2015 Annual Inspection and Radiological Survey Results for the Piqua, Ohio, Decommissioned Reactor Site

Summary

The former Piqua Nuclear Power Facility (PNPF), a decommissioned nuclear power demonstration facility, was inspected on April 22, 2015. The site, located on the east bank of the Great Miami River in Piqua, Ohio, was in good physical condition. There is no requirement for a follow-up inspection.

The site consists of a reactor containment building and an associated auxiliary building that are both used by the City of Piqua as storage space, shops, and offices. The Piqua Underground Utility Department (approximately 10 people) occupies the facility.

Deterioration in the lower portions of the interior of the containment building is unchanged from last year's inspection (e.g. peeling lead-based paint, plaster falling off the walls in some areas, and worn pipe insulation). The cathodic protection system and the high water alarm systems were checked and found to be in good operating condition.

An annual radiological survey was conducted during the annual inspection. Survey results from 104 locations revealed no removable contamination. Three direct readings (1 beta and 2 alpha) exceeded the minimum detectable activity (MDA):

- The floor drain at the 56-foot level (1,140 dpm/100 cm^2 beta),
- An air duct at the 83-foot level (96 dpm/100cm^2 alpha), and
- The floor under a flange on the 100-foot level (216 dpm/100 cm^2 alpha)

Beta activity has been detected in the past in the floor drain at the 56-foot level. All three readings were well below the action level for alpha/beta of 5,000 dpm/100 cm^2.

1.0 Introduction

This report presents the findings of the annual U.S. Department of Energy (DOE) inspection of the Piqua Nuclear Power Facility (PNPF) in Piqua, Ohio. This facility is assigned to the DOE Office of Legacy Management (LM) for long-term custody and care.

M. Miller (Chief Inspector), K. Broberg, (Assistant Inspector), R. Mowen and L. Oeffner (Radiological Technicians), all of Stoller Newport News Nuclear (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc., the contractor for DOE LM, conducted the inspection on April 22, 2015.

Mr. Shane Johnson, Supervisor for the Piqua Underground Utility Department met with inspectors during the inspection. A copy of this report will be forwarded to Mr. Johnson.

Four employees with the Ohio Department of Health also attended the inspection/survey to gain additional information on the facility: E. Denison, S. Dettmer, P. Hintz, and J. Boley.

The purpose of the inspection was to confirm the integrity of the visible features at the facility and to determine if radiological or non-radiological hazards were present.

2.0 Inspection Results

Features discussed in this report are shown on the attached drawings. Photographs to support specific observations are identified in the text and on the drawings by photograph location (PL) numbers.

Exterior
The Containment Building exterior was refurbished around 1995. The exterior surface of the reactor containment building was in good condition (PL-1).

Surrounding Area
A visual inspection was made of the area surrounding the facility. No changes that could impact the integrity of the facility were observed. It should be noted that in 2012 a new property survey was conducted at the site and a new survey plat of the property boundaries was produced for FIMS purposes.

Interior
Inspectors looked for evidence of structural deterioration and entombment degradation. Concerns noted in previous inspections remain unchanged (i.e., peeling lead based paint, falling plaster, and deteriorating pipe insulation).

56 foot level: The 56-foot level is the lowest level of the facility. The level is currently empty. The condition of peeling paint on the interior walls of the containment building remains unchanged from the 2014 inspection. Peeling paint (that is falling onto the floors) was analyzed in 2006 and found to contain 0.35 percent lead. The paint will probably continue to peel and fall to the floor. Inspectors are not exposed to unacceptable risk when performing routine inspection activities. Piqua personnel are aware of the presence of the lead-based paint.

A spiral staircase is present in the containment structure. Plaster is falling off the walls of the staircase enclosure. This damage has been noted in previous inspection reports.

79 foot level: Interior conditions noted in previous inspections (e.g. broken plaster, peeling paint, and water damage) are unchanged. In 2013 the City of Piqua cleaned out several of the rooms on this level and they are now being used for storage.

Evidence for water seeping along the ceiling seam of the OAP room remains unchanged from previous inspections (peeling paint and rust stains). This room is located directly above Room B-1. Evidence for water seeping from the ceiling seam of Room B-1 also remains unchanged from previous inspections. The southwest wall of both rooms is the curved wall of the containment structure. Both rooms show evidence for water seeping along the same wall of the containment building. The condition is noted on the 79-foot level inspection map and will continue to be monitored in future inspections.

Fresh moisture was present in the room next to B-1. The fresh moisture was noted on the site inspection map last year (PL-2). The cause for this moisture is believed to be a crack along the outer wall of the containment structure. It is recommended that this crack be filled in to prevent further moisture from seeping into the structure.

100 foot level: During the 2010 inspection, the roof above Room 125 had ponded water and was not properly draining; water was observed on the floor of Room 125, and the outside corner of the room was damaged. Room 125 is accessed off the loading dock. It is no longer used by Piqua personnel. Piqua personnel repaired the outside corner of the room and corrected the roof drainage problem above the room in 2011. The roof appears to be draining properly and no water was observed on the floor of Room 125 during this year's inspection. The outer corner of the roof appears to be in approximately the same condition as it was in 2014. Inspectors will continue to watch the outer corner to determine if the deterioration is progressing.

Inspectors noted in 2014 that the extreme cold of the winter appeared to have an impact on the platform that is located between the Auxiliary building and the containment structure (PL-3). It is recommended that the platform be examined, and a determination made as to how it is attached to the containment dome structure. If collapse of the platform could damage the wall of the containment dome, it is recommended that the platform be reinforced so that it does not collapse.

It was noted during this year's inspection that there were several areas with exposed electric wires on the outside of the facility (PL-4 through PL-10). It is recommended that Piqua personnel properly secure these exposed wires. If the wires have been properly isolated from energy sources, and are no longer energized, they need to be labeled as such.

It was noted in this year's inspection that the concrete around the south west air lock is in poor condition. Numerous cracks were present and some small pieces of concrete are falling off (PL-11 and PL-12). It is recommended that Piqua personnel make concrete repairs to this airlock.

Roof Top: Inspectors this year found that several roof issues from the previous year have not been addressed. Specifically, several of the roofing fabric seams are beginning to separate (PL-13). Inspectors also noted that several of the roof drains continue to be partially plugged with material and plant growth causing water to pond on the roof fabric and not properly drain (PL-14, PL-15, and PL-16). Inspectors this year also found one small hole in the roofing fabric (PL-17). It is recommended that the City of Piqua address these roof concerns before they develop into larger issues.

2.1 Cathodic Protection System

A cathodic protection system is installed on the Containment Building to protect the steel shell. The system consists of 10 carbon (graphite) electrodes, buried radially approximately 10 feet to 20 feet from the building foundation, and a rectifier unit that provides DC current. The rectifier unit is mounted in the break room south of and outside the airlock on the 100-foot level. Each carbon electrode is 3 inches in diameter and 60 inches long. The electrodes are connected to the rectifier unit by a header cable; splices are protected in flush-mounted boxes. A structure contact point for monitoring potential can be found on the shell associated with each electrode; some of the contact points also have cables remaining from an abandoned zinc anode protection system. The system also includes reference electrodes and test holes.

Maintenance of the cathodic protection system is specifically addressed in Contract AT(11–1)–1798, dated May 10, 1968, between the U.S. Atomic Energy Commission and the City of Piqua. The City agrees to maintain the system in an operational condition as long as required to preserve the integrity of the entombment until radiological decay renders the contents safe, estimated to be approximately 100 years. Maintenance requirements are not specified but

include monthly inspections of the rectifier unit, recording the current and voltage output, and periodic (estimated to be every five years) inspections of the entire system by a qualified service provider. Operating and maintenance costs are borne by the City.

The entire system was checked by a qualified service provider in April 2010, resulting in the replacement of one of the header cables. According to the maintenance log kept with the unit, the system is being checked by plant personnel.

2.2 High Water Alarm System

An alarm system is installed in the sump on the 56-foot level to detect high water levels before they rise to the bottom of the pressure vessel (PL-18). This system is designed to prevent immersion and accelerated corrosion of the pressure vessel. The alarm triggers when the sump fills to near overflow, alerting personnel to both high water and possible sump pump failure. The alarm registers in the auxiliary building on the Supervisory Control and Data Acquisition system, which is monitored 24 hours a day by an operator. The alarm system is included in the monthly building inspection. The reactor sump alarm test log indicates that the alarm is being tested monthly.

2.3 Radiological Survey

SN3 staff performed the annual radiological survey on the interior of the reactor containment building, auxiliary building, and exterior areas. A total of 104 sample locations were checked for both removable and surface contamination using direct measurements and smears for the detection of alpha and beta-gamma activity. Gamma exposure rates also were measured. Prior to 2008, 111 sample locations were surveyed. Locations 1-5 were removed from the survey in 2008 because the HVAC equipment being sampled was removed. Locations 60 and 61 (located in Room B-6 on the 79-foot level) could not be sampled because the room was locked.

In 2009, Rooms R-6 and R-7 on the 100-foot level were modified by the City of Piqua. Modifications included the elimination of a connecting air duct between the two rooms. Smear sample #46 was collected from this air duct prior to 2009. Survey location #46 is now located on the floor of Room R-7 in front of the former air duct.

Table 1 presents information on the instrumentation used to perform the survey. General area gamma exposure rates measured throughout the facility ranged from 4.3 to 11.6 μrem/hr. All gamma readings were less than or equal to background.

Table 1. Instrumentation for Radiological Survey

Type of Measurement	Radiation	Detector	Meter	Background	Correction Factor	Minimum Detectable Activity
Surface Activity	Alpha	Ludlum 43-89 #5785	Ludlum 2360 #5751	0.0 cpm/100 cm²	8 alpha	34 dpm/ 100 cm²
Surface Activity	Beta	Ludlum 43-89 #5785	Ludlum 2360 #5751	130 cpm/100 cm²	4 beta	352 dpm/ 100 cm²
Exposure Rate	Gamma	N/A	Eberline FH40 GL #016191	12.2 μrem/hr	N/A	1 μrem/hr
Removable Activity	Alpha	N/A	Ludlum 3030/ #5899	1.0 cpm	Efficiency 40.7%	6.7 dpm/ 100 cm²
Removable Activity	Beta	N/A	Ludlum 3030/ #5899	32.0 cpm	Efficiency 30.9%	91.2 dpm/ 100 cm²

Key: cpm = counts per minute; dpm = disintegrations per minute; cm^2 = square centimeters; μrem/hr = microrem per hour

Table 2 presents direct surface and removable activity results. Direct surface measurement results indicate that there were three locations with direct readings that exceeded the minimum detectable activity (MDA):

- Direct Reading Location 16: The floor drain at the 56-foot level (1,140 dpm/100 cm^2 beta),
- Direct Reading Location 31: An air duct at the 83-foot level (96 dpm/100cm^2 alpha), and
- Direct Reading Location 108: The floor under a flange on the 100 foot level (216 dpm/100 cm^2 alpha).

The smears from all three locations indicated that no removable activity was present. All other direct measurements were below the MDA.

No removable contamination was found at any of the 104 sampling points. Attached are the survey maps that indicate the location of each direct measurement and smear sample. The maps also indicate the results of the gamma exposure rate survey conducted at PNPF.

Table 2. Results of the 2015 Radiological Survey at the Piqua, Ohio, Decommissioned Reactor Site

Location/ Building	Elevation[a]	Direct/ Smear #	Direct Reading Activity dpm/100 cm^2 Alpha / Beta		Removable Activity dpm/100 cm^2 Alpha / Beta		Remarks
Outside	111 ft.	1	NA	NA	NA	NA	HVAC Equip. Removed
Outside	111 ft.	2	NA	NA	NA	NA	HVAC Equip. Removed
Outside	111 ft.	3	NA	NA	NA	NA	HVAC Equip. Removed
Outside	111 ft.	4	NA	NA	NA	NA	HVAC Equip. Removed
Outside	111 ft.	5	NA	NA	NA	NA	HVAC Equip. Removed
Outside	111 ft.	6	<MDA	<MDA	<MDA	<MDA	On concrete platform
Outside	111 ft.	7	<MDA	<MDA	<MDA	<MDA	On concrete platform
Outside	111 ft.	8	<MDA	<MDA	<MDA	<MDA	On concrete platform
Outside	100 ft.	9	<MDA	<MDA	<MDA	<MDA	On concrete platform
Containment	56 ft.	10	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	11	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	12	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	13	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	14	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	15	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	**16**	<MDA	**1,140**	<MDA	<MDA	In drain
Containment	56 ft.	17	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	18	<MDA	<MDA	<MDA	<MDA	On pedestal
Containment	56 ft.	19	<MDA	<MDA	<MDA	<MDA	On drain
Containment	56 ft.	20	<MDA	<MDA	<MDA	<MDA	On sump grating
Containment	56 ft.	21	<MDA	<MDA	<MDA	<MDA	On vent by stairwell
Containment	56 ft.	22	<MDA	<MDA	<MDA	<MDA	On drain
Containment	56 ft.	23	<MDA	<MDA	<MDA	<MDA	On drain
Containment	79 ft.	24	<MDA	<MDA	<MDA	<MDA	Floor
Containment	79 ft.	25	<MDA	<MDA	<MDA	<MDA	Floor
Containment	79 ft.	26	<MDA	<MDA	<MDA	<MDA	Floor
Containment	79 ft.	27	<MDA	<MDA	<MDA	<MDA	Floor
Containment	83 ft.	28	<MDA	<MDA	<MDA	<MDA	On top of HVAC duct
Containment	83 ft.	29	<MDA	<MDA	<MDA	<MDA	Grating on platform
Containment	83 ft.	30	<MDA	<MDA	<MDA	<MDA	Pipe adjacent to plenum
Containment	83 ft.	**31**	**96**	<MDA	<MDA	<MDA	In duct
Containment	83 ft.	32	<MDA	<MDA	<MDA	<MDA	Floor grating
Containment	83 ft.	33	<MDA	<MDA	<MDA	<MDA	Pump pedestal
Containment	83 ft.	34	<MDA	<MDA	<MDA	<MDA	In drain
Containment	83 ft.	35	<MDA	<MDA	<MDA	<MDA	In drain
Containment	83 ft.	36	<MDA	<MDA	<MDA	<MDA	Pump pedestal
Containment	83 ft.	37	<MDA	<MDA	<MDA	<MDA	Stairwell
Containment	100 ft.	38	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	39	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	40	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	41	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	42	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	43	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	44	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	45	<MDA	<MDA	<MDA	<MDA	On drain
Containment	100 ft.	46	<MDA	<MDA	<MDA	<MDA	On floor of Room R-7
Containment	111 ft.	47	<MDA	<MDA	<MDA	<MDA	Floor
Containment	111 ft.	48	<MDA	<MDA	<MDA	<MDA	Floor
Containment	111 ft.	49	<MDA	<MDA	<MDA	<MDA	Floor
Containment	100 ft.	50	<MDA	<MDA	<MDA	<MDA	Airlock floor
Aux. Bldg.	79 ft.	51	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	52	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	53	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	54	<MDA	<MDA	<MDA	<MDA	On drain
Aux. Bldg.	79 ft.	55	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	56	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	57	<MDA	<MDA	<MDA	<MDA	Floor

Table 2 (continued). Results of the 2015 Radiological Survey at the Piqua, Ohio, Decommissioned Reactor Site

Location/ Building	Elevation[a]	Direct/ Smear #	Direct Reading Activity dpm/100 cm^2 Alpha / Beta		Removable Activity dpm/100 cm^2 Alpha / Beta		Remarks
Aux. Bldg.	79 ft.	58	<MDA	<MDA	<MDA	<MDA	On drain
Aux. Bldg.	79 ft.	59	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	60	NA	NA	NA	NA	Floor
Aux. Bldg.	79 ft.	61	NA	NA	NA	NA	On drain
Aux. Bldg.	79 ft.	62	<MDA	<MDA	<MDA	<MDA	On sump cover
Aux. Bldg.	79 ft.	63	<MDA	<MDA	<MDA	<MDA	Pump
Aux. Bldg.	79 ft.	64	<MDA	<MDA	<MDA	<MDA	Floor under tank
Aux. Bldg.	79 ft.	65	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	66	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	67	<MDA	<MDA	<MDA	<MDA	Inside HVAC on floor
Aux. Bldg.	79 ft.	68	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	89 ft.	69	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	121 ft.	70	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	121 ft.	71	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	121 ft.	72	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	121 ft.	73	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	121 ft.	74	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	121 ft.	75	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	111 ft.	76	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	111 ft.	77	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	111 ft.	78	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	111 ft.	79	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	111 ft.	80	<MDA	<MDA	<MDA	<MDA	On vent duct
Aux. Bldg.	111 ft.	81	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	82	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	83	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	84	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	85	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	86	<MDA	<MDA	<MDA	<MDA	On floor drain
Aux. Bldg.	100 ft.	87	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	88	<MDA	<MDA	<MDA	<MDA	On floor drain
Aux. Bldg.	100 ft.	89	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	90	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	91	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	92	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	93	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	94	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	95	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	96	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	97	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	98	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	99	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	100	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	101	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	102	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	100 ft.	103	<MDA	<MDA	<MDA	<MDA	Floor
Containment	56 ft.	104	<MDA	<MDA	<MDA	<MDA	On drain
Containment	100 ft.	105	<MDA	<MDA	<MDA	<MDA	On drain
Outside	100 ft.	106	<MDA	<MDA	<MDA	<MDA	Concrete floor
Outside	100 ft.	107	<MDA	<MDA	<MDA	<MDA	Concrete wall
Outside	100 ft.	**108**	**216**	<MDA	<MDA	<MDA	Floor under flange
Outside	100 ft.	109	<MDA	<MDA	<MDA	<MDA	Concrete floor
Outside	100 ft.	110	<MDA	<MDA	<MDA	<MDA	Concrete floor
Containment	79 ft.	111	<MDA	<MDA	<MDA	<MDA	In HVAC duct

[a] Elevations are designated as feet above the lowest floor of the original plant.
key: dpm = disintegrations per minute; cm^2 = centimeters squared; MDA = minimum detectable activity; NA = not applicable or not accessible, < = less than

3.0 Recommendations

1) Fresh moisture was noted on the wall, outside of Room B-1 on the 79-foot level. The cause for this moisture is believed to be a crack along the outer wall of the containment structure.

   Recommendation: It is recommended that the crack on the outer wall be sealed to prevent further moisture from seeping into the structure.

2) Inspectors noted that the extreme cold of the past winter appears to have had an impact on a platform that is located between the Auxiliary building and the containment structure.

   Recommendation: It is recommended that the platform be examined, and a determination made as to how it is attached to the containment dome structure. If collapse of the platform could damage the wall of the containment dome, it is recommended that the platform be reinforced so that it does not collapse.

3) It was noted during this year's inspection that there were several areas with exposed electric wires on the outside of the facility. If the wires have been properly isolated from energy sources, and are no longer energized, they need to be labeled as such.

   Recommendation: It is recommended that Piqua personnel properly address these exposed wires.

4) It was noted in this year's inspection that the concrete around the south west air lock is in bad condition. Numerous cracks were present and some small pieces of concrete are falling off.

5) Recommendation: It is recommended that Piqua personnel make concrete repairs to this airlock.

6) Inspectors this year found that several roof issues from the previous year had not been addressed. Specifically, several of the roofing fabric seams are beginning to separate, roof drains continue to be partially plugged with material and plant growth causing water to pond on the roof fabric and not properly drain, and one small hole was observed in the roof fabric.

   Recommendation: It is recommended that the City of Piqua address these roof issues.

4.0 Photographs

Photograph Location Number	Azimuth	Elevation Level	Photograph Description
PL–1	180	100	Containment dome.
PL–2	225	79	Fresh active staining in corner.
PL–3	140	100	Separation between deck and containment dome.
PL–4	135	100	Broken conduit below deck.
PL–5	135	100	Broken conduit below deck.
PL–6	135	100	Broken conduit below deck.
PL-7	NA	100	Broken electrical conduit leading to outlet.
PL-8	NA	100	Broken electric box.
PL-9	Na	100	Broken electric conduit.
PL-10	NA	100	Exposed cable in ground.
PL-11	45	100	Concrete around southwest airlock.
PL-12	NA	100	Concrete around southwest airlock.
PL-13	NA	100	Roof fabric separating around vent.
PL-14	30	121	Water ponded on northeast corner of roof.
PL-15	135	121	Drain clogged with vegetation on roof.
PL-16	180	121	Roof fabric separating.
PL-17	NA	121	Small hole in roof fabric.
PL-18	NA	56	Floor sump.

PIQ 4/2015. PL–1. Containment dome.

PIQ 4/2015. PL–2. Fresh active staining in corner.

PIQ 4/2015. PL–3. Separation between deck and containment dome.

PIQ 4/2015. PL–4. Broken conduit below deck.

PIQ 4/2015. PL–5. Broken conduit below deck.

PIQ 4/2015. PL–6. Broken conduit below deck.

PIQ 4/2015. PL–7. Broken electrical conduit leading to outlet.

PIQ 4/2015. PL–8. Broken electric box.

PIQ 4/2015. PL–9. Broken electric conduit.

PIQ 4/2015. PL–10. Exposed cable in ground.

PIQ 4/2015. PL–11. Concrete around southwest airlock.

PIQ 4/2015. PL–12. Concrete around southwest airlock.

PIQ 4/2015. PL–13. Roof fabric separating around vent.

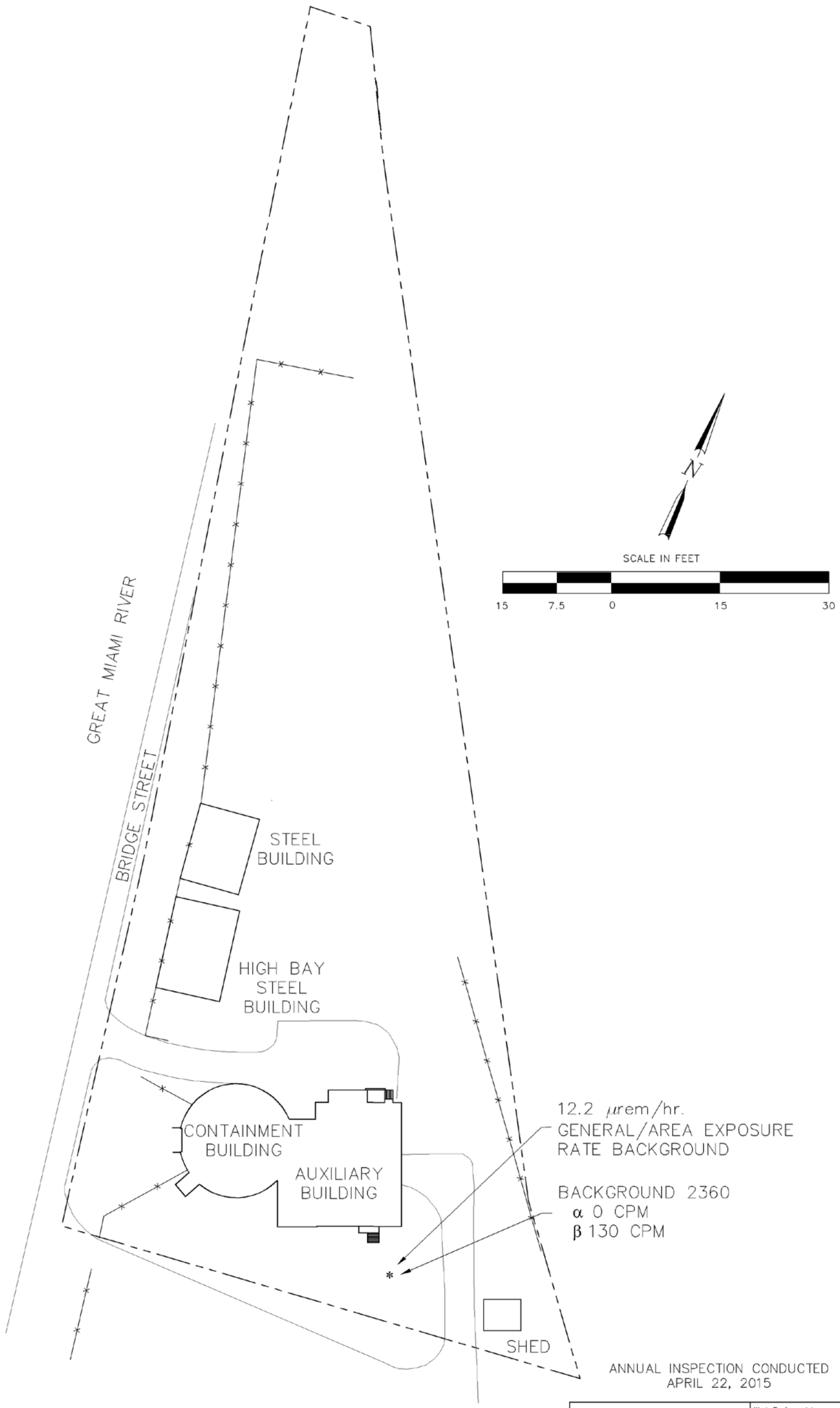
PIQ 4/2015. PL–14. Water ponded on northeast corner of roof.

PIQ 4/2015. PL–15. Drain clogged with vegetation on roof.

PIQ 4/2015. PL–16. Roof fabric separating.

PIQ 4/2015. PL–17. Small hole in roof fabric.

PIQ 4/2015. PL–18. Floor sump.



ANNUAL INSPECTION CONDUCTED
APRIL 22, 2015

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

Work Performed by
SNI Stoller Newport News Nuclear
A Subsidiary of Huntington Ingalls Industries
Under DOE Contract No. DE-LM0000415

2015 ANNUAL RADIOLOGICAL SURVEY RESULTS
PIQUA DECOMMISSIONED REACTOR SITE
PIQUA, OHIO

DATE PREPARED:	FILENAME:
JUNE 1, 2015	S1239100

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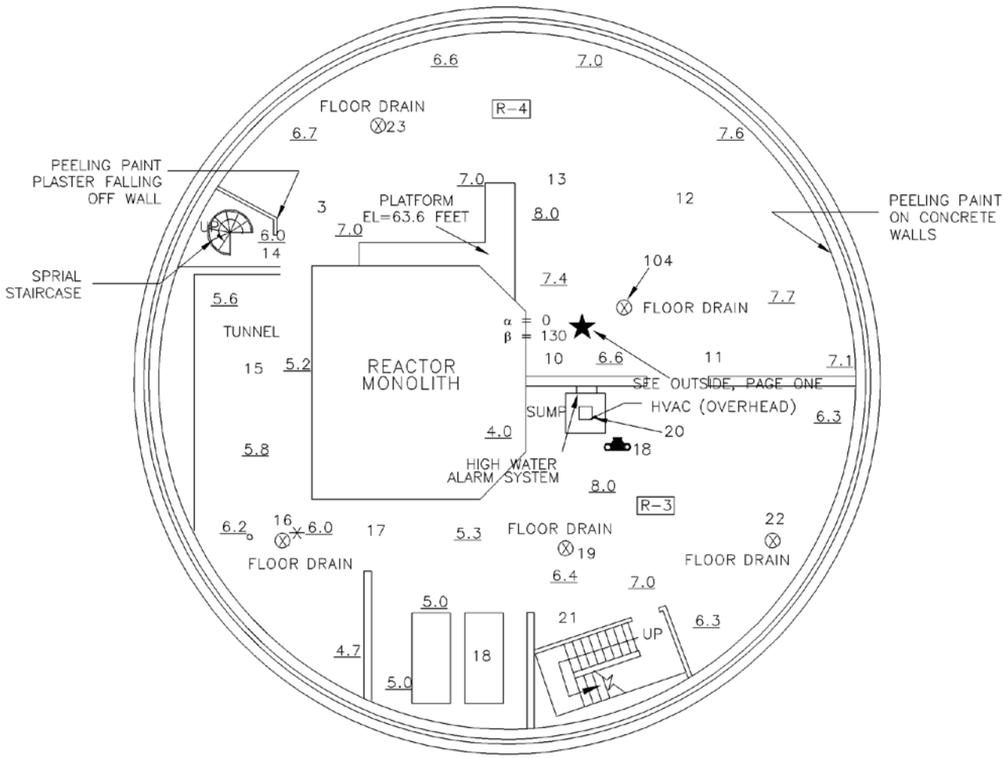
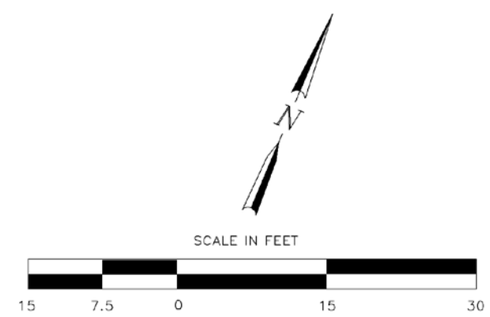


PLAN – 56 FOOT LEVEL

SMEAR/DIRECT LOCATIONS ON THE 56-FOOT LEVEL

10-FLOOR
11-FLOOR
12-FLOOR
13-FLOOR
14-FLOOR
15-FLOOR
16-IN DRAIN
17-FLOOR
18-ON PEDESTAL
19-ON DRAIN
20-SUMP GRATING
21-ON VENT BY STAIRWELL
22-ON DRAIN
23-ON DRAIN
104-ON DRAIN



INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	016191
CAL. DUE	3-30-16	3-25-2016	3-25-2016
CORRECTION FACTORS	α 8 β 4	α EFF. 40.7% β EFF. 30.9%	N/A
BACKGROUND	α 0 CPM β 130 CPM	α 1.0 CPM β 32.0 CPM	12.2 μrem/hr

KEY:

NO. = GENERAL AREA EXPOSURE RATE (μrem/hr)

*NO. = CONTACT EXPOSURE RATE (μrem/hr)

NO. = SMEAR/DIRECT LOCATION

R-4 = ROOM NUMBER

SURVEYED BY: ROY L. MOWEN DATE: 4/22/15

REVIEWED BY: DATE:

★ = BACKGROUND DETERMINATION LOCATION OUTSIDE
2360 α = 0 cpm
β = 130 cpm

1 PHOTO LOCATION, ROTATION, AND NUMBER

NOTE: ALL 2015 GAMMA READINGS WERE ≤ BKGD ON THIS LEVEL.

ANNUAL INSPECTION CONDUCTED
APRIL 22, 2015

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

Work Performed by SNC Stoller Newport News Nuclear
Under DOE Contract No. DE-LM0000415

2015 ANNUAL RADIOLOGICAL SURVEY RESULTS
PIQUA DECOMMISSIONED REACTOR SITE
PIQUA, OHIO

DATE PREPARED: JUNE 1, 2015

FILENAME: S1239100

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SMEAR/DIRECT LOCATIONS ON THE
79–FOOT LEVEL IN CONTAINMENT STRUCTURE

24–FLOOR
25–FLOOR
26–FLOOR
27–FLOOR
111–IN HVAC DUCT
74–FOOT LEVEL

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G–L
SERIAL #	5751/5785	5899	016191
CAL. DUE	3–30–16	3–25–2016	3–25–2016
CORRECTION FACTORS	α 8 β 4	α EFF. 40.7% β EFF. 30.9%	N/A
BACKGROUND	α 0 CPM β 130 CPM	α 1.0 CPM β 32.0 CPM	12.2 μrem/hr

KEY:

NO. =GENERAL AREA EXPOSURE RATE (μrem/hr)

⊗NO. =CONTACT EXPOSURE RATE (μrem/hr)

NO. =SMEAR/DIRECT LOCATION

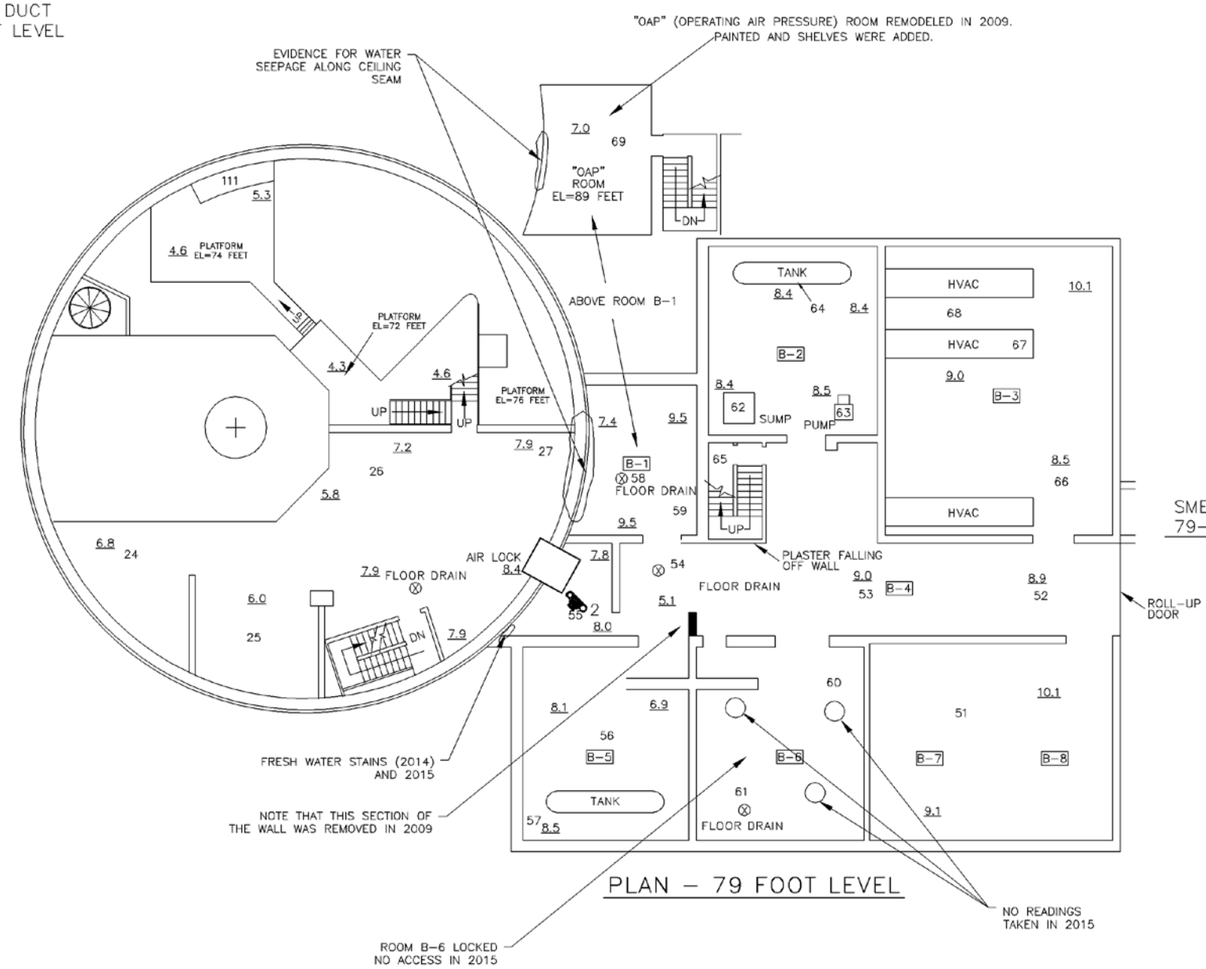
R–4 = ROOM NUMBER

SURVEYED BY: ROY L. MOWEN DATE: 4/22/15

REVIEWED BY: DATE:

PHOTO LOCATION, ROTATION, AND NUMBER

NOTE: ALL 2015 GAMMA READINGS ≤ BKGD ON THIS LEVEL



PLAN – 79 FOOT LEVEL

SMEAR/DIRECT LOCATIONS ON THE
79–FOOT LEVEL IN AUX. BLDG.

51–FLOOR
52–FLOOR
53–FLOOR
54–ON DRAIN
55–FLOOR
56–FLOOR
57–FLOOR
58–ON DRAIN
59–FLOOR
60–FLOOR
61–ON DRAIN
62–ON SUMP COVER
63–PUMP
64–FLOOR UNDER TANK
65–FLOOR
66–FLOOR
67–INSIDE HVAC ON FLOOR
68–FLOOR
69–FLOOR–89' LEVEL OAP ROOM

N

SCALE IN FEET

15 7.5 0 15 30

ANNUAL INSPECTION CONDUCTED
APRIL 22, 2015

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

Work Performed by SNR Stoller Newport News Nuclear
A Subsidiary of Huntington Ingalls Industries
Under DOE Contract No. DE–LM0000415

2015 ANNUAL RADIOLOGICAL SURVEY RESULTS
PIQUA DECOMMISSIONED REACTOR SITE
PIQUA, OHIO

DATE PREPARED: JUNE 1, 2015

FILENAME: S1239100

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SMEAR/DIRECT LOCATIONS ON THE 83-FOOT LEVEL

28-ON TOP OF HVAC UNIT
29-GRATING ON PLAT FORM
30-PIPE ADJACENT TO PLENUM
31-IN DUCT
32-FLOOR GRATING
33-PUMP PEDESTAL
34-IN DRAIN
35-IN DRAIN
36-PUMP PEDESTAL
37-STAIRWELL

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	016191
CAL. DUE	3-30-16	3-25-2016	3-25-2016
CORRECTION FACTORS	α 8 β 4	α EFF. 40.7% β EFF. 30.9%	N/A
BACKGROUND	α 0 CPM β 130 CPM	α 1.0 CPM β 32.0 CPM	12.2 μrem/hr

KEY:

NO. =GENERAL AREA EXPOSURE RATE (μrem/hr)

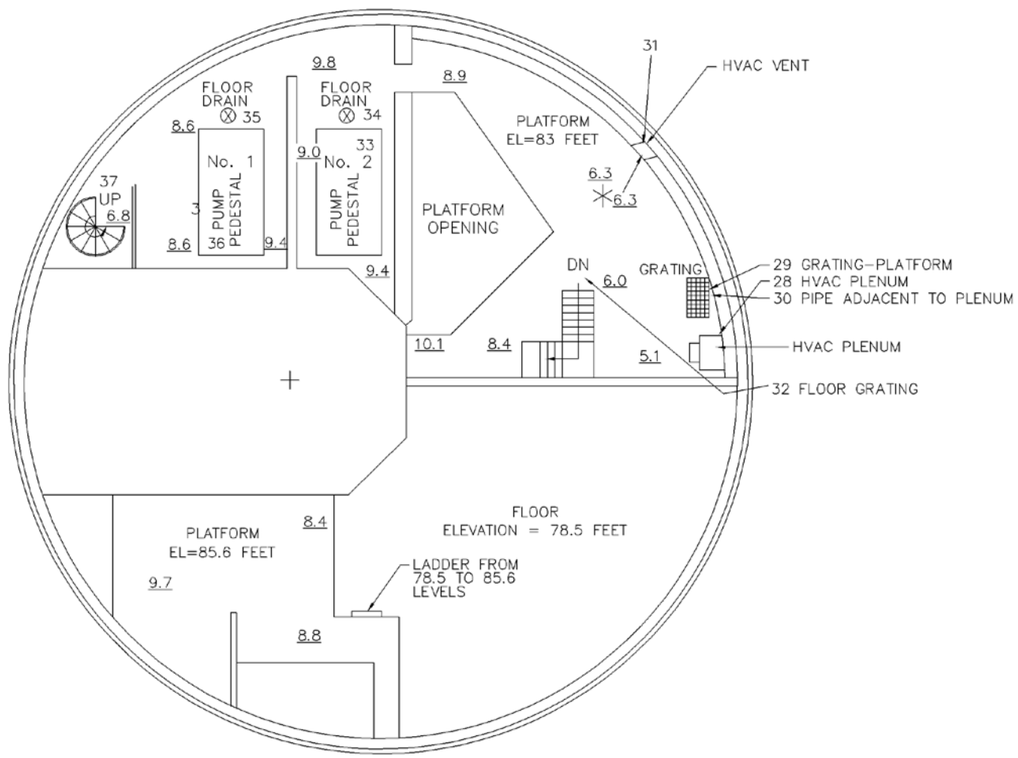
✳NO. =CONTACT EXPOSURE RATE (μrem/hr)

NO. =SMEAR/DIRECT LOCATION

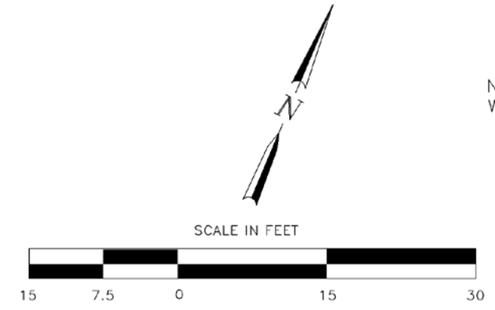
R-4 = ROOM NUMBER

SURVEYED BY: ROY L. MOWEN DATE: 4/22/15

REVIEWED BY: DATE:



PLAN – 83 FOOT LEVEL



NOTE: ALL 2015 GAMMA READINGS WERE ≤ BKGD. ON THIS LEVEL

ANNUAL INSPECTION CONDUCTED APRIL 22, 2015

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

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PIQUA, OHIO

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SMEAR/DIRECT LOCATIONS ON THE
100-FOOT LEVEL IN CONTAINMENT STRUCTURE

38-FLOOR
39-FLOOR
40-FLOOR
41-FLOOR
42-FLOOR
43-FLOOR
44-FLOOR
45-ON DRAIN
46-ON DRAIN
50-AIRLOCK FLOOR
105-ON DRAIN

SMEAR/DIRECT LOCATIONS OUTSIDE

106-CONCRETE FLOOR
107-CONCRETE WALL
108-FLOOR UNDER FLANGE
109-CONCRETE FLOOR
110-CONCRETE FLOOR

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	016191
CAL. DUE	3-30-16	3-25-2016	3-25-2016
CORRECTION FACTORS	α 8 β 4	α EFF. 40.7% β EFF. 30.9%	N/A
BACKGROUND	α 0 CPM β 130 CPM	α 1.0 CPM β 32.0 CPM	12.2 μrem/hr

KEY:

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NO. =CONTACT EXPOSURE RATE (μrem/hr)

NO. =SMEAR/DIRECT LOCATION

R-4 = ROOM NUMBER

SURVEYED BY: ROY L. MOWEN DATE: 4/22/15

REVIEWED BY: DATE:

ROOMS R-6 AND R-7 WERE REMODELED IN 2009. WALLS WERE PAINTED, SHELVES ADDED, AND THE AIR DUCT BETWEEN THE TWO ROOMS WAS REMOVED.

NOTE: ALL 2015 GAMMA READINGS WERE ≤ BKGD ON THIS LEVEL

NEW EPOXY FLOORS INSTALLED IN ROOMS 115 AND 121-A IN 2009.

NEW A/C UNIT INSTALLED IN ROOM 121-A IN 2009.

EXPLANATION

GRAPHITE ANODES

PHOTO LOCATION, ROTATION, AND NUMBER

SCALE IN FEET

15 7.5 0 15 30

SMEAR/DIRECT LOCATIONS ON THE
100-FOOT LEVEL IN AUX. BLDG.

82-FLOOR
83-FLOOR
84-FLOOR
85-FLOOR
86-ON FLOOR DRAIN
87-FLOOR
88-ON FLOOR DRAIN
89-FLOOR
90-FLOOR
91-FLOOR
92-FLOOR
93-FLOOR
94-FLOOR
95-FLOOR
96-FLOOR
97-FLOOR
98-FLOOR
99-FLOOR
100-FLOOR
101-FLOOR
102-FLOOR
103-FLOOR

PLAN – 100 FOOT LEVEL

ANNUAL INSPECTION CONDUCTED
APRIL 22, 2015

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GRAND JUNCTION, COLORADO

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2015 ANNUAL RADIOLOGICAL SURVEY RESULTS
PIQUA DECOMMISSIONED REACTOR SITE
PIQUA, OHIO

DATE PREPARED: JUNE 1, 2015

FILENAME: S1239100

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SMEAR/DIRECT LOCATIONS ON THE 111-FOOT LEVEL IN CONTAINMENT STRUCTURE

47-FLOOR
48-FLOOR
49-FLOOR

SMEAR/DIRECT LOCATIONS ON THE 111-FOOT LEVEL IN THE AUX. BLDG.

76-FLOOR
77-FLOOR
78-FLOOR
79-FLOOR
80-ON VENT DUCT
81-FLOOR

SMEAR/DIRECT LOCATIONS ON THE OUTSIDE ON ROOF

6-ON CONCRETE PLATFORM
7-ON CONCRETE PLATFORM
8-ON CONCRETE PLATFORM

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	016191
CAL. DUE	3-30-16	3-25-2016	3-25-2016
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✳NO. =CONTACT EXPOSURE RATE (μrem/hr)

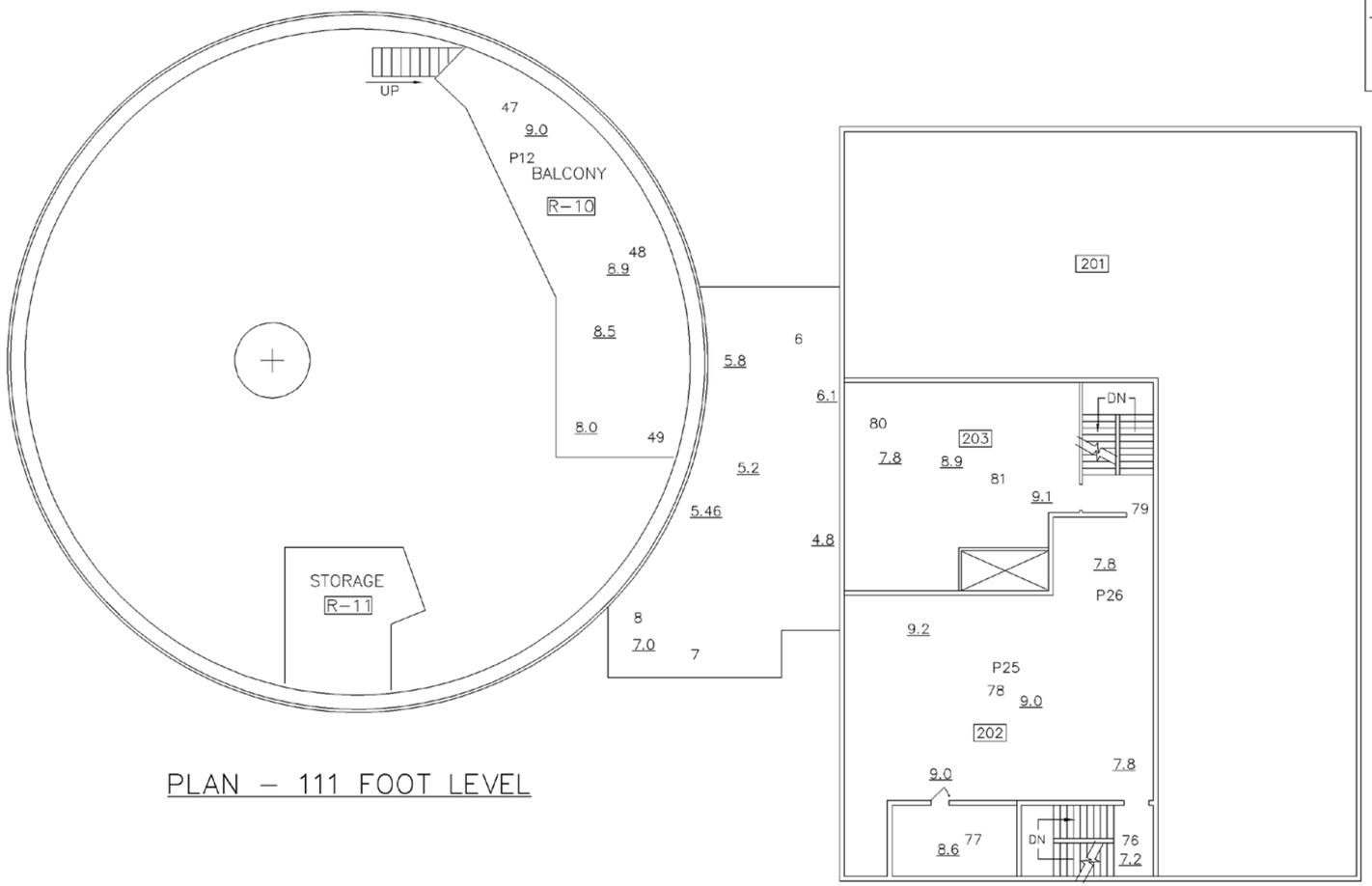
✳ NO. =SMEAR/DIRECT LOCATION

R-4 = ROOM NUMBER

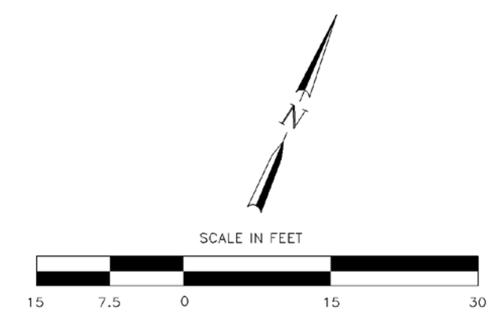
SURVEYED BY:	DATE:
ROY L. MOWEN	4/22/15
REVIEWED BY:	DATE:

NOTE: ALL 2015 GAMMA READINGS WERE ≤ BKGD ON THIS LEVEL

NOTE: SAMPLE 1-5 WERE DELETED BECAUSE HVAC EQUIPMENT HAS BEEN REMOVED FROM ROOF.



PLAN – 111 FOOT LEVEL



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PIQUA DECOMMISSIONED REACTOR SITE
PIQUA, OHIO

DATE PREPARED:	FILENAME:
JUNE 1, 2015	S1239100

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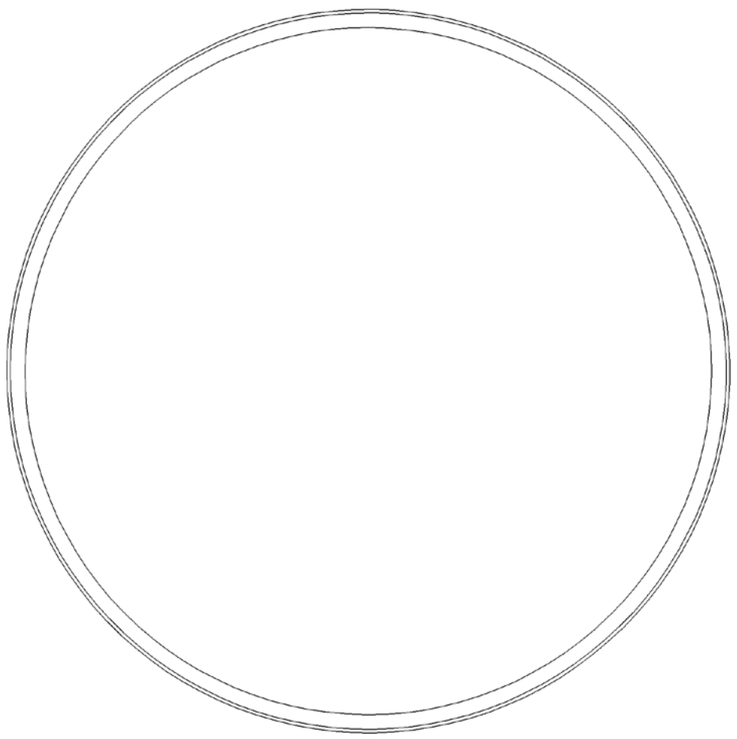
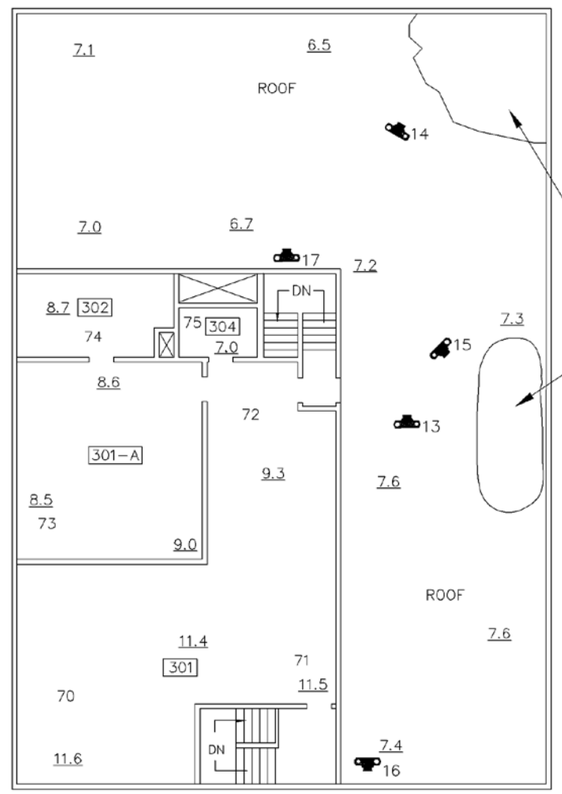
SMEAR/DIRECT LOCATIONS ON THE
121-FOOT LEVEL IN THE AUX. BLDG.

70-FLOOR
71-FLOOR
72-FLOOR
73-FLOOR
74-FLOOR
75-FLOOR



PLAN – 121 FOOT LEVEL



INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	016191
CAL. DUE	3-30-16	3-25-2016	3-25-2016
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R-4 = ROOM NUMBER

SURVEYED BY:	DATE:
ROY L. MOWEN	4/22/15
REVIEWED BY:	DATE:

1 PHOTO LOCATION, ROTATION, AND NUMBER

NOTE: ALL 2015 GAMMA READINGS WERE < BKGD ON THIS LEVEL.

PONDED WATER ON ROOF

N

SCALE IN FEET

15 7.5 0 15 30

ANNUAL INSPECTION CONDUCTED
APRIL 22, 2015

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PIQUA, OHIO

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