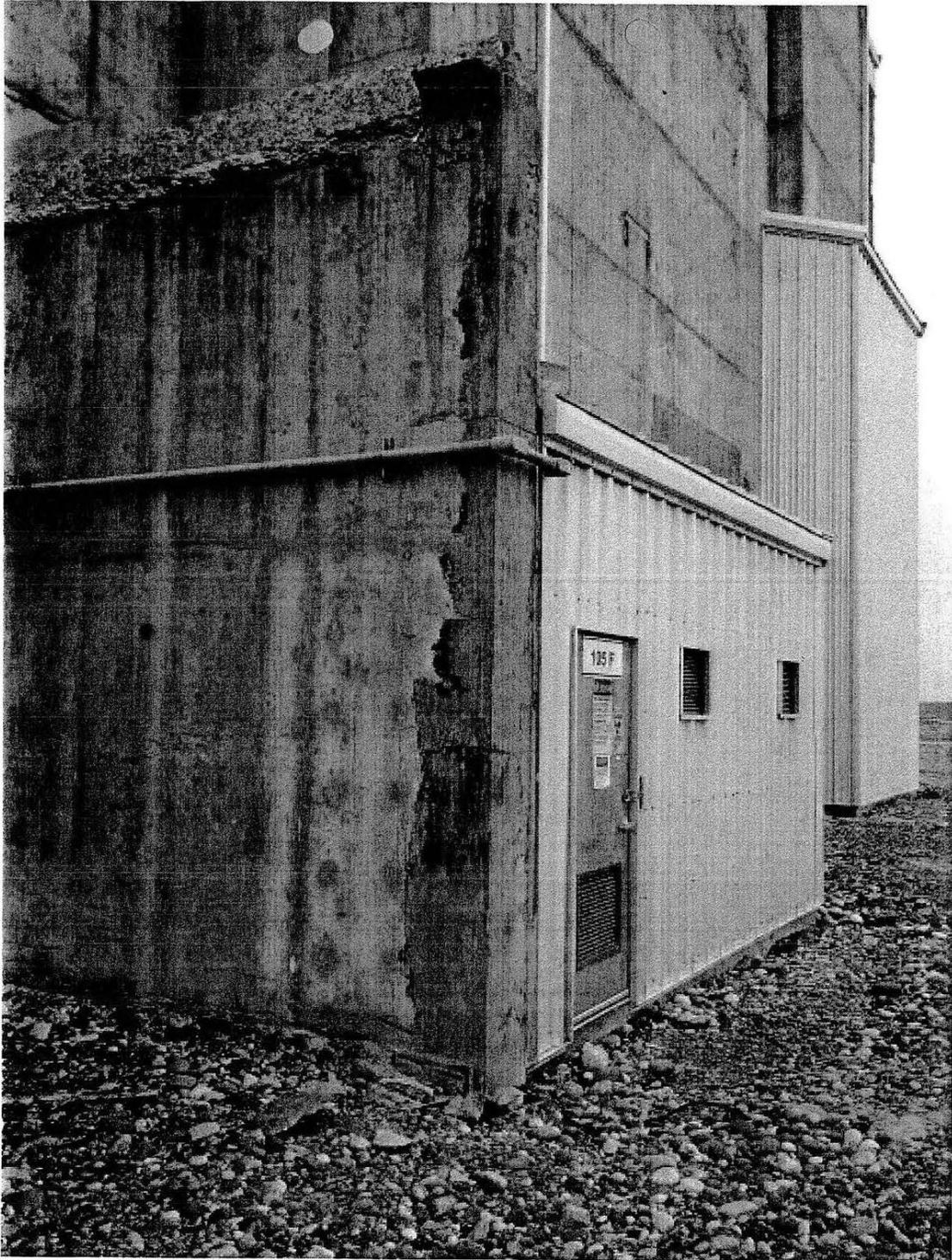
SEND COMPLETED RWDFs TO DOCUMENT CONTROL AT MSIN H4-11

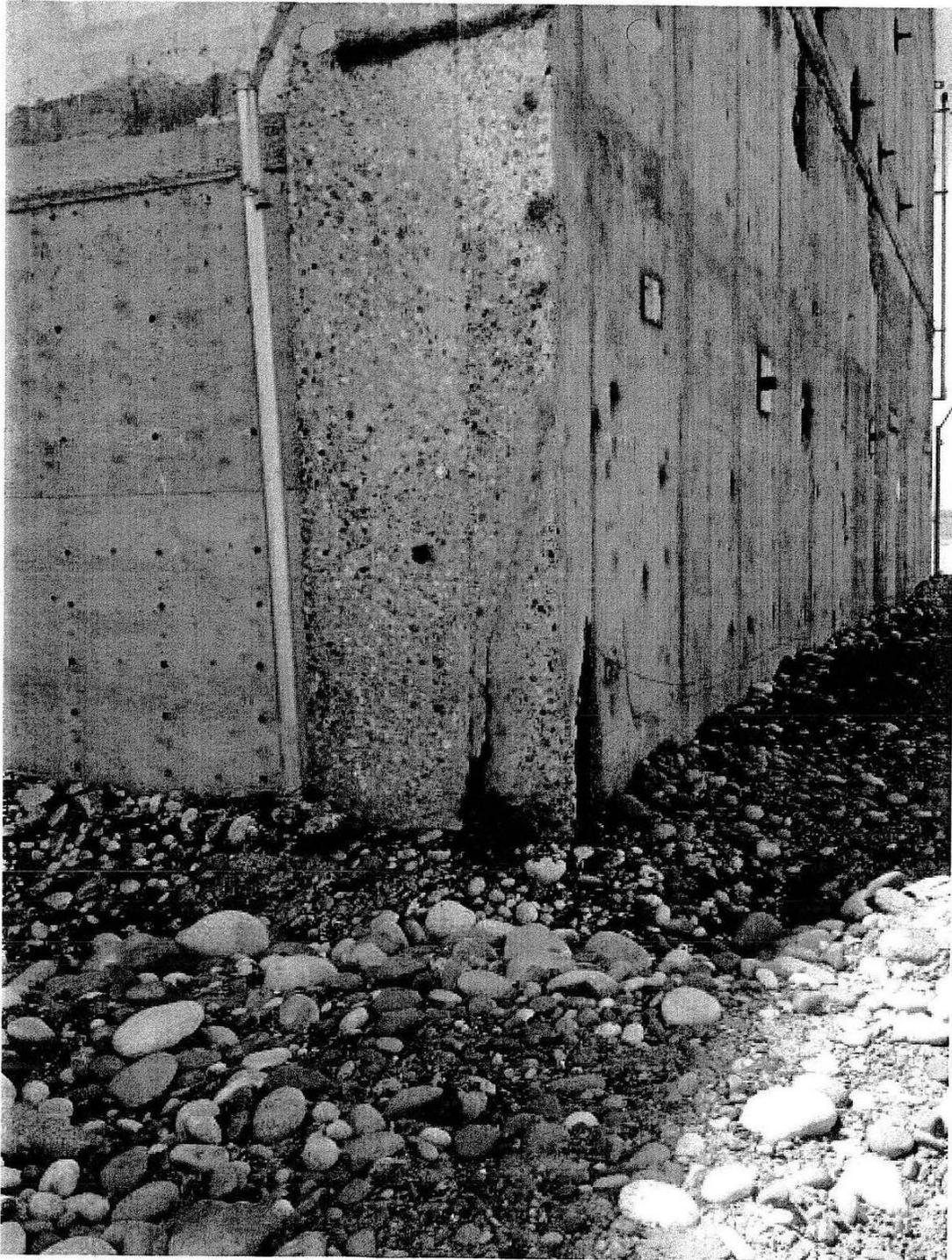


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SM-650-08-2012

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PREVENTATIVE MAINTENANCE PACKAGE COVER SHEET				
PM Package No.: SM-650		Rev No.: 3		
Title: Annual Surveillance 100B, C, D, DR, NE, N, F & H Inactive Facilities				
Procedure No. (if applicable): TASK INSTRUCTION				
Work Supervisor: Dean Humphrys		Technical: Steve Garnett		Planner: Patty Lichy
Freq <u>Annual</u>		Grace/Lead <u>25%</u> days		Active Date <u>08/01/2012</u>
RWP # (or N/A) <u>N/A</u>		Air Quality <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Due Date <u>08/31/2012</u>
LOCATION:				
Area <u>100</u>		Bldg/Fac <u>Various</u>		Room <u>N/A</u>
Equip Tag <u>N/A</u>		Model <u>N/A</u>		Serial # <u>N/A</u>
Equip # <u>N/A</u>		Description <u>Annual Surveillances of Inactive Facilities</u>		
COA <u>H100SM2222</u>				
RESOURCES:				
	CODE	CRAFT NAME	NO.	EST. MHRS
	D&D	D&D Woker	2	40.00
	RCT	Rad. Con. Tech.	1	40.00
Brief Description, Reference Documents:				
PERFORM THE ANNUAL SURVEILLANCE ON THE 100 B, C, D, DR, NE, N F AND H INACTIVE FACILITIES PER THE TASK INSTRUCTIONS. RECORD RESULTS FOR EACH FACILITY ON A DATA SHEET.				
Lockout Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If Lockout required, check one: <input type="checkbox"/> TAF <input type="checkbox"/> Eight-Criteria Checklist		
USQ Screening <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If no, Project Engineer print name, sign and date: <u>MARK ALLEN PER</u>		
If yes, Screening/Determination/CX No.: <u>TELECON</u>				
USQ Evaluator(s) print name, sign, date: <u>PA Lichy 7-24-12</u>				
FHC Evaluation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If yes, FHC Evaluation No.: <u>MARK ALLEN PER TELECON</u>		
Project Engineer print name, sign, date: <u>PA Lichy 7-24-12</u>				
APPROVAL				
Based on my personal review, I agree that the work described in this package meets technical requirements, can be performed safely, contains the controls from the JHA and is approved for scheduling.				
Responsible Manager: <u>Gregory L Fennell</u>		Signature: <u>[Signature]</u>		Date: <u>7-24-12</u>
PM PACKAGE CLOSURE RECOMMENDATION				
Based on my personal review of this work package and inspection of the work site, I recommend closure of this preventative maintenance work package.				
Work Supervisor: <u>Dean Humphrys</u>		Signature: <u>[Signature]</u>		Date: <u>12/19/12</u>
(or designee) Name		Signature		Date
Technical: <u>Steve Garnett</u>		Signature: <u>[Signature]</u>		Date: <u>03/04/13</u>
(if applicable) Name		Signature		Date
PM PACKAGE CLOSURE APPROVAL				
Responsible Manager: <u>STEVEN J GARNETT</u>		Signature: <u>[Signature]</u>		Date: <u>03/04/13</u>
Name		Signature		Date

WCH-FS-245 (07/11/2012)

PREVENTATIVE MAINTENANCE WORK PACKAGE APPROVAL FORM	
PM Package No.: <u>SM-650</u>	Rev. No.: <u>4</u>
Title: <u>Annual Surveillance of 100 B, C, D, DR, F, H Area Inactive Facilities</u>	
CONCURRENCE	
Based on my personal review, I agree all work described in this package meets technical requirements under my cognizance, and contains the controls from the JHA.	
Work Supervisor:	<u>Dean Humphrys</u> <i>Dean Humphrys</i> <u>8/16/11</u> Name and Signature Date
PSR:	Morgan Spaman <u>Nick Smith</u> <i>Nick Smith</i> <u>8-16-11</u> Name and Signature Date
EPL:	<u>Dave Warren</u> <i>per telecon PA Lucky</i> <u>8-10-11</u> Name and Signature Date
Engineering :	<u>Mark Allen</u> <i>per telecon PA Lucky</i> <u>8-10-11</u> Name and Signature Date
:	 Name and Signature Date
:	 Name and Signature Date
USQ Screening <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If no, Project Engineer print name, sign and date: <u>MARK ALLEN</u>	
If yes, Screening/Determination/CX No.: <u>PER TELECON PA Lucky 8-10-11</u>	
USQ Evaluator(s) print name, sign, date:	
FHC Evaluation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If yes, FHC Evaluation No.: <u>MARK ALLEN PER TELECON PA Lucky 8-10-11</u>	
Project Engineer print name, sign, date:	
APPROVAL	
Based on my personal review, and the concurrence of the above technical experts, I agree that the work described in this package meets technical requirements under my cognizance, can be performed safely and contains the controls from the JHA.	
Responsible Manager:	<u>Bill Hooper</u> <i>Bill Hooper</i> <u>8/16/11</u> Name and Signature Date

WCH Task Instruction

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 Rev 4
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Surveillance of 100 Area Inactive Facilities

**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. <u>190-C</u>	
People Performing Surveillance	Sign/Initial <u>RD</u> Date <u>12/20/12</u>
	Sign/Initial _____ Date <u>1/1</u>
5.2 Walk down	
Inspect for structural damage	✓
No signs missing	✓
No water leaks	✓
No ground subsidence (Possible pipe failure)	✓
Doors locked	<u>yes</u>
No excess combustible	<u>NO</u>
No excess equipment	<u>NO</u>
No electrical hazards	<u>NO</u>
No asbestos concerns	✓
No unidentified containers or suspect hazardous material	<u>NO</u>
No occupational hazards	<u>NO</u>
Housekeeping needed	<u>OK</u>
REMARKS	
<u>N/A</u>	
SUPERVISOR REVIEW: <u>[Signature]</u> DATE <u>1/16/13</u>	

WCH Task Instruction

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Surveillance of 100 Area Inactive Facilities

**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. 105-H	
People Performing Surveillance	Sign/Initial <i>[Signature]</i> Date 9/10/12
	Sign/Initial _____ Date ____/____/____
5.2 Walk down	
Inspect for structural damage	no/nd
No signs missing	nd
No water leaks	nd
No ground subsidence (Possible pipe failure)	nd
Doors locked	yes
No excess combustible	nd
No excess equipment	nd
No electrical hazards	nd
No asbestos concerns	nd
No unidentified containers or suspect hazardous material	nd
No occupational hazards	nd
Housekeeping needed	yes
REMARKS updated access into sign needed, misc wood trashect needs picked up.	
SUPERVISOR REVIEW: <i>[Signature]</i>	DATE: 12/19/12

WCH Task Instruction Surveillance of 100 Area Inactive Facilities	PM#	SM-650
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ATTACHMENT 1
ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
TASK INSTRUCTION DATA SHEET

Building No. <u>151-B</u>	
People Performing Surveillance	Sign/Initial <u>Sullivan</u> Date <u>12/19/12</u>
	Sign/Initial _____ Date <u>1 1</u>
5.2 Walk down	
Inspect for structural damage	Yes
No signs missing	No
No water leaks	Yes
No ground subsidence (Possible pipe failure)	No
Doors locked	Yes
No excess combustible	Na
No excess equipment	Na
No electrical hazards	Na
No asbestos concerns	Na Yes
No unidentified containers or suspect hazardous material	Na
No occupational hazards	Yes
Housekeeping needed	Yes
REMARKS <u>large section of roof removed, animal intrusion, broken windows and needs house keeping</u>	
<u>Posted OCF, and IH task 2.</u>	
<u>vest mandator rot posted for asbestos</u>	
SUPERVISOR REVIEW: <u>[Signature]</u>	DATE <u>12/19/12</u>

WCH Task Instruction

**Surveillance of 100 Area Inactive
Facilities**

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**ATTACHMENT 2
TASK INSTRUCTION DATA SHEET ADDITIONAL REMARKS**

Building No. <i>151-D</i>		
REMARKS		
<i>NA PAL 7-8-13</i>		
PERFORMED BY <i>[Signature]</i>	DATE <i>7/6/12</i>	
PERFORMED BY _____	DATE _____	
SUPERVISOR REVIEW: _____	DATE _____	

~~SM-650-201~~ PAL 7-5-13
SM-650-05-2013

Acrobat 9.0

PREVENTATIVE MAINTENANCE PACKAGE COVER SHEET						
PM Package No.:	SM-650			Rev No.:	3	
Title:	Annual Surveillance 100B, C, D, DR, N, F & H Inactive Facilities					
Procedure No. (if applicable):	TASK INSTRUCTION					
Work Supervisor:	Technical:		Planner:			
Greg Funnell	Steve Garnett		Patty Lichy			
Freq	Annual	Grace/Lead	25%	days	Active Date	05/01/2013
RWP # (or N/A)	N/A	Air Quality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Due Date	05/31/2013
LOCATION:						
Area	100	Bldg/Fac	Various	Room	N/A	
Equip Tag	N/A	Model	N/A	Serial #	N/A	
Equip #	N/A	Description	Annual Surveillances of Inactive Facilities			
COA	H100SM2222					
RESOURCES:	CODE	CRAFT NAME	NO.	EST. MHRS		
	D&D	D&D Woker	2	40.00		
	RCT	Rad. Con. Tech.	1	40.00		
Brief Description, Reference Documents:						
PERFORM THE ANNUAL SURVEILLANCE ON THE 100 B, C, D, DR, N, F AND H INACTIVE FACILITIES PER THE TASK INSTRUCTIONS. RECORD RESULTS FOR EACH FACILITY ON A DATA SHEET.						
Lockout Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Lockout required, check one: <input type="checkbox"/> TAF <input type="checkbox"/> Eight-Criteria Checklist				
USQ Screening	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If no, Project Engineer print name, sign and date: MARK ALLEN per				
If yes, Screening/Determination/CX No.:	Telecon					
USQ Evaluator(s) print name, sign, date:	P.Lichy 5-2-13					
FHC Evaluation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, FHC Evaluation No.: MARK ALLEN PER TELECON				
Project Engineer print name, sign, date:	P.Lichy 5-2-13					
APPROVAL						
Based on my personal review, I agree that the work described in this package meets technical requirements, can be performed safely, contains the controls from the JHA and is approved for scheduling.						
Responsible Manager:	Gregory L Funnell	[Signature]	5-6-13			
Name		Signature	Date			
PM PACKAGE CLOSURE RECOMMENDATION						
Based on my personal review of this work package and inspection of the work site, I recommend closure of this preventative maintenance work package.						
Work Supervisor:	Greg Funnell	[Signature]	7-2-13			
(or designee)	Name	Signature	Date			
Technical:	William Hayward	[Signature]	7/2/13			
(if applicable)	Name	Signature	Date			
PM PACKAGE CLOSURE APPROVAL						
Responsible Manager:	Gregory L Funnell	[Signature]	7-3-13			
Name		Signature	Date			

WCH-FS-245 (07/11/2012)

PREVENTATIVE MAINTENANCE WORK PACKAGE APPROVAL FORM	
PM Package No.: SM-650	Rev. No.: 4
Title: Annual Surveillance of 100 B, C, D, DR, F, H Area Inactive Facilities	
CONCURRENCE	
Based on my personal review, I agree all work described in this package meets technical requirements under my cognizance, and contains the controls from the JHA.	
Work Supervisor:	Dean Humphrys <i>Dean Humphrys</i> 8/16/11
Name and Signature	Date
PSR:	Morgan Spamer- Nick Smith <i>Mark Smith</i> 8-16-11
Name and Signature	Date
EPL:	Dave Warren <i>per telecon PA Lichy</i> 8-10-11
Name and Signature	Date
Engineering:	Mark Allen <i>per telecon PA Lichy</i> 8-10-11
Name and Signature	Date
Name and Signature	Date
Name and Signature	Date
USQ Screening <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If no, Project Engineer print name, sign and date: <i>MARK ALLEN</i>
If yes, Screening/Determination/CX No.:	<i>PER TELECON PA Lichy 8-10-11</i>
USQ Evaluator(s) print name, sign, date:	
FHC Evaluation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, FHC Evaluation No.: <i>MARK ALLEN PER TELECON PA Lichy 8-10-11</i>
Project Engineer print name, sign, date:	
APPROVAL	
Based on my personal review, and the concurrence of the above technical experts, I agree that the work described in this package meets technical requirements under my cognizance, can be performed safely and contains the controls from the JHA.	
Responsible Manager:	Bill Hooper <i>Bill Hooper</i> 8/16/11
Name and Signature	Date

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ATTACHMENT 1
ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
TASK INSTRUCTION DATA SHEET

Building No. <u>105-C</u>	
People Performing Surveillance	Sign/Initial <u>[Signature]</u> Date <u>6/10/13</u>
	Sign/Initial _____ Date <u>1 1</u>
5.2 Walk down	✓
Inspect for structural damage	✓
No signs missing	✓
No water leaks	✓
No ground subsidence (Possible pipe failure)	✓
Doors locked	✓
No excess combustible	✓
No excess equipment	✓
No electrical hazards	✓
No asbestos concerns	✓
No unidentified containers or suspect hazardous material	✓
No occupational hazards	✓
Housekeeping needed	✓
REMARKS <u>contact sign needs updating, weeds, lots of prep. fixed CA signs on water tunnel vents</u>	
<u>Capex repair is adequate for the short time until transition to MSA. No further action needed. WCH 7/2/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u>	DATE <u>7-3-13</u>

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**ATTACHMENT 1
ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
TASK INSTRUCTION DATA SHEET**

Building No. <u>105-D^{PO} 190-C</u>	
People Performing Surveillance	Sign/Initial <u>[Signature]</u> Date <u>6/10/13</u>
	Sign/Initial _____ Date ____/____/____
5.2	Walk down
	Inspect for structural damage <input checked="" type="checkbox"/>
	No signs missing <input checked="" type="checkbox"/>
	No water leaks <input checked="" type="checkbox"/>
	No ground subsidence (Possible pipe failure) <input checked="" type="checkbox"/>
	Doors locked <input checked="" type="checkbox"/>
	No excess combustible <input checked="" type="checkbox"/>
	No excess equipment <input checked="" type="checkbox"/>
	No electrical hazards <input checked="" type="checkbox"/>
	No asbestos concerns <input checked="" type="checkbox"/>
	No unidentified containers or suspect hazardous material <input checked="" type="checkbox"/>
	No occupational hazards <input checked="" type="checkbox"/>
	Housekeeping needed <input checked="" type="checkbox"/>
REMARKS <u>fixed rad postings, weeds, cable & wire for metal posts lying on ground.</u>	
<u>no further action needed. 7/2/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u> DATE <u>7-3-13</u>	

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**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. <u>105-D</u>	
People Performing Surveillance	Sign/Initial: <u>[Signature]</u> Date <u>6/10/13</u>
	Sign/Initial: _____ Date <u>1/1</u>
5.2 Walk down	/
Inspect for structural damage	/
No signs missing	/
No water leaks	/
No ground subsidence (Possible pipe failure)	/
Doors locked	/
No excess combustible	/
No excess equipment	/
No electrical hazards	/
No asbestos concerns	/
No unidentified containers or suspect hazardous material	/
No occupational hazards	/
Housekeeping needed	/
REMARKS <u>contact sign needs updated. fumble needs all around of misc. wood.</u>	
<u>Contact sign is adequate for short time remaining until transition to MSA. mmh 7/1/13</u>	
<u>No further actions needed. mmh 7/1/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u> DATE <u>7-3-13</u>	

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**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. <u>105-DR</u>	
People Performing Surveillance	Sign/Initial <u>120</u> Date <u>6/10/13</u>
	Sign/Initial _____ Date ____/____/____
5.2 Walk down	
Inspect for structural damage	/
No signs missing	/
No water leaks	/
No ground subsidence (Possible pipe failure)	/
Doors locked	/
No excess combustible	/
No excess equipment	/
No electrical hazards	/
No asbestos concerns	/
No unidentified containers or suspect hazardous material	/
No occupational hazards	/
Housekeeping needed	/
REMARKS <u>contact sign needs updated, weeds, sweat haws</u>	
<u>Contact sign is adequate for short period of time remaining until transition to MSA. No further action needed in MH 7/1/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u>	DATE <u>7-3-13</u>

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**ATTACHMENT 1
ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
TASK INSTRUCTION DATA SHEET**

Building No. <u>105 H</u>	
People Performing Surveillance	Sign/Initial <u>[Signature]</u> Date <u>6/6/13</u>
	Sign/Initial _____ Date _____
5.2 Walk down	
Inspect for structural damage	/ yes ^{w/} _{6/27/13}
No signs missing	/
No water leaks	/
No ground subsidence (Possible pipe failure)	/
Doors locked	/
No excess combustible	/
No excess equipment	/
No electrical hazards	/
No asbestos concerns	/
No unidentified containers or suspect hazardous material	/
No occupational hazards	/
Housekeeping needed	/
REMARKS <u>lots of welds S. side is full of swallow nests.</u> <u>access sign needs updated</u>	
<u>Two dumpsters have fallen off building. Structure not damaged & Engineering notified. IF-2013-1029 issued to track resolution.</u>	
<u>Contract sign is OK with transition to MSA. No additional actions needed. WCH 7/1/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u>	DATE <u>2-3-13</u>

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**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
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Building No. <u>105-F</u>	
People Performing Surveillance	Sign/Initial <u>[Signature]</u> Date <u>6/6/13</u>
	Sign/Initial _____ Date <u>1/1</u>
5.2 Walk down	
Inspect for structural damage	/
No signs missing	/
No water leaks	/
No ground subsidence (Possible pipe failure)	/
Doors locked	/
No excess combustible	/
No excess equipment	/
No electrical hazards	/
No asbestos concerns	/
No unidentified containers or suspect hazardous material	/
No occupational hazards	/
Housekeeping needed	Yes No <u>Yes</u> <u>NO</u> <i>write 7/1/13</i>
REMARKS <u>needs, sticks metal around outside, lots of bat poop.</u>	
<u>access sign needs updated.</u>	
<u>Current sign is adequate for short term until information to MSA. No further action needed. 7/1/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u> DATE <u>7-3-13</u>	

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**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. <u>105-N, 109 N</u>	
People Performing Surveillance	Sign/Initial <u>[Signature]</u> Date <u>6.11.13</u>
	Sign/Initial _____ Date ____/____/____
5.2 Walk down	
Inspect for structural damage	<input checked="" type="checkbox"/>
No signs missing	<input checked="" type="checkbox"/>
No water leaks	<input checked="" type="checkbox"/>
No ground subsidence (Possible pipe failure)	<input checked="" type="checkbox"/>
Doors locked	<input checked="" type="checkbox"/>
No excess combustible	<input checked="" type="checkbox"/>
No excess equipment	<input checked="" type="checkbox"/>
No electrical hazards	<input checked="" type="checkbox"/>
No asbestos concerns	<input checked="" type="checkbox"/>
No unidentified containers or suspect hazardous material	<input checked="" type="checkbox"/>
No occupational hazards	<input checked="" type="checkbox"/>
Housekeeping needed	<input checked="" type="checkbox"/>
REMARKS <u>access signs needed, weeds, swallows poop.</u> <u>109N is full of spiders and needs sprayed in</u> <u>service room.</u>	
<u>Contact signs will be provided by MSA after inspection</u> <u>No further action needed. MWH 7/2/13</u>	
SUPERVISOR REVIEW: <u>[Signature]</u>	DATE <u>7-3-13</u>

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SM-650-05-2014

Acrobat 9.0

PREVENTATIVE MAINTENANCE PACKAGE COVER SHEET				
PM Package No.: SM-650		Rev No.: 3		
Title: Annual Surveillance 100B, C, D, DR, N, F & H Inactive Facilities				
Procedure No. (if applicable): TASK INSTRUCTION				
Work Supervisor: Greg Funnell		Technical: Steve Garnett		Planner: Patty Lichy
Freq: Annual	Grace/Lead: 25%	days	Active Date: 05/01/2014	
RWP # (or N/A): N/A	Air Quality: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Due Date: 05/31/2014	
LOCATION:				
Area: 100	Bldg/Fac: Various	Room: N/A		
Equip Tag: N/A	Model: N/A	Serial #: N/A		
Equip #: N/A	Description: Annual Surveillances of Inactive Facilities			
COA H100SM2222				
RESOURCES:				
CODE	CRAFT NAME	NO.	EST. MHRS	
D&D	D&D Worker	2	40.00	
RCT	Rad. Con. Tech.	1	40.00	
Brief Description, Reference Documents:				
PERFORM THE ANNUAL SURVEILLANCE ON THE 100 B, C, D, DR, N, F AND H INACTIVE FACILITIES PER THE TASK INSTRUCTIONS. RECORD RESULTS FOR EACH FACILITY ON A DATA SHEET.				
Lockout Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Lockout required, check one: <input type="checkbox"/> TAF <input type="checkbox"/> Eight-Criteria Checklist				
USQ Screening <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If no, Project Engineer print name, sign and date: MARK ALLEN per Telecon				
If yes, Screening/Determination/CX No.: _____				
USQ Evaluator(s) print name, sign, date: PA Lichy 4-21-14				
FHC Evaluation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
If yes, FHC Evaluation No.: _____				
Project Engineer print name, sign, date: MARK ALLEN per Telecon PA Lichy 4-21-14				
APPROVAL				
Based on my personal review, I agree that the work described in this package meets technical requirements, can be performed safely, contains the controls from the JHA and is approved for scheduling.				
Responsible Manager:	Name: <i>Gregory L Funnell</i>	Signature: <i>[Signature]</i>	Date: 4-22-14	
PM PACKAGE CLOSURE RECOMMENDATION				
Based on my personal review of this work package and inspection of the work site, I recommend closure of this preventative maintenance work package.				
Work Supervisor:	Name: Greg Funnell	Signature: <i>[Signature]</i>	Date: 6-30-14	
Technical:	Name: Steve Garnett	Signature: <i>[Signature]</i>	Date: 07/07/2014	
PM PACKAGE CLOSURE APPROVAL				
Responsible Manager:	Name: <i>Gregory L Funnell</i>	Signature: <i>[Signature]</i>	Date: 7-8-14	

WCH-FS-245 (07/11/2012)

PREVENTATIVE MAINTENANCE WORK PACKAGE APPROVAL FORM	
PM Package No.:	SM-650
Rev. No.:	4
Title: Annual Surveillance of 100 B, C, D, DR, F, H Area Inactive Facilities	
CONCURRENCE	
Based on my personal review, I agree all work described in this package meets technical requirements under my cognizance, and contains the controls from the JHA.	
Work Supervisor:	Dean Humphrys <i>Dean Humphrys</i> 8/16/11
Name and Signature	Date
PSR:	Morgan Spaman Nick Smith <i>Mark Smith</i> 8-16-11
Name and Signature	Date
EPL:	Dave Warren <i>per telecon PA Luchy</i> 8-10-11
Name and Signature	Date
Engineering:	Mark Allen <i>per telecon PA Luchy</i> 8-10-11
Name and Signature	Date
Name and Signature	Date
Name and Signature	Date
USQ Screening <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If no, Project Engineer print name, sign and date: <i>MARK ALLEN</i>
If yes, Screening/Determination/CX No.:	<i>PER TELECON PA Luchy 8-10-11</i>
USQ Evaluator(s) print name, sign, date:	
FHC Evaluation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, FHC Evaluation No.:
	<i>MARK ALLEN PER TELECON PA Luchy 8-10-11</i>
Project Engineer print name, sign, date:	
APPROVAL	
Based on my personal review, and the concurrence of the above technical experts, I agree that the work described in this package meets technical requirements under my cognizance, can be performed safely and contains the controls from the JHA.	
Responsible Manager:	Bill Hooper <i>Bill Hooper</i> 8/16/11
Name and Signature	Date

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ATTACHMENT 2
TASK INSTRUCTION DATA SHEET ADDITIONAL REMARKS

Building No. 105-C

REMARKS Small Holes closed where birds were
getting in, and bird feces cleaned up

PERFORMED BY Shay Dewitt

DATE 6/10/14

PERFORMED BY David Stewart

DATE 6-10-14

SUPERVISOR REVIEW: [Signature]

DATE 6-30-14

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**ATTACHMENT 1
ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
TASK INSTRUCTION DATA SHEET**

Building No. 105-D	
People Performing Surveillance	Sign/Initial <u>Shs RCB</u> 1 30 Date <u>5/15/17</u>
	Sign/Initial _____ Date ____/____/____
5.2 Walk down	
Inspect for structural damage	OK
No signs missing	OK
No water leaks	OK
No ground subsidence (Possible pipe failure)	OK
Doors locked	OK
No excess combustible	OK
No excess equipment	OK
No electrical hazards	OK
No asbestos concerns	OK
No unidentified containers or suspect hazardous material	OK
No occupational hazards	OK
Housekeeping needed	N/A
REMARKS <u>unable to get to door, dug up</u>	
<u>① Waste Sites brought in clean fill to provide access @ 6-30-14</u>	
SUPERVISOR REVIEW <u>[Signature]</u>	DATE <u>6-13-14</u>

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ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
TASK INSTRUCTION DATA SHEET**

Building No. <u>105-DR</u>	
People Performing Surveillance	Sign/Initial <u>SMR</u> , <u>SD</u> Date <u>5/15/14</u>
	Sign/Initial _____ Date _____
5.2 Walk down	
Inspect for structural damage	<u>good</u>
No signs missing	<u>good</u>
No water leaks	<u>good</u>
No ground subsidence (Possible pipe failure)	<u>good</u>
Doors locked	<u>good</u>
No excess combustible	<u>good</u>
No excess equipment	<u>good</u>
No electrical hazards	<u>good</u>
No asbestos concerns	<u>good</u>
No unidentified containers or suspect hazardous material	<u>no</u>
No occupational hazards	<u>no</u>
Housekeeping needed	<u>yes</u>
REMARKS <u>not very much, but what looks like bat droppings</u> <u>will perform cleanup or</u>	
SUPERVISOR REVIEW: <u>[Signature]</u>	DATE <u>6-30-14</u>

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 Facilities**

**ATTACHMENT 1
 ANNUAL SURVEILLANCE OF 100 AREA INACTIVE FACILITIES
 TASK INSTRUCTION DATA SHEET**

Building No. 105-F	
People Performing Surveillance	Sign/Initial <u>SAM</u> <u>DES</u> Date <u>5/12/14</u>
	Sign/Initial _____ Date ____/____/____
5.2 Walk down	
Inspect for structural damage	NO
No signs missing	NO
No water leaks	NO
No ground subsidence (Possible pipe failure)	NO
Doors locked	YES
No excess combustible	NO
No excess equipment	NO
No electrical hazards	NO
No asbestos concerns	NO
No unidentified containers or suspect hazardous material	NO
No occupational hazards	NO
Housekeeping needed	NO
REMARKS	
SUPERVISOR REVIEW: <u>[Signature]</u> DATE <u>6-30-14</u>	

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**ATTACHMENT 2
TASK INSTRUCTION DATA SHEET ADDITIONAL REMARKS**

Building No. 105-N / 109-N

REMARKS RCT took sample of glycol. Floor dry
put on glycol. Sample came back clean, and
glycol was cleaned up.

PERFORMED BY Shan Dewitt

DATE 6-3-14

PERFORMED BY James Stewart

DATE 6-3-14

SUPERVISOR REVIEW: [Signature]

DATE 6-30-14

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