AMENDMENT OF SOLICITATION

1. AMENDMENT NO. 01	2. EFFECTIVE DATE – 10/2/2025	3. PAGE 1 OF 63

4. ISSUED BY: **Southern Ohio Cleanup Company LLC**
P.O. Box 368
3930 US Route 23 South
Piketon, OH 45661

5. NAME AND ADDRESS OF CONTRACTOR (*Name, street ,county, state &,zip code*)	6. AMENDMENT OF (RFP) SOLICITATION NO. FBPSC239441	DATE
All Offeror(s)		10/2/2025

7.
The above numbered solicitation is amended as set forth in Item 8. The hour and date specified for receipt of Offers
_ is extended X is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:

(a) By completing Items 5 and 9, and returning one (1) copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or e-mail which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by e-mail or letter, provided each e-mail or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

8. DESCRIPTION OF AMENDMENT

Except as provided herein, all terms and conditions of the document remain unchanged and in full force and effect.

Add the following to the Request for Proposal:

Exhibit 4 - Process Knowledge Document

Pre-Preproposal Conference: Thursday, October 9, 2025 At 2:00 PM

9A. NAME AND TITLE OF SIGNER (*Type or print*)		10A. Southern Ohio Cleanup Company LLC Mark Pollard – Contract Administrator	
9B. CONTRACTOR/OFFEROR _____ (*Signature of person authorized to sign*)	9C. DATE SIGNED	10B. MARK POLLARD (Affiliate) Digitally signed by MARK POLLARD (Affiliate) Date: 2025.10.02 12:41:26 -04'00' (*Signature*)	10C. DATE SIGNED

Exhibit 4

COLLECTED PROCESS KNOWLEDGE INFORMATION FOR THE X-710 TECHNICAL SERVICES BUILDING AND ASSOCIATED FACILITIES AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

U.S. Department of Energy

October 2024

Approved for public release; distribution is unlimited.

This page is intentionally left blank.

COLLECTED PROCESS KNOWLEDGE INFORMATION FOR THE X-710 TECHNICAL SERVICES BUILDING AND ASSOCIATED FACILITIES AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

U.S. Department of Energy

October 2024

Prepared for
U.S. Department of Energy

Prepared by
Fluor-BWXT Portsmouth LLC, Under Contract DE-AC30-10CC40017
FBP-ER-GEN-BG-RPT-0126, Revision 0

This page is intentionally left blank.

CONTENTS

Page

This page is intentionally left blank.

FIGURES

Page

This page is intentionally left blank.

ACRONYMS

AA	atomic absorption
ASTM	American Society for Testing and Materials
CA	contamination area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
COC	Chain of Custody
DOE	U.S. Department of Energy
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
ER	Environmental Remediation
ES&H	Environmental, Safety, and Health
FBP	Fluor-BWXT Portsmouth LLC
FTIR	Fourier Transform Infrared
GC	Gas Chromatograph
GC/MS	Gas Chromatograph/Mass Spectrometer
GDP	gaseous diffusion plant
ICP-MS	inductively coupled plasma mass spectrometry
IH	Industrial Hygiene
ISE	ion-selective electrode
LOC	level of concern
LOIC	level of immediate concern
NCS	Nuclear Criticality Safety
NCSA	nuclear criticality safety approval
NDA	nondestructive assay
PCB	polychlorinated biphenyl
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RI/FS	remedial investigation and feasibility study
SVOC	semi-volatile organic compound
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TIMS	Thermal Ionization Mass Spectrometer
USEC	United States Enrichment Corporation
VOC	volatile organic compound

This page is intentionally left blank.

1 INTRODUCTION AND BACKGROUND

The U.S. Department of Energy (DOE) Portsmouth Gaseous Diffusion Plant (PORTS) performed uranium enrichment operations, including a wide assortment of supporting operations during its production era. The X-710 Technical Service Building is a two-story, 139,000-sq ft building that housed a wide variety of support operations. The building was constructed at two separate sections built at different times. The northern portion was built in 1953 as part of original site construction and has an area of approximately 109,000 sq ft. The northern portion is made of reinforced concrete and concrete block. The southern portion of the building was built in 1975 and has an area of approximately 30,000 sq ft as a steel-framed structure with steel siding. General operations ceased in the building in March 2021 and most personnel and remaining operations were relocated to other buildings on site. The building is access controlled by a Facility Manager. An aerial view of the X-710 Technical Services Building and associated structures is provided as Figure 1, which identifies the main structure, associated structures, and the nearest streets to the building.

The X-710 Technical Service Building contains laboratories and facilities that provided technical, production, and development support for the PORTS. Operations have included material sampling and testing, chemical analysis and laboratory services, information services and management (technical library and computer systems and procedures), instrumentation development and testing, cascade testing and evaluation, development testing/evaluation/fabrication, offices for technical services management, equipment repair and fabrication shops, a storeroom, and the mechanical equipment room. The X-710 Technical Service Building supported cell deposit removal and technetium-99 cleanup projects, conducted environmental sample analysis, and was home base for the PORTS nondestructive assay (NDA) Applied Nuclear Technology Lab and Industrial Hygiene Health Physics support group.

In 2011, following the start of a new DOE contract focused on remedial actions for the former gaseous diffusion plant (GDP) a transition (hereafter in this document referred to as “Transition”) occurred from the former operating contractor, the United States Enrichment Corporation (USEC), and the primary site focus became site cleanup under Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and Resource Conservation and Recovery Act (RCRA). Remedial actions include decontamination and decommissioning (D&D) of the facility (i.e., deactivation and demolition of hundreds of buildings on site) and the remaining environmental media cleanup actions in accordance with the 1989 Consent Decree for RCRA Deferred Units investigations and the resulting planning and implementation.

Over the span of the operational years of the X-710 Technical Service Building, specific activities within the building areas have been modified many times to support the activities needed to support the site focus. There have been many laboratory room reassignments (moves), some accommodating new laboratory technologies, some addressing operations planning, and some to increase site environmental monitoring capabilities. The vast array of changes is testimony to the overall flexibility of the X-710 Technical Service Building to function as a comprehensive laboratory and support facility. Early focus was on production support for the uranium enrichment process, material acceptance testing, and Industrial Hygiene analytical support. In the mid to late 1980s, in line with the establishment of the U.S. Environmental Protection Agency (EPA) and new federal regulations, more emphasis was placed on environmental testing and analyses.

This page is intentionally left blank.

2 DESCRIPTION OF X-710 TECHNICAL SERVICE BUILDING LABORATORY ROOMS

The remainder of this report includes materials sourced from other site documents, information provided from a personal account by a current long-time employee, who has been in continuous service at the X-710 Technical Service Building since November 16, 1981, and information from other individual personnel recollections. The information is intended to provide the reader with general process knowledge of the operations in the X-710 Technical Service Building during the past approximately 40 years.

2.1 General Information

A major reshuffling of activities within the building occurred in the late 1980s with the placement of a "core security area" (hereafter referred to as "Core") concept in the X-710 Technical Service Building to allow increased security over Special Nuclear Materials (i.e., enriched uranium-bearing materials). All uranium handling operations were moved to a controlled area centrally located in laboratory portion of the building, that included labs accessible from the first and second North-South corridors, beginning in the far west section of the first floor, extending eastward. The guard station was established in the middle East-West corridor between Room 156 and Room 157. The rooms vacated to move previous uranium handling operations were repurposed for those being displaced and other subsequent activities. This Core move will be mentioned in many of the room discussions included below.

Many of the rooms contain specific area-related Nuclear Criticality Safety (NCS) controls that are implemented and require special qualifications of personnel performing operations in those areas. The existing site Chemical Hygiene Plan also covers unique hazards and controls associated with laboratory materials and activities.

While many, if not all, of the laboratory rooms have had the possibility of containing materials and information that was and/or is still classified, there are certain rooms where these materials were handled more frequently. Under an earlier DOE prime contract (circa 2000s), several extensive efforts were made to identify these materials and consolidate the materials into processing areas.

If not specifically discussed in room-by-room narratives below, process knowledge suggests that the room was used either as a facility maintenance area, storage area, or administrative type room. Although administrative in nature, the office and administrative areas of the building have a potential for having contaminant content from other areas of the building. Many administrative areas (particularly on the second floor) have experienced radiological contamination issues resulting from water from roof leaks. It is noted that almost the entire roof is designated as a radiological contamination area (CA) due to removable surface contamination on the roof surface left by historical operations likely due to the exhaust from laboratory hoods and building ventilation. These areas are not included in the specific process knowledge provided in this document.

For reference, the initial 1956 floor plan layouts of the first and second floors are provided in Appendix A, 1975 floor plans are provided in Appendix B, and current floor plans (circa 2013), which include the 1975 addition on the south end of the building, are provided in Appendix C. It must be noted that room numbers and configurations have changed many times in the course of the history of the building and caution should be used in applying the information provided in this document when current room numbering differs from numbering during operational times.

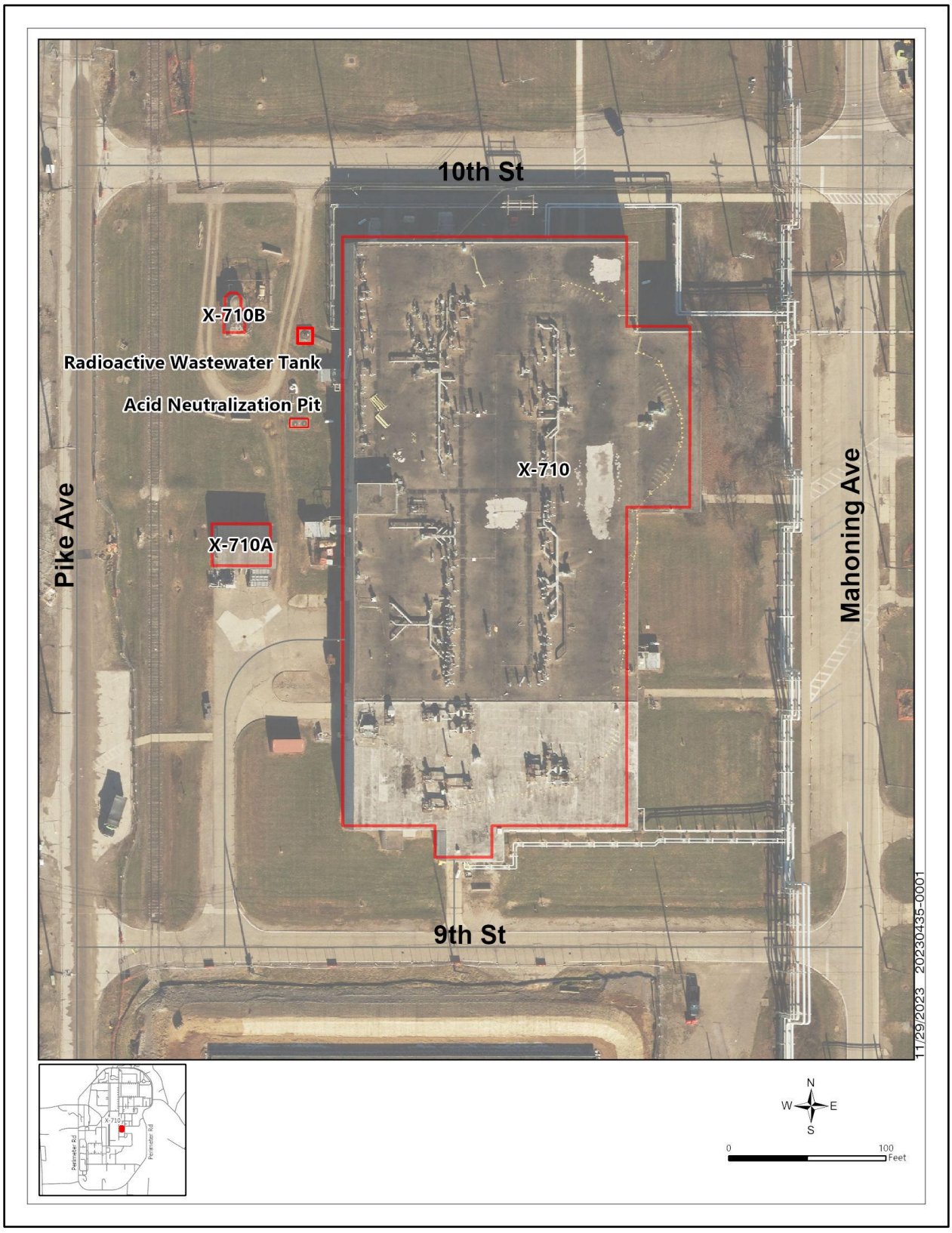

Figure 1. Location of the X-710 Technical Services Building and Associate Facilities

2.2 1953 Building Area − First Floor

2.2.1 Loading Dock

Delivery of most materials to the X-710 Technical Service Building, including samples, occurred at the Loading Dock on the west side of the building, resulting in potential for spills/leaks there. The Loading Dock housed areas for barrels used for collecting contaminated scrap metal and scrap glass discarded by the X-710 Technical Service Building laboratory rooms, glass shop, and machine shop operations. Process knowledge from multiple past building employees indicates that early disposal of trichloroethylene (TCE) waste included pouring it out in the general vicinity of the dock area's surrounding grounds and driveway apron.

2.2.1.1 Loading Dock Room 101

This room was originally marked as a "Coolant" room on the 1956 floor plan. However, it was later used as a storage area for full Poly-bottles awaiting disposition. In later years, a small area in the west side of this room was carved out for X-710 dry active waste (DAW) storage and disposition.

2.2.1.2 Loading Dock Room 103

The original floor plan identified this room as "Acids and Solvents Storage." It was more recently used as a waste storage area. In the 1980s and 1990s, in addition to organic waste poly-bottle stations (where wastes were added to bottles and spills occurred frequently), the room also contained 55-gal drums of various solvents that were stored and handled in this area. Drums were brought into the area, the stoppers (bungs) were replaced with a valve and vent, tipped using a manual tipper, and moved with the chain-fall/trolley system. Small spills and drips were prevalent as the then-current (typical) practice was to move the TCE drum by one person. Drip containers under each of the valves commonly leaked. Drums included 1,1,1-trichloroethane, trichloroethene, Freon-113 (trichlorotrifluoroethane), carbon tetrachloride, and various alcohols (methyl, ethyl, and isopropyl). Other drums of chemicals were most likely stored there as well (drum cradles were stored side by side and lined the north and most of the west wall of the room). This room may have also contained cutting oils and other supplies for the shops areas as well. Although this room was identified in the early days as an acid storage room, it is uncertain if bulk acids were ever stored there – they were not known to be stored there during the timeframe addressed by the knowledge of the long-time employee.

2.2.2 Room 109, Transformer Room

Room 109 has been a Transformer Room since the building was constructed. Figure 2 shows some electrical panels in this room.

Figure 2. Room 109 Transformer Room, Electrical Panels

2.2.3 Rooms 111 & 112

Rooms 111 and 112 provided for very high throughput subsampling and uranium hexafluoride [UF_6] transfers from various sample containers (1S, 2S, hoke tubes, U-tubes, and others) for analyses followed by recovery operations and subsequent cleaning/refurbishment of these sample containers for reuse. This area was known for fairly routine small uncontrolled UF_6 releases. Additionally, large amounts of TCE were used as part of TCE/Dry Ice cold-bath systems resulting in potential TCE spills. These operations were also known to have inadvertent interaction with various utilities resulting in contamination of sanitary drains and water supply. Sample container refurbishment efforts included large amounts of liquid decontamination solutions as well as an extensive silver soldering/brazing operation.

The fume hoods along the South wall were also used for routine poly-bottle sampling and special uranium oxide handling projects. Liquid spills in this area were frequent.

2.2.4 Room 114

This room was originally labeled “Quality Control Lab” and “Records and Receiving”, and later became the UF_6 Controls and Standards area. The operations were very similar to UF_6 transfer operations in Rooms 111 and112 with similar issues on a smaller scale for Controls and Standards. This area was historically operated by more senior and experienced personnel due to the value of the standards and controls being processed/created.

2.2.5 Rooms 115 & 126, 116& 127

Originally labeled “Mass Spectrometer Room No. 1” (Room 115) and “Mass Spectrometer Room No. 2” (Room 126), these rooms contained multiple gas phase magnetic sector mass spectrometers. These instruments were used for routine processing of very high quantities of hoke tube, U-tube, and pinch tube

samples for uranium enrichment determination. The 6-inch magnet spectrometers were separated by enrichment range over the entire working enrichment of the three Process Buildings at PORTS. Two 15-inch magnet spectrometer were used for higher accuracy and precision work. These instruments were originally equipped with mercury diffusion pumps that were later replaced with alternate technologies. In the late 1980s, three Finnegan gas phase mass spectrometers (one later transferred out to another facility) were installed and became operational. Small releases of UF_6 were commonplace primarily from leaking valves on tube type sample containers as well as when hooking up and disconnecting the tubes from the spectrometers. "Gulpers" for these disconnect leaks were possibly implemented in the early 1990s. Gulpers were HEPA filtered ventilation equipped with flexible inlet tubes that were extendable for easy placement near areas where connects and disconnects were being made (i.e., areas which had the highest probability of UF_6 release). Room 116 and Room 127 were small interior rooms which served primarily as administrative areas within these two material processing areas. Figure 3 shows a mass spectrometer unit in the foreground on the right in Room 115. Figure 4 shows a general view of the work area in Room 126.

Figure 3. Room 115 Mass Spectrometer, Looking South

Figure 4. Room 126 Mass Spec Operating Floor, Looking North

2.2.6 Room 117

Room 117 housed an early model Thermal Mass Spectrometer that was a workhorse for high accuracy uranium enrichment determinations, including standards work. After the Finnigan Mass Spectrometer instruments were installed, a Thermal Ionization Mass Spectrometry (TIMS) unit was installed and became operational, however, the TIMS unit was ultimately not very useful as a production analytical tool.

2.2.7 Room 118

Room 118 is currently being used to store small cylinders known as 2S (2,000 g capacity) UF_6 sample containers. Process knowledge indicates that this room has always been a storage area for the Mass Spectrometry Group and/or the Uranium Sampling Laboratory Group, which is consistent with the1956 floor plan layout label for this room as “M.S. Storage”.

2.2.8 Rooms 128, 129, & 129A

These areas provided space for all mechanical and electronic maintenance activities associated with the Mass Spectrometer Group. Hood areas are high risk for various contaminants, including mercury which was used in early diffusion pumps (a type of vacuum pump for producing extremely high vacuums).

2.2.9 Room 124

Since the implementation of the Core security area in the 1980s, this room was used as an area for corrosive gas analyses, and mainly gas analyses by Fourier Transform Infrared (FTIR) Analysis and/or specially designed gas chromatograph (GC) analysis. These analyses had previously been housed in the suite of second story rooms 223 through 226. In addition to the corrosive gases associated with the GDP, handling and analyses of boron trifluoride and phosgene gases were some of the more interesting corrosive gases that were analyzed.

2.2.10 Rooms 120, 122, 123, 135, 136, 137,138, 139, & 140

Based on process knowledge, these rooms have been associated with the uranium chemistry group. Since the inception of the Core security area, the rooms have essentially been configured as they are today with Rooms 120, 123, 135, 136, 137 and 138 interconnected as one large block (also a radiological contamination area). Room 122 has continued to be an office/administration area while Rooms 139 and 140 (although not areas controlled for loose radiological contamination) contained analytical instrumentation, such as inductively coupled plasma mass spectrometry (ICP-MS) and Gamma Spectroscopy systems.

The Uranium Chemistry Group typically handled higher concentrations of uranium bearing materials (both solutions and solids) for various specifications and contaminants analyses. They were integral to Customer Order Management when that was a process for the enriched UF_6 product. As such, they handled the unique process of the hydrolysis of P10 sample containers (small 10-12 g fluorothene [polymerized monochlorofluorethylene, i.e., polyvinylfluoride] tubes that are common to UF_6 specifications testing) followed by all appropriate analyses. These analyses typically involved large quantities of various concentrated acids including nitric, sulfuric, hydrochloric, perchloric, and others. Various organic chemicals were used as separation and/or purification agents. Gravimetric analyses, potentiometric titrations, (ultraviolet-visible spectrometers, atomic absorption (AA) spectrometry, and later ICP and ICP-MS, were analytical techniques of choice.

In the early years, cleaning of glassware throughout the laboratory was performed in chromic acid baths; in later years this was replaced by sulfuric acid baths with NOCHROMIX® (a patented inorganic oxidizer). Specific rooms where this was the case are identified, however this may not be a complete list due to the decades-long operational history and limited knowledge of current long-term employees. Figures 5 and 6 show general views of the rooms used by the Uranium Chemistry Group.

Figure 5. Room 120, View of Room Window in Room 122, Looking South

Figure 6. Room 138, from Room 139, Looking South

2.2.11 Room 141

Based on the 1956 floor plan layout, Room 141 was labeled “Electronic Equipment,” and was adjacent to Room 139 which was labeled “Electronic Maintenance Shop.” After the inception of the Core security area, Room 141 was turned into the uranium Chain of Custody (COC) area where almost all uranium bearing samples were delivered for distribution to the appropriate lab area within the Core. Incidental off-shift samples could be delivered directly to certain lab areas under alternate security measures.

2.2.12 Rooms 142, 157, and 158

After the inception of the Core security area, process services activities were moved from Rooms 152 and 154 to Rooms 142 and 157. Room 157 was isolated for entry only from Room142. Room 158 was created as an administrative area for process services. Room 158, which was labeled as “Metal Storage” in the 1956 floor plan layout, had been used as an administrative area for the Machine Shops; it included a large granite layout table that is still in place. Prior to the inception of the Core security area, Rooms 142 and 157 housed personnel for the site drinking water laboratory (Water Lab) activities. All Water Lab activities were carried out in Room 157 while Room 142 served dual duty as an administrative area and also contained a surface area determination process. The surface area measurement system was a large elemental mercury-containing apparatus on the South Wall lab rack which was used primarily in determinations related to pelletized trapping media. When the Core security area was implemented, Water Lab activities moved to a refurbished Room 154 and the mercury surface area unit was dismantled and no longer necessary as it was replaced by instrumentation of a different technology.

Process Services Group activities that took place in this area included operational support for all sub-atmospheric sampling of dynamic and static UF_6 systems. This group performed a wide diversity of testing to support operational processes and projects, which included 24-hr, 7-day per week support to operations for many years. A few of the hazards unique to this operation were handling and processing large volumes of radiologically contaminated solutions, including contaminated waste nitric acid and contaminated waste acetone. The operations also handled, processed, and cleaned very large amounts of contaminated elemental mercury using a portion of the rack system in Room 142 that had previously held the earlier mercury apparatus. The walk-in hood that was installed in Room 142 during development of the Core security area was used for dumping/recharging chemical traps for the Process Services sample buggies. This walk-in hood also served as an ejection point for an air-jet ejector that was tied to the can conditioning manifold in that room. The cans were Monel 1-liter gas sample containers. This ejector was used for the quick evacuation of residual corrosive gases from the system. The gases were released to atmosphere through this hood. Room 142 also contains an area dedicated to Plant 031 component storage, spaced appropriately. Plant 031 refers to a specific nuclear criticality safety evaluated activity.

Figure 7 shows the mail-slot storage system used for the sample cans.

Figure 7. Room 142, View Looking East

2.2.13 Room 143

Process Knowledge indicates that Room 143 has always been used for Mass Spectrometry source refurbishment and other Mass Spectrometry repair activities. The 1956 floor plan layout labeled this room "Electronic Source Lab."

2.2.14 Room 144

The 1956 floor plan layout labeled this room "Electronic Tube Shop." After implementation of the Core security area, Room 144 was refurbished with installation of stainless sheet flooring over the entire floor of the room. This room was most likely an extension of the Mass Spectrometry area.

2.2.15 Room 156

In the 1956 floor plan layout, Room 156 was labeled as "UF_6 Reduction." It was once used as a part of what was known as the Chemical Technology Group. This group conducted equipment testing, including pigtails (connecting tubing) and valve experiments. This room has a fluorine delivery system in the bank of hoods on the north wall (as shown in Figure 8). Multiple Chemical Technology projects were also reported out of this room, including technetium-99 trap development and re-conditioning activities. The technetium-99 trap re-conditioning activities involved a process for these traps which were used in the reduction of technetium concentrations in the large cylinders by flowing feed gas from the parent cylinder to the daughter cylinder through technetium trap carts. This was a process performed in the X-340 Complex and was supported by this room in the X710. Reconditioning activities were conducted after

traps had decayed, had been emptied, and were re-charged with fresh trapping media. This re-conditioning involved fluorine and heat treatment cycles.

Other activities in the 1980s and 1990s, which continued until cessation of all activities in 2021, were various continuous vent stack sampler activities.

Figure 8. Room 156, View from the South End Looking North

2.2.16 Room 154

As previously described under "Rooms 142, 157, and 158", historical activities performed in Room 154 moved in the late 1980s to Room 142 and Room 157. The Water Lab activities moved to a refurbished Room 154. However, from 1981 until the implementation of the Core security area, all Process Services activities described earlier in Rooms 142 and 157 were completed. Their repertoire of field sampling and testing services was even more extensive at this earlier time. Support to special engineering projects was also commonplace.

2.2.17 Room 152

In the 1956 floor plan layout, Room 152 is labeled as "Uranium Development." As of 1981, the northern portion of the lab room (north lab aisle) was devoted entirely to coal analyses (i.e., moisture, ash, heat content, and sulfur) for the coal used at the coal-fired boilers at the former X-600 Steam Plant. This was necessary to apply penalties/premiums to the coal supplier as well as a means to identify the total sulfur emissions (generation of SO_2) for the EPA. The southern portion of this lab room (South two aisles) was used for various Process Services activities with the primary activity being a high throughput sample

buggy maintenance program. Services provided included oil changes, manifold cleanings, mercury manometer maintenance (draining, cleaning, and re-filling), trap refurbishment (dumping, cleaning, and re-filling), electrical and heater repairs, and post maintenance testing.

In the late 1980s, the buggy maintenance activities were moved out of this laboratory to the X-760 Chemical Engineering Building. The South two aisles were then refurbished, along with some other space in the north end of this room, for moving all analyses related to American Society for Testing and Materials (ASTM) oil specifications (primarily testing on process lube oils) from Room 212 back to this area. Recollections are that testing on process lube oils took place in this room in the early days when the Materials Sampling & Testing Department (where the Process Services Group resided) tested many more materials coming on site as part of QA acceptance. This move of all ASTM-type testing back in this area was also facilitated by the need for testing waste samples for the "new" characteristic hazards identified in EPA's SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (corrosivity, flammability, etc.) and the fact that they were also based on ASTM type methods.

2.2.18 Shops Areas (general comments)

Shop areas, in general, were mainly used in the fabrication and repair of special laboratory systems. Extreme efforts were made to ensure that these shops did not work on radiologically contaminated materials. Process Knowledge indicates that the only supplies which were reprocessed were non-porous glass materials that could be assured free of contamination that were repaired in the glass shop. Nonetheless, around 2011 a milling machine in the machine shop was contaminated by processing samples for the remedial investigation and feasibility study (RI/FS) from the X-326 Process Building for size reduction.

2.2.19 Rooms 146 and 149

These rooms, originally identified on the 1956 floor plan layouts as the "Metallography/Dark Room" and the "Metallurgy Laboratory," are now known as the Mechanical Welding Shop and the Mechanical Sheet Metal Shop (aka, Welding Shop and Fab Shop). Shop equipment in these rooms included press brakes, drill presses, a welding room and table, and other equipment.

2.2.20 Room 160

This room was identified on the original floor plan layout as "Machine Shop" and has continued that use throughout the history of the building. Equipment housed in this room includes lathes, drill presses, milling machines, metal band saws, and others. There was also a glass bead blasting chamber located in the northwest corner of the room. Figures 9 and 10 are photographs in the room from November 2023.

Consistent with the use as metal work shop, a 2004 evaluation for beryllium-containing dusts, reported in *Final Report, Beryllium Surface Contamination Initial Characterization* (United States Enrichment Corporation [USEC] 2004) (Beryllium Contamination Report), the Room 160 Machine Shop was one of the rooms where a portion of wipe samples resulted in beryllium values at the level of concern (LOC), meaning values between 0.2 µg/100cm^2 and 1.0 µg/100cm^2. The areas with elevated beryllium content were cleaned following the report, but the potential presence of beryllium in inaccessible areas of the room should be considered when deactivation activities for the building are undertaken.

Figure 9. Room 160, Machine Shop

Figure 10. Room 160 Machine Shop

2.2.21 Room 168

This room was originally identified as the Carpenter Shop in the 1956 Floor Plans. In a 2013 Floor plan layout for initial deactivation planning, it was labeled as an "ER Office," used as an office for Environmental Remediation personnel.

2.2.22 Room 170

This room was identified on the original floor plan layout as "Glass Shop" and has continued that use throughout the history of the building. It is noted that the Glass Shop contained a hydrogen gas supply line for using a hydrogen flame for glass operations. A primary shutoff valve is contained inside the laboratory as well as an emergency shutoff valve for the room which is located outside the room in the hallway/corridor.

2.2.23 Room 171

Room 171 is a Mechanical Room, originally labeled in the 1956 floor plan layout as "Mechanical Equipment" and has been in continuous use for this purpose. Figure 11 shows the two vacuum pumps housed in this room.

Figure 11. Room 171, Vacuum Pumps

2.3 1953 Building Area – Second Floor

2.3.1 Rooms 201, 202A, 202B, & 203

The 1956 floor plan layout labels Room 201 as a storage room for electrical items. Rooms 202A and 202B were originally undivided as Room 202, labeled as "Spectrograph Work Room." Room 203 was originally labeled as "Counting Storage." From 1981 onward, Process Knowledge indicates these rooms were all assigned to the Metallurgy Group. Since at least the year 1981, Room 201 never experienced much use, and Process Knowledge indicates fixed radiological contamination issues were associated with this room which were the result of prior radiologically contaminated metal sample preparations (cutting). Rooms 202A, 202B, and 203 were reassigned as an area for Return COC when Environmental efforts with RCRA tracking of samples was initiated.

The 2004 Beryllium Contamination Report identified that 100% of the samples from Room 203 Chain-of-Custody were in the LOC range for beryllium content with one sample as high as the Level of Immediate Concern (LOIC) range (1.0 µg/100cm^2 to 3.0 µg/100 cm^2). The room was subsequently decontaminated by USEC for continued use. A large canopy fume hood in Room 203 was removed due to the beryllium contamination.

Regarding Room 202B, per *Remedial Investigation and Feasibility Study (RI/FS) Report for the Process Buildings and Complex Facilities Decontamination and Decommissioning Evaluation Project at the Portsmouth Gaseous Diffusion Plant (PORTS) Piketon, Ohio*, (DOE 2014) (Process Building RI/FS):

"The X-710 Radiographic Facility (X-ray Facility) is located in Room 202B on the west side of the second floor. The X-ray Facility was used to radiograph small valves, sample containers, welds, and other components for determining internal soundness. The facility consists essentially of an X-ray vault that contains an industrial X-ray machine. The vault is 12 ft by 12 ft by 13 ft high. Three walls of the vault are common with adjacent rooms, and these rooms can be isolated during radiographic procedures. The fourth wall of the vault is an exterior wall located 14 ft above ground level. The three inside walls are 2 in. thick and contain 1/8 in. lead sandwiched between steel sheets. The exterior wall is constructed of concrete blocks. The floor is made of 3 in. of reinforced concrete with 12-in. steel beams and is covered with 3/8-in. lead sheeting. The roof has concrete and structural steel joists with nothing located above. Bi-parting access doors open into the control room and are constructed of 1/8 in. lead sandwiched between layers of wood."

It is noted that this industrial X-ray machine in Room 202B has since been removed. Radiological contamination signs are posted at the entrances to many rooms and 90-day storage areas for hazardous chemical wastes are present in the X-710 Technical Service Building, indicating contamination exists in these areas. Laboratory equipment used for radionuclide analysis is also contaminated.

2.3.2 Rooms 211, 212, 213, and 214

The 1956 floor plan layout labels these rooms as "Office," "Bal.," "Trouble Shooting," Trouble Shooting Storage," and "Industrial Hygiene."

In the early 1980s, these rooms housed personnel from the Environmental, Safety, and Health (ES&H) section which provided the PORTS site Environmental and Industrial Hygiene (IH) support. Room 212 was used for a very diverse assortment of preparation and wet chemistry techniques. The bank of hoods on the north wall in Room 212, and at least the north aisleway, were devoted to ASTM oil testing that evidently had been moved to Room 212 from Materials Sampling and Testing. Some of the more interesting preparations and analyses were for heavy metals, including mercury analyses and cyanide-

bearing solutions analysis. The area in Room 212 is awaiting deactivation and being currently used as a laboratory instrument graveyard. Figures 12 and 13 show the current storage activities in Room 212.

Figure 12. View from Middle of Room 212, Looking West

Figure 13. Room 212 From South End Looking North

Room 213 was devoted mainly to uranium analyses by pellet fluorimetry after digestion and concentration preparation. Room 214 was used for column ion exchange separation of uranium from urine followed by concentration and plating in preparation for Alpha Spectrometry counting to determine uranium-235 and technetium-99 content. Fluoride content was determined directly by ion-selective electrode (ISE) buffered analyses. These constituted the bulk of the Bioassay program that was in place until 2011. A few personnel were tested for mercury in their urine routinely. Occasionally, other metal determinations in urine would be made as well. The north end of Room 214 was devoted to vegetation preparation and analyses for the same analytes.

Since the 2011 transition, Room 213 was the command center and Room 214 was the area where two atmospheric chambers were employed for bench scale testing for classified matter. Since 2014, the far north end (and ventilation hoods) was used to process laboratory samples from the X-326 Process Building Line Recorder instrument lines removed from the general area of Auxiliary Control Room 6. This material contained levels of technetium compounds which resulted in the fixed contamination of this area.

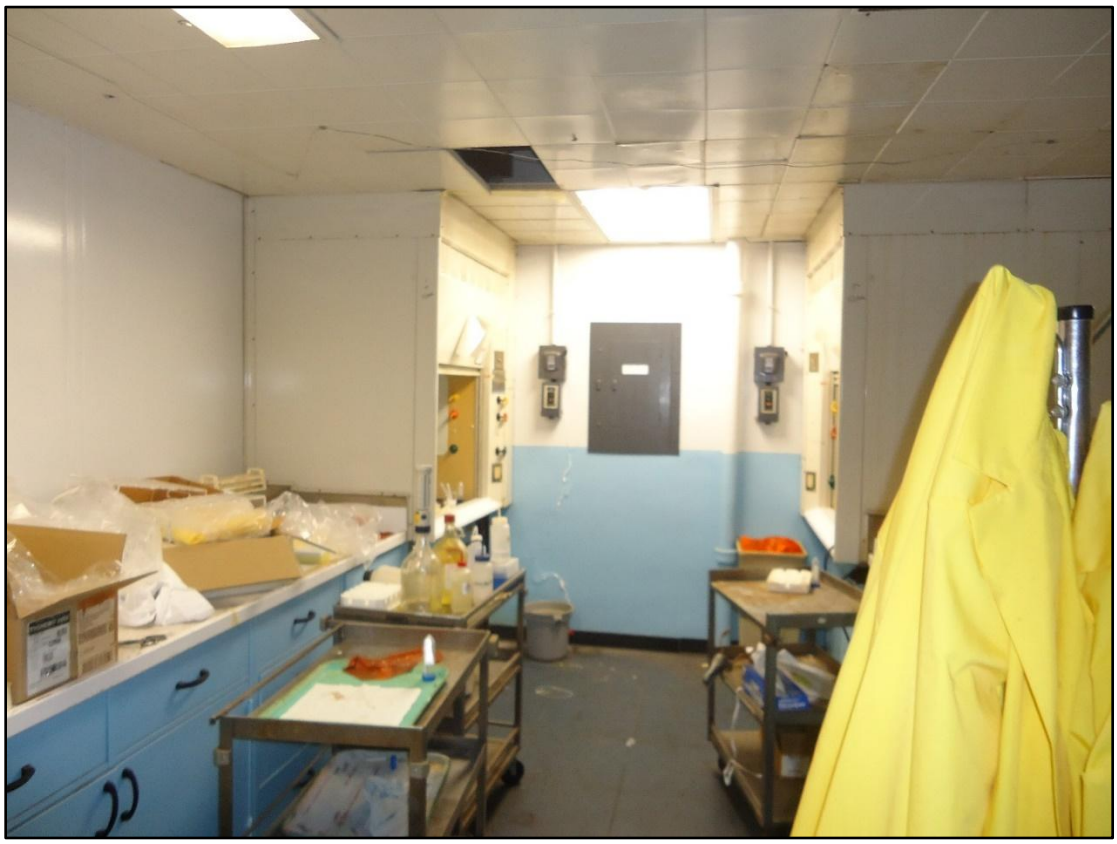

Figure 14. Room 214, View from South Door Looking West (November 2023)

2.3.3 Rooms 229, 229A, 230, and 232

The 1956 floor plan layout labels Room 229 and 229A as "Radiochem Lab," while the area now designated as Rooms 230, 231, and 232 was originally identified as the men's toilet and locker rooms. Although Process Knowledge and the history of these rooms is not very clear, they have always been treated as some of the least desirable areas in the building and seemed to have had many contamination issues. It is believed that this may have been the area where fluorination of uranium oxides to create UF_6 standards (known as synthetic G standards) was conducted, and the rooms used to validate the original creation of the isotopic "G" standard suite. This operation most definitely occurred but could have been in other labs as indicated by designations on other room layout maps.

This area contained the only three sink drain systems in the building that were identified as going to the X-710 Technical Service Building Radioactive Wastewater Tank (a.k.a. "Hot Pit") which is located outside and approximately 75 feet west of the building (See Figure 1). Also see Section 3.

Several higher-level radiation source materials were discovered in these rooms over the years as Health Physics began to investigate. The Radiochemistry lab continued to use these rooms for various purposes. For a brief period, toxicity characteristic leachate procedure (TCLP) extractions were completed in this area on highly contaminated trap materials from the X-326 Process Building as well as materials from other Process Buildings.

2.3.4 Rooms 223, 224, & 226

The 1956 floor plan layout labels Rooms 223, 224, and 225 as 'Infrared Spectrometer Room," "Gas Analysis Process Improvement," and "Office," respectively.

By 1981, these rooms performed corrosive gas analyses similar to what was moved to Room 124 during the implementation of the Core security area. The work here was probably much more in-depth due to the space available and the fact that this was the time period when research was being completed on the various compounds discovered in the GDP cascade. These included many contaminants as well as reaction products associated with auxiliary systems (e.g., Freon Degrader). There was an extensive in-house library of infrared spectra developed from the common cascade and support systems gases. In many cases, to obtain these spectra, experimentation in synthesis with pure gases was carried out.

After implementation of the Core security area, this area was converted to regular Gas Chromatograph and later, Gas Chromatograph/Mass Spectrometer (GC/MS) instrumentation area. At the peak of these operations, Room 223 contained Four Gas Chromatographs equipped with various detectors (Electron Capture, Flame Ionization, Electrolytic Cell, and others), as well as a Liquid Chromatograph. These were used for various organics analyses including multiple organic compounds. Room 224 contained three GC/MS units equipped with Purge & Trap systems configured to perform VOC analyses. Room 223 was primarily storage for neat organic compounds and various standards. This included a very extensive listing (too extensive to catalogue) of organic compounds including various polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), herbicides, pesticides, various fuels, and various chlorofluorocarbons.

After cessation of organics analyses in 2014, Room 224 became a shipping area for packaging samples for shipment to off-site laboratories for hazardous/radiological analyses.

2.3.5 Room 222

In the 1956 floor plan layout, Room 222 was labeled "Gas Analysis Storage." In the early- to mid-1990's, when it became the Sample Receiving Area, or Sample Custody Room (for purposes of demonstrating Chain of Custody for samples) and remained purposed for that role until all X-710 Technical Service Building lab operations ceased in March of 2021.

2.3.6 Rooms 220A, 220B, 221A, and 221B

In the 1956 floor plan layout, these rooms labeled 221,221A, 221B were all one room and the room was labeled "Spectrochem Development". Room 220 was labeled "Densitometer."

Process Knowledge for the last uses of these areas is described here. Rooms 220B, 221A, and 221B were devoted to Gamma Spectrometry analyses. In the late 80s, Rooms 220A and 221B were established for housing two of the first ICP-MS units used at PORTS (primarily for Bioassay) determining uranium and uranium-235 in urine. Room 221A was used as an administrative area and Room 220B was a sample dilution and preparation area for the ICP-MS process. These ICP-MS units required special ductwork that tied into some of the local exhaust ventilation to exhaust vapors generated by the plasma.

2.3.7 Rooms 216, 218, and 219

The most recent uses for Rooms 216, 218, and 219 are discussed here. Room 219 was primarily an administrative area, while Room 216 was used for various preparations for metals analyses by AA, ICP, or ICP-MS. In earlier years, this room was used for handling large volumes of uranium oxides in preparation for analytical techniques for metals contaminants. Along the northeast wall of Room 218, a technique called Arc Spark Emission Spectroscopy was located and included a dark room in the very northeast corner for film development of these spectra. Later, the other analytical instruments (AAs, ICPs) and their operating systems were housed in Room 218 and required specialized local ductwork for

each of the instrument exhausts. Note that some of the same type of special ductwork was used for the exhaust from the previous Arc Spark unit).

2.3.8 Room 238

This room was under the Chemical Technology (development) area and performed various project development work. In the mid- to late 1980s, this area evolved into an area where the extraction procedure (EP) Toxicity (predecessor to the TCLP) extraction test was performed. This room sat mostly unused, or was overflow for organic extractions (similar to those described in Room 254) in the 1990's. Late in the USEC operations period and before the Fluor-BWXT Portsmouth LLC (FBP) contract, this area was specifically set aside for performing preparations for various direct analyses as well as the TCLP test on classified components as part of the Cascade Characterization processes. This continued to be the case for analytical work on classified components until the cessation of all X-710 Technical Service Building lab operations in March 2021. Radiochemistry separations were also performed in this area to alleviate lack of hood flow out of Room 262 where they were previously centered.

2.3.9 Rooms 240 and 241

In the 1956 floor plan layout, Room 240 and 241 were labeled "Interhalogen Storage" and "Process Improvement Samples." A drawing dated 2013 labeled these rooms as "R&D Lab" and "Lab Office." A long-time employee who has been involved in a very large number of projects at PORTS, suggested it would be nearly impossible to provide a complete listing of all the research and development projects in which he was personally involved in these rooms. Therefore, only the highlights are captured here. Rooms 240 and 241 are now an open floor plan suite.

This is an area that has handled a large number of classified materials; many confidential restricted data as well as secret restricted data from different phases of Centrifuge development/deployment/troubleshooting. Sweeps to assure no classified materials remained present were conducted prior to extra security controls being removed from this room. This effort was completed well before the X-710 Technical Service Building was evaluated and moved outside the Limited Area of PORTS (the Limited Area boundaries moved in support of the X-326 Process Building demolition activities in or around 2020). However, due to the nature of the configuration of the room layouts of these labs with all the various drawers and cabinets, additional scrutiny and verification during deactivation will be necessary to confirm that no materials which are non-WAC compliant remain unintentionally in any small areas.

This area contains at least one hood that contains access to the building fluorine supply header and many fluorine treatment and passivation studies/processes were undertaken. This is also one of two areas where an air jet ejection system was used to assist in evacuating corrosive gases from systems prior to employing common laboratory vacuum pumping techniques. The ejection system was tied into one of the hoods in this area.

Many UF_6 transfer and manipulation processes were performed. During plant operations, these and other corrosive and non-corrosive gas standards preparation activities (Line recorder standards and Portable Infrared Analyzer buggy standards, as well as various laboratory related gaseous standards) were completed here. Both early and post-transitional NDA Working Reference Materials were established. The latter of these were produced after 2011, with a higher level of regulator scrutiny and resulted in a more complete traceability to national standards.

Technetium trapping material studies were completed in this area leading to the development of a patented process for purification of UF_6 by removing technetium-99 using metal fluoride (specifically magnesium fluoride) as a trapping media. Inventor status was attributed to Mr. Anthony Saraceno and Mr. Keith Banks.

Very early bench scale nickel carbonyl nickel recovery experiments were also completed in this area.

Figures 15 and 16 are left and right portions of a panoramic photograph view of Rooms 240/241.

Figure 15. Photograph of Room 240/241 - Left Portion of Panorama

Figure 16. Photograph of Room 240/241 - Right Portion of Panorama

Figure 17. Photograph of Room 240 From South Door Looking North to Room 241

2.3.10 Room 243

The 1956 floor plan layout drawings labeled this room as “Interhalogen Process Studies”, but it is now known as the Radiochemistry Lab. Although this room has been included in coverage of one of the X-710 Technical Service Building nuclear criticality safety approval (NCSA) documents, it has never contained a fissile material operation. From Process Knowledge and evidence of the remaining ovens and manifold systems in the room, this was an area used for valve testing. Only non-enriched material would have been used in these tests as it would have been a waste of enriched material separative work units to use enriched uranium. There is access through the hood in this area to the building fluorine supply system as this was most likely necessary for appropriate valve evaluation.

Throughout the later 1980s, development of different online sampling systems was explored for sources under the EPA National Emission Standards for Hazardous Air Pollutants. This culminated in the final design of the Continuous Vent Stack Sampler that is still being used in three locations on site (plus one in use at the American Centrifuge Plant, next door to the PORTS) today. At one time, nearly 20 of these units were serviced from this area. These were all classified as non-fissile material operations as well. These Vent Stack Sampler support activities continued in this area until the cessation of all X-710 Technical Service Building laboratory activities in March 2021. Figures 18 & 19 depict Room 243.

Figure 18. Room 243, From South Door Looking Northwest

Figure 19. Hood in Northwest Corner of Room 243

2.3.11 Rooms 244, 245, and 246

The 1956 floor plan layout drawings labeled these rooms as “Counting Room,” “Counting Prep Room,” and “Fission Counter.” These three rooms have historically been devoted to radiochemistry activities. Room 244 was primarily a counting room with multiple Gamma (germanium crystal detectors) and multi-chamber Alpha Spectrometry Counting systems (Alpha Spec). It was configured in this manner until the cessation of X-710 Technical Service Building laboratory operations in March 2021.

Room 245 was used more extensively when wet chemistry digestion and separation techniques were more prevalent in use than those developed as packed column separations. Room 245 was used for these remaining digestions and muffle furnace techniques until cessation of X-710 Technical Service Building laboratory operations in March 2021.

Room 246 was primarily used as excess sample storage and controlled sealed source storage. Process Knowledge indicates that this room may have at one time contained a large instrument which was possibly a gamma cave system.

These and other Radiochemistry rooms were addressed in NCSA 0710-015, and allowed to serve as an alternate sample receiving area (COC room) and, situationally due to other constraints, functioned as such. Early on, cleaning of glassware was performed in Chromic Acid baths later replaced by Sulfuric Acid baths with NOCHROMIX® additive. Figure 20 shows the Alpha Spec unit in Room 244.

Figure 20. Photograph of Alpha Spec Rack and Chambers located in Room 244

2.3.12 Room 266

The 1956 floor plan layout drawings labeled this room as "Corrosion Storage." Process Knowledge indicates that for years this room housed an Electron Microprobe instrument which was either not in service or used very infrequently in the early 1980s. Process Knowledge indicates that around the early 1990's, this instrument was removed, and the room was re-purposed as a Radiochemistry counting room containing several gas proportional counters as well as liquid scintillation counting instruments. It continued in this capacity until cessation of X-710 Technical Service Building laboratory operations in March 2021.

2.3.13 Rooms 263, 264, and 265

The 1956 floor plan layout drawings labeled these rooms as "Feed and Waste Reduction," "Bal. Room," and "Office," respectively. Process Knowledge indicates that a large-scale electroplating operation was housed in Room 263 and a lot of cyanide containing solutions were used in the processes. Previous uses of this room in the late 1970's into early 1980's included some types of organic processing.

Throughout the 1980s and going forward, these rooms became a hub of preparatory work, where preparation of large volumes of samples for PCB analyses took place. To a somewhat lesser degree, both pesticides, herbicides, and some other specific organic compounds were also worked with in this area. In later years, probably after 2000, a couple of GC units with electron capture detectors (which contained nickel-63 radioactive sealed sources) were moved into what had been an administrative area consisting of Rooms 264 and 265. Known organic solvents used in high volume included hexane, acetone, methylene chloride, methanol, and a few others. Standards and mixtures of all Aroclor and Aroclor mixes (i.e., PCBs), pesticides, and herbicides, as well as other organic compounds were present. Early on, cleaning of glassware was performed in chromic acid baths and later replaced by sulfuric acid baths with NoChromix® additive. Figures 21 and 22 are photographs of Room 263 taken in November 2023.

Figure 21. Room 263 Hoods

Figure 22. Room 263 Canopy Hood Area Housing Blendstock Apparatus

2.3.14 Room 262

The 1956 floor plan layout drawings labeled this room as "Radiation Protection." Prior to the shifted emphasis to environmental work discussed earlier, this area was a part of the Chemical Technology Development Group. They typically worked on special projects (e.g., PCB cleanup of process lube oils, real time analyses of vent emissions, cascade Freon leak/loss stoppage, etc.). For the last several years, up to the cessation of all X-710 Technical Service Building laboratory operations in March 2021, this room housed Radiochemistry preparations and separations activities. One item of note is that this room did not have good airflow in the south end of the room, and the operations tended to generate acidic vapors that would degrade metal and coat open surfaces with acid.

2.3.15 Room 260

The 1956 floor plan layout drawings labeled this room as "X-Ray Storage." This area was an extension of the X-Ray Diffraction/Fluorescence area in Rooms 256 through 259 until Room 260 was converted to an environmental laboratory for performing total organic carbon/total organic halide analyses. These

analyses continued in this area until the mid-2000's when interest in these was discontinued in favor of more direct methods of speciation for organic contaminants.

2.3.16 Room 256, 257, 258, and 259

The 1956 floor plan layout drawings labeled these rooms as "Prep Room," "Dark Room," "X-Ray Diff. Room," and "Office," respectively.

These rooms collectively served as an area of operations for techniques involving conventional microscopic investigation, X-Ray Diffraction, and X-Ray Fluorescence. Room 256 typically housed the X-Ray Diffraction and X-Ray Fluorescence instrumentation. Room 257 was a dark room for developing X-Ray Diffraction film. Room 258 was primarily an administrative area, and at one time had a lighted film viewing table. Room 259 contained regular microscopy work, balance work, and elementary sample preparation tools.

2.3.17 Rooms 254 and 255

The 1956 floor plan layout drawings labeled these rooms as "Gas Metals Reactions," and "Office," respectively.

This area continued with occupancy of personnel and operations in the development area of the laboratory until during the Oil, Chemical, and Atomic Workers Union strike of 1990/1991. During this time, this area was renovated into an area devoted to handling the growing demands for the high capacity of site samples requiring TCLP analyses as a result of EPA's rules to establish regulatory levels for organic chemicals. This room coexisted for the preparation of samples for SVOCs, pesticides, herbicides, PCBs, and various other organic components. Analytical instruments (two GC/MS units) were installed exclusively for SVOC analyses.

This room contains a bank of four hoods along the south wall. During startup of these operations in the early 1990's, these hoods were determined to contain levels of contamination. The far west hood was determined to have high levels of contamination behind the plenum that comes down the back of the hood directing airflow from front to rear across the floor. This became apparent when SVOC concentrating equipment became contaminated beyond salvage after a rain event resulted in washing contamination out of the hood. This hood was determined by Health Physics personnel (Radiation Protection program) to contain some of the highest levels of contamination in the X-710 Technical Service Building. Figure 23 is a photograph of Room 254 taken in November 2023.

Figure 23. Room 254 from North Door, Looking Southeast

2.3.18 Room 286

This room was dedicated to high accuracy and precision flow measurements and contained standard orifices that were traceable to Primary flow standards. These were used for extensive barrier testing as well as other flow applications. The south side of the room was also used for laser development work, primarily as accurate alignment aids.

After removal all classified material from the area, several sweeps revealed classified material had been left behind. Finally, just prior to the FBP contract, the room was extensively swept and renovated into office space for Laboratory Management. Although large volumes of classified material had historically been handled in this area, the risk of finding any classified material in this room now would be extremely low due to the extensive renovation that was performed.

An unusual feature for an office/administrative area exists in this room. The west wall contains two large ports that are attached as inlets to a vacuum system used during the previous flow measurement operations. These ports are labeled as radiologically contaminated.

2.3.19 Room 285

This was a room dedicated to the use of the Chemical Technology/Development Group. It was used by the resident paints and adhesives expert. With the swing of emphasis on environmental type analyses, this lab area was converted into another room for Radiochemistry to use as an area for preparation of samples for both gas proportional and Liquid Scintillation counting techniques. Although partitioned as an office area, Room 284 housed balance and other preparation activities.

2.3.20 Room 282B

The only use of this room at least from 1981 was by the IH group. They used this room for preparation and administration of sampling pumps and other sampling apparatus, as well as a few chemicals used as part of the IH sampling process.

2.3.21 Room 281

Prior to the switch to emphasis on environmental analysis, this room was a part of the Chemical Technology Group who used various flow technologies, as well as Thermogravimetric Analysis techniques, which were housed in this area. With the shift that created more need for environmental capacity as well as the closing of the X-760 which housed a laboratory area where sample preparations were completed, this room became a primary area for sample preparations (primarily for metals analyses). This included many 'Hot Block' digestion operations as well as microwave digestion techniques. Mercury analyses based on a specialized Bacharach instrument founded on Atomic Absorption theory of operation were also carried out in this area. This room is unique in that there is an overhead crane in the room that, in conjunction with an access panel that can be removed in the floor, can be used to raise/lower equipment and supplies from the first to second floors through access in Room 156 on the first floor.

2.3.22 Rooms 274 through 280

Although some of these rooms were used in the last years of X-710 operations as administrative offices, this entire suite of rooms was formerly used in microscopy work, both normal and electron microscopes. The last years saw Rooms 271, 274, 275, 277, and 279 used for functions associated with asbestos analyses (both bulk and filters).

2.4 1975 Building Addition – First Floor

2.4.1 Room 185 Complex

This entire area was dedicated to metallurgical testing (hardness, tensile, fracture, chemical composition) as well as sample preparation and mounting for electron microscope, microprobe, other X-Ray techniques and other chemical composition testing. Room 185B is currently designated as a Plant 031 component storage area and contains several used pumps from sample buggies (spaced appropriately). Room 185C, although not used much since 2011, still houses residual materials, removed from the X-760 Chemical Engineering Building prior to its demolition, when buggy maintenance activities were moved to the X-710 Technical Service Building. Room 185C also contains some Plant 031 component storage areas, and possibly some materials stored under Plant 048 controls and spacing. Room 185A was originally a sample preparation, mounting, and polishing area which most recently has been converted to perform liquid hydrogen fluoride specifications analyses in support of the depleted uranium conversion operations underway at another DOE facility at the site. Additionally, this room was most recently used by plant sampling crews for hood ventilation for waste sampling operations (such as sample prep).

The 2004 Beryllium Contamination Report identified samples from the Room 185 Metallurgical Lab as returning 25% of samples taken as LOC for beryllium. These areas were subsequently decontaminated for use, but the Facility Manager indicated that there is a canopy hood in Room 185 that is tagged as a potential beryllium hazard.

2.4.2 Room 187

Early use of this room after it was constructed in 1975 has not been determined. Later, it served as a support area for the Radiochemistry Smear Counting laboratory and after 2011 the ER sampling group used this area for sample container preparation.

2.4.3 Rooms 189 thru 193B

These rooms were used by engineering groups that were part of Production Support which included Laboratory Services, Development Engineering Services (which was more electrical/instrumentation work), and other functions. Process Knowledge indicates that handling of chemicals and hazardous materials in these areas in the early years was very limited.

In later years, Room 191 served as Air and Smear Counting Laboratory and later (after 2011) as Air Filter Counting. Room 192 served as the Chemical Receiving and Distribution area for the X-710 Technical Service Building. Room 192A has been used for training, records storage, and most recently used as a Radiation Protection Smear Counting area. Room 193 was used for Laboratory Instrument maintenance, and then followed by ER Sampler supply storage. For many years, Rooms 193A and 193B have been used for, and continue to serve as, laboratory permanent records storage.

2.4.4 Rooms 194 through 199

These rooms are designated as ER offices. Room 195A is used as storage for the ER group.

2.5 1975 Building Addition – Second Floor

2.5.1 General Information

Much of this entire area was used as a computer resources area prior to other computer facilities being made available on site. One piece of evidence of this is the existence of the raised flooring with access below for cable runs.

2.5.2 Rooms 337, 337A, and 340

This area was used in the last years for NDA (Applied Nuclear Technology). From their formation as a group to the time of the FBP contract transition, they occupied this area. Room 337A was primarily used for source storage.

2.5.3 Room 335

This room was used for a little while (prior to transition in 2011) for electronic instrument maintenance activities. After transition, it reverted to an administrative area.

2.5.4 Rooms 330 and 331

As the need for increased environmental analytical capacity began, these rooms were used as part of the Laboratory Controls and Standards Group. Preparation of non-UF_6 standards of all types was performed in these rooms. A particular emphasis within these rooms was on preparation of standards for various types of Wet Chemistry as well as metals and radiochemistry instrumental analytical techniques.

This area contained a wide variety of metals and radionuclide standards (both individual component and multi-component mixtures). Uranium oxide standards traceable to national standards were routinely handled in this area. A small benchtop high efficiency particulate air filtered hood was used for this operation slightly before FBP transition and in the latter years.

3 ASSOCIATED AND ANCILLARY STRUCTURE

Associated and ancillary structures are shown on Figure 1.

3.1 X-710A Technical Service Gas Manifold Shed

The X-710A Technical Service Gas Manifold Shed is an open-air structure built in 1955 located west of the X-710 Technical Service Building (see Figure 1 and also Figure 24). The facility was used for receiving, storing, and distributing specialized high-pressure gas through gas manifolds and cylinders for use in the laboratory areas of the adjacent X-710 Technical Service Building. The building constitutes an elevated concrete floor platform approximately 4 ft above grade, 37 ft long and 26 ft wide. The platform is enclosed with an expanded-metal fence and a shed-type corrugated cement asbestos (transite) panel roof supported by steel framing. A six-ft-wide loading dock adjoins one side of the structure and extends the full length of the shed. There are no walls, only a high chain-link fence which secured and enclosed the gas manifolds and cylinder storage area. The chain-link fence divides the platform into two storage areas. The gas cylinders have been removed. However, the previous configuration permitted oxygen cylinders to be contained in one storage area while the other contained hydrogen, liquid propane, and acetylene cylinders. Electricity is supplied to the X-710A Technical Service Gas Manifold Shed.

Figure 24. X-710A Technical Service Gas Manifold Shed

3.2 X-710B Explosion Test Facility

The X-710B Explosion Test Facility was built in 1956 and is a small structure approximately 75 ft west of the X-710 Technical Service Building. It is comprised of an approximately 12-ft by 14-ft laboratory/control room area with an adjacent circular explosion test chamber, approximately 8 ft in diameter and 10 ft in height (Figure 25), and an attached fluorine pig. The facility has 245 ft^2 of floor space. The entire structure is made of reinforced concrete. There is a small opening between the laboratory/control room and the explosion test chamber, which could be sealed off and was provided for piping. A 42 ft^3 fluorine pig is located approximately 12 ft east of the explosion test chamber. The fluorine pig and the explosion test chamber are enclosed in a secured area by a high chain link fence.

Blast-proof steel doors provide exterior access to the test chamber and work area. For manipulating test specimens, an 18-in. by 18-in. bullet-proof glass vision panel and sleeves for remote control were provided. Other operational equipment included a fume hood with a powered exhauster and an acid-type sink that drained to the acid neutralization pit.

The facility was built to conduct experiments with unstable compounds that might result in an explosion. Based on interview information reported in *Report for Environmental Audit Supporting Transition of the Gaseous Diffusion Plants to the United States Enrichment Corporation, Appendix A, Volume II: Portsmouth Facilities Report* (DOE 1993), the facility had not been used to conduct experiments during the eight years prior to publication of that 1993 report. The facility had been utilized to store small gas cylinders that contained unknown gases manufactured onsite by a chemist.

Figure 25. X-710B Explosion Test Facility

3.3 Acid Neutralization Pit and Radioactive Wastewater Tank

Two below-grade ancillary structures, an acid neutralization pit, and a radioactive wastewater tank (See Figure 1), supported laboratory operations. These two ancillary structures are briefly described in the following two subsections.

3.3.1 Acid Neutralization Pit

A below-grade 5,000-gal neutralization pit, approximately 15 ft long, 9 ft wide, and 8 ft deep, is located approximately 21 ft west of the X-710 Technical Service Building. The neutralization pit, constructed of concrete and lined with acid-proof brick, was used to treat operations effluent (including organic solvents) with lime before discharge to the sanitary sewer system (DOE 2000).

The neutralization pit was taken out of service in the 1990s. The wastewater from the neutralization pit was originally discharged to the former X-615 Old Sewage Treatment Plant (above-grade structures demolished in 2006), then later to the X-6619 Sewage Treatment Plant built in 1980. When the neutralization pit structure was isolated, bypass piping was installed so that the wastewater from the building sink drains discharged via piping to the X-6619 Sewage Treatment Plant. The influent piping to the pit, a 6-in. Duriron pipe, was sealed from the inside of the pit and sealed and air-gapped on the exterior of the pit. During the pit isolation work, the neutralization pit was flushed extensively with water.

3.3.2 Radioactive Wastewater Tank

This below-grade tank is located on the west side of the X-710 Technical Service Building, approximately 21 ft west of the building directly north of the neutralization pit discussed above. This 500-gal tank is a buried steel radioactive wastewater storage tank in a concrete vault installed in 1954. The tank was installed to collect effluent from the originally planned high-level radiological laboratory in the X-710 Technical Service Building; however, this laboratory was never fully operational. The design of this ancillary facility included 2 in, stainless steel pipe for radioactive wastewater effluent contained in a concrete below-grade trench leading to the tank pit. The tank's contents were removed in the mid-1980s when the tank was taken out of service (DOE 2000).

One long-time employee who worked in the Environmental Sampling Group from the mid-70s to the mid-80s indicated that the Environmental Sampling Group had identified mercury and radiological constituents (among others) in both the acid neutralization pit and the radioactive wastewater tank. This led to sampling the sludge generated by the X-615 Old Sewage Treatment Plant and the X-6619 Sewage Treatment Plant. The sludge was subsequently characterized as mixed waste. This long-time employee suggests that the potential exists for mercury residue to remain in the lower-level drainpipes such as sink traps.

4 REFERENCES

DOE 2022, *5-Unit Groundwater Plume Area Excavation Work Plan at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, DOE/PPPO/03-0868&D3, U.S. Department of Energy, Piketon, Ohio, August.

DOE 2014, *Remedial Investigation and Feasibility Study (RI/FS) Report for the Process Buildings and Complex Facilities Decontamination and Decommissioning Evaluation Project at the Portsmouth Gaseous Diffusion Plant (PORTS) Piketon, Ohio*, DOE/PPPO/03-0245&D3, U.S. Department of Energy, Piketon, OH, June.

DOE 2000, *Quadrant I Cleanup Alternatives Study/Corrective Measures Study Final Report for Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, DOE/OR/12-1248&D6, U.S. Department of Energy, Piketon, OH, May.

DOE 1993, *Report for Environmental Audit Supporting Transition of the Gaseous Diffusion Plants to the United States Enrichment Corporation, Appendix A, Volume II: Portsmouth Facilities Reports*, DOE/OR/1087&V3, U.S. Department of Energy, June.

USEC 2004, *Final Report, Beryllium Surface Contamination Initial Characterization*, POEF-USEC-61, Prepared by the United States Enrichment Corporation for Bechtel Jacobs Company, LLC, November 19, 2004.

This page is intentionally left blank.

APPENDIX A. 1956 ERA FLOOR PLANS OF THE X-710 TECHNICAL SERVICE BUILDING

This page is intentionally left blank.

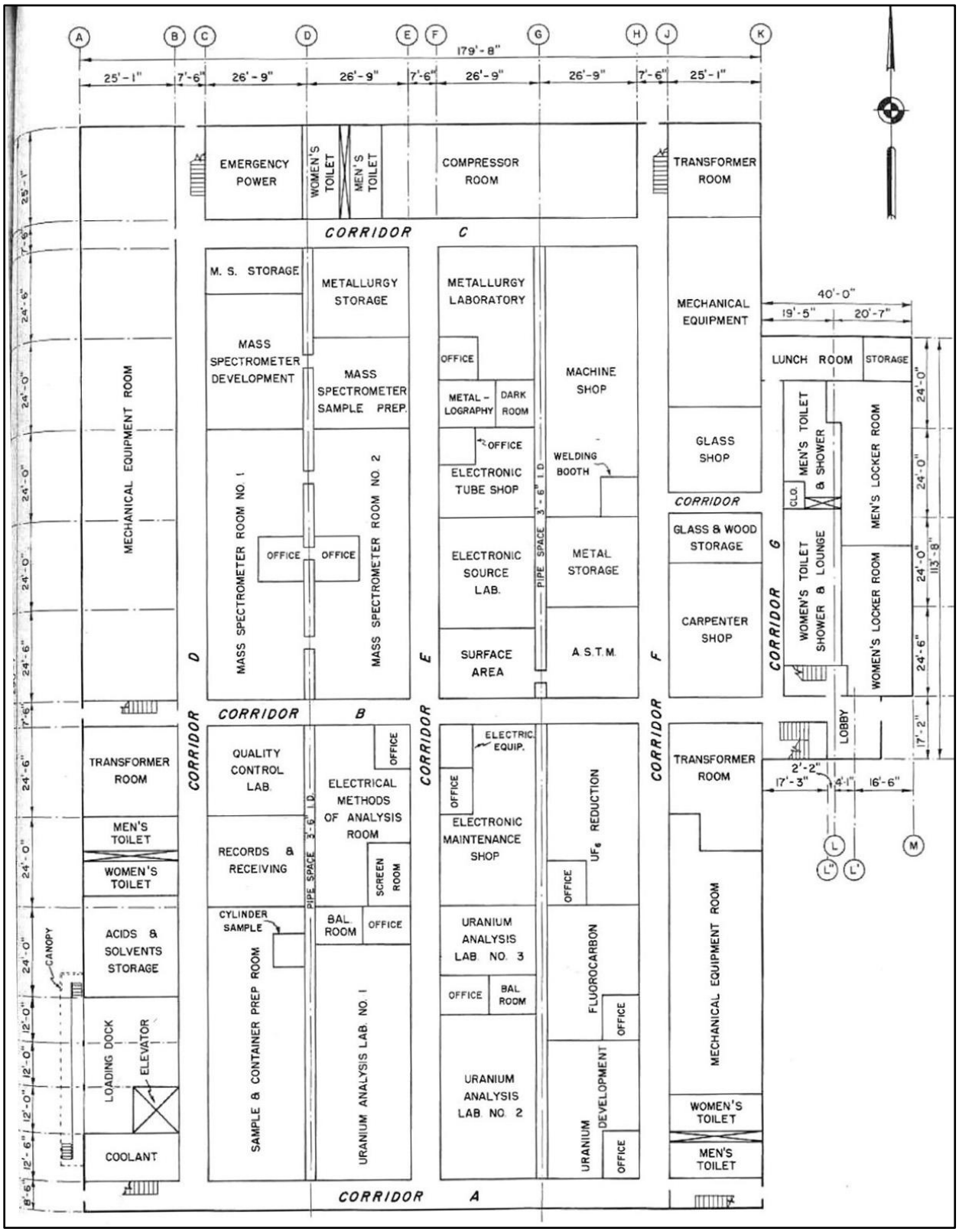

Figure A-1. First Floor Layout of the X-710 Technical Service Building, Circa 1956

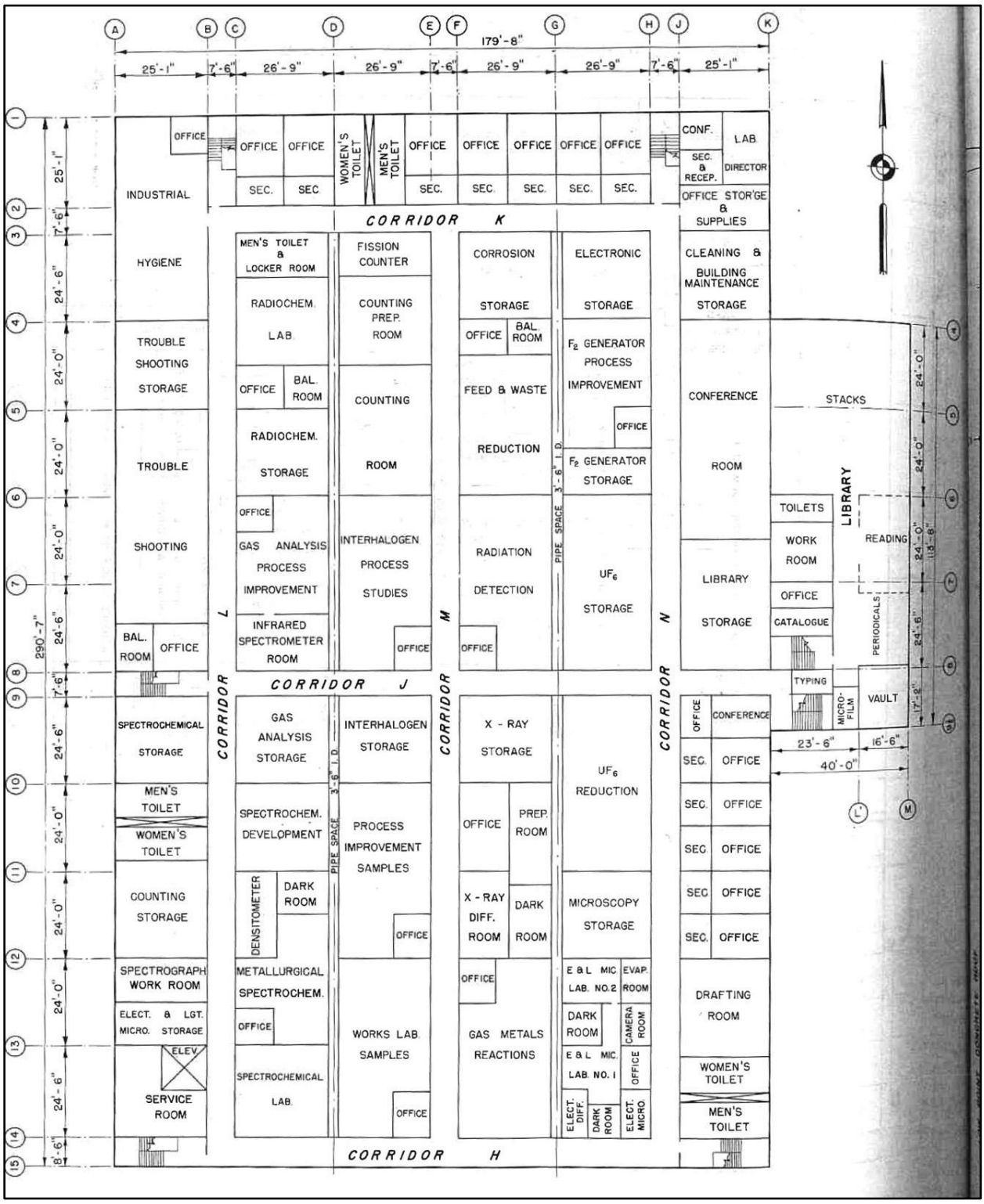

Figure A-2. Second Floor Layout of the X-710 Technical Service Building, Circa 1956

APPENDIX B. 1975 FLOOR PLANS OF THE X-710 TECHNICAL SERVICE BUILDING

This page is intentionally left blank.

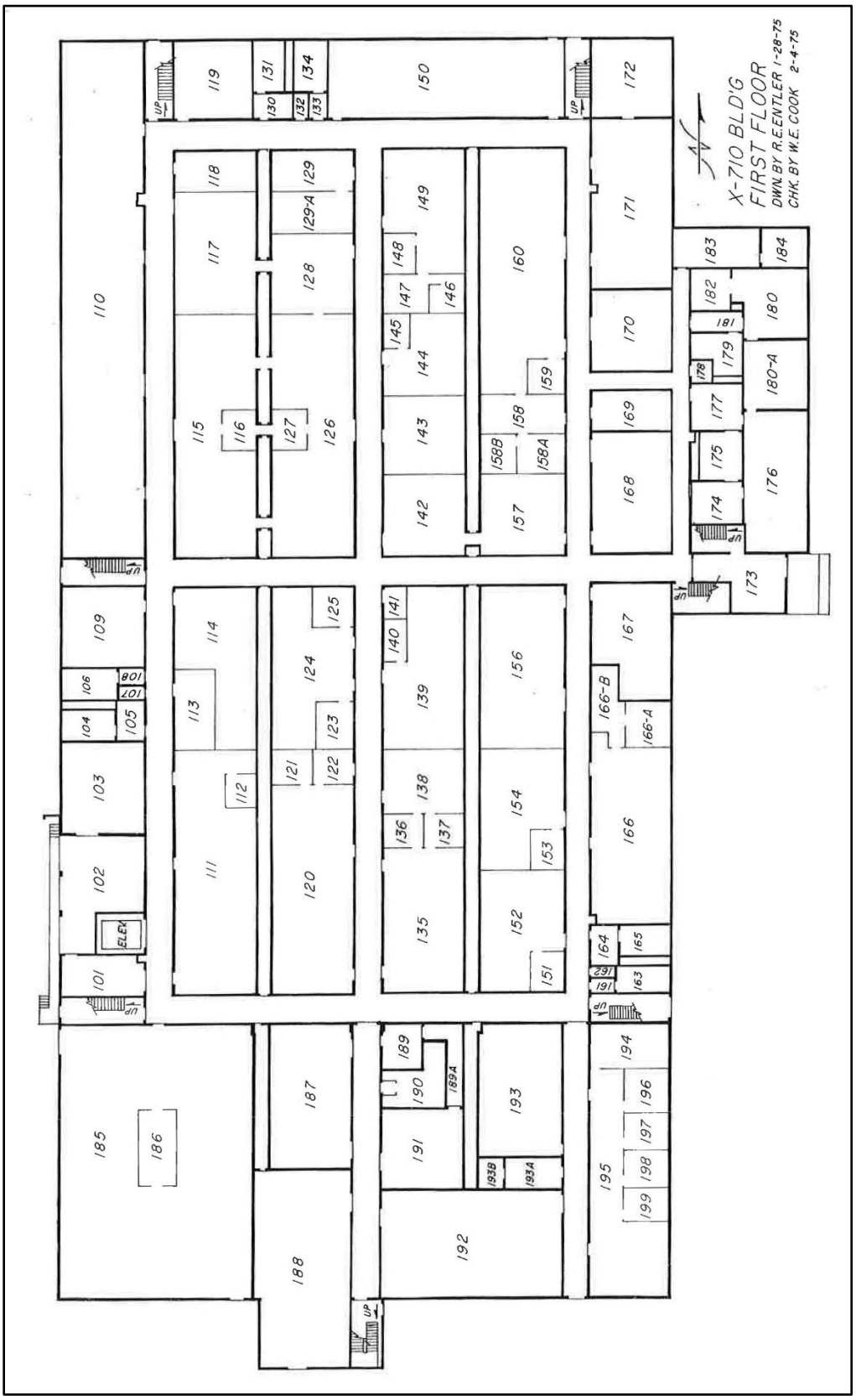

Figure B-1. First Floor Layout of the X-710 Technical Service Building, Circa 1975

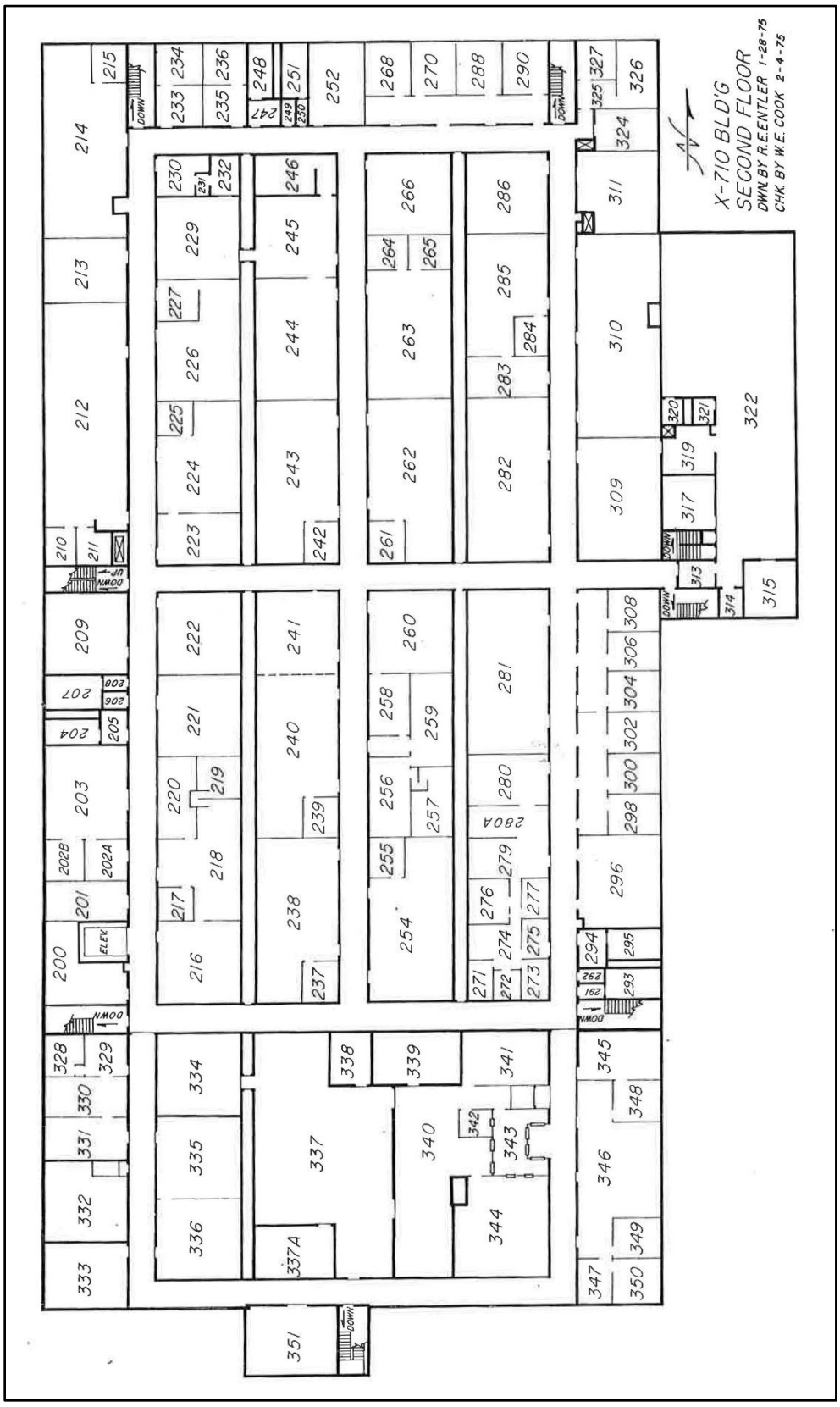

Figure B-2. Second Floor Layout of the X-710 Technical Service Building, Circa 1975

APPENDIX C. 2013 FLOOR PLANS OF THE X-710 TECHNICAL SERVICE BUILDING

This page is intentionally left blank.

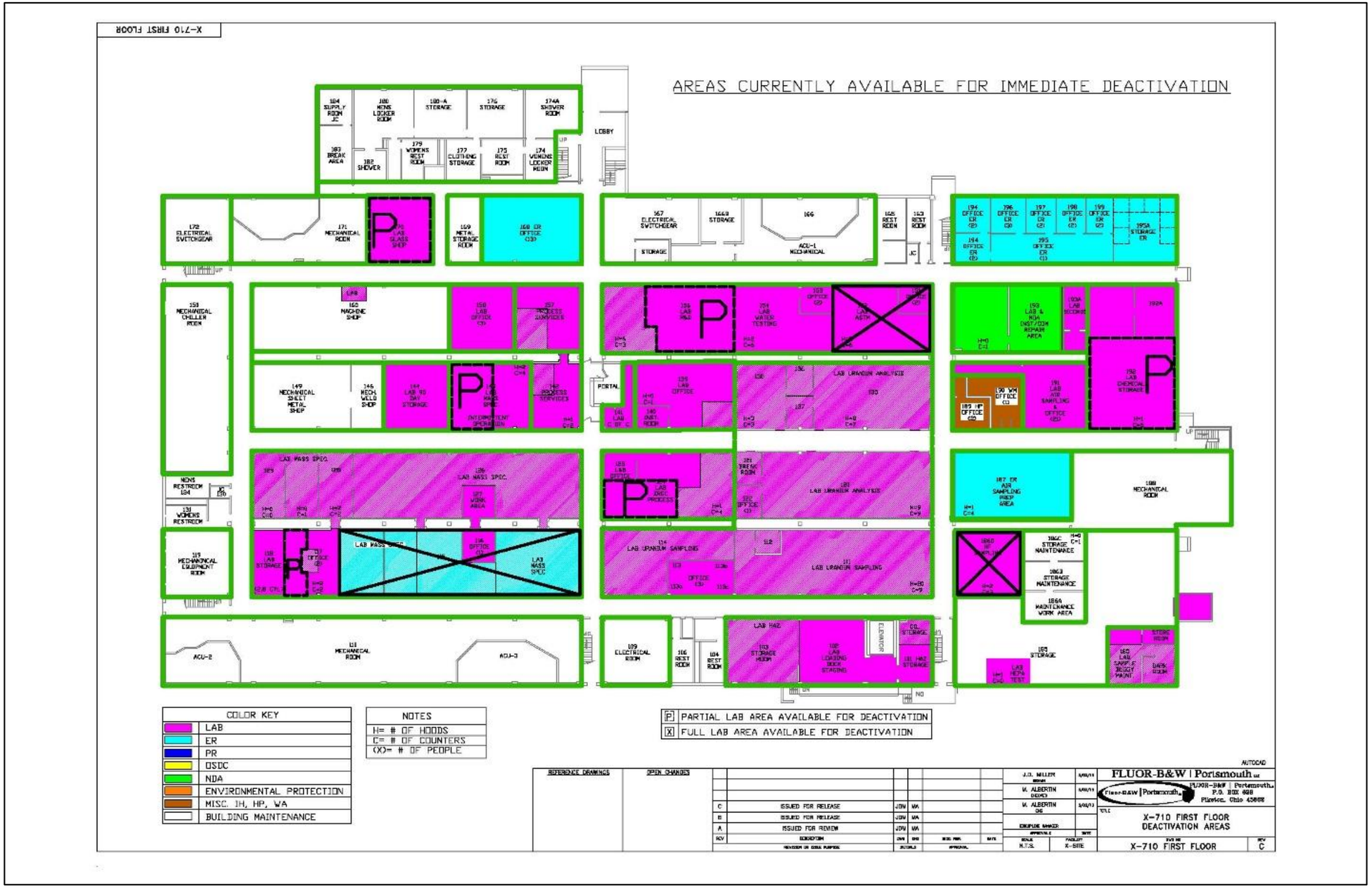

Figure C-1. First Floor Layout of the X-710 Technical Service Building, Circa 2013

Figure C-2. Second Floor Layout of the X-710 Technical Service Building, Circa 2013