

# **2013 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 18, 2013. The site, located on the east bank of the Great Miami River in Piqua, Ohio, is 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. At the end of 2012, the Piqua Power Systems Department (PPS) moved out of the facility, and the Piqua Underground Utility Department moved in. Approximately 10 people now occupy the facility.

Deterioration in 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 observed to be in good operating condition.

An annual radiological survey was conducted during the annual inspection. Survey results from 106 locations revealed no removable contamination. Only one direct reading exceeded the minimum detectable activity (MDA): the floor drain at the 56 foot level (1,584 dpm/100 cm<sup>2</sup>). Beta activity has been detected in the past at the floor drain. The reading is well below the action level of 5,000 dpm/100 cm<sup>2</sup>.

## **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), and R. Mowen, (Radiological Technician), all of S.M. Stoller Corporation, the contractor for the DOE Office of Legacy Management, conducted the inspection on April 18, 2013.

Mr. Bowman, the Power Distribution Manager for the City of Piqua, was contacted at the start of and met with inspectors at the start of the inspection. Due to the department change at the facility, the point of contact for DOE will now be Mr. Todd Brandenburg. A copy of this report will be forwarded to Mr. Brandenburg.

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 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. It was previously used to store cable spools. With departure of the Piqua PPS group, the level was empty. The condition of peeling paint on the interior walls of the containment building remains unchanged from the 2012 inspection (PL-2). 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 (PL-3). Plaster is falling off the walls of the staircase enclosure and cable spools have rolled into the wall damaging the plaster at the entrance to the spiral staircase on the 56-foot level. This damage has been noted in previous inspection reports (PL-4).

79 foot level: Interior conditions noted in previous inspections (e.g. broken plaster, peeling paint and water damage) are unchanged.

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 site inspection map and will continue to be monitored in future inspections.

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 of the loading dock. It is no longer used by Piqua personnel and is kept locked. 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, but the floor was damp (PL-5).

## **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, but a few monthly entries were missing from the log. Piqua plant personnel were notified of the missing log entries. Subsequent information presented by the City of Piqua indicates that the system is being properly maintained.

## **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-6). 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, but some monthly entries were missing from the log. Piqua plant personnel were notified of the missing log entries. Subsequent information provided by Piqua personnel indicates that the sump is being properly maintained. Very little water was present in the base of the sump during the inspection.

## 2.3 Radiological Survey

S.M. Stoller staff performed the annual radiological survey on the interior of the reactor containment building, auxiliary building, and exterior areas (PL-7). A total of 106 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.

In 2009, Rooms R-6 and R-7 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.

The City prefers to keep the door to Room 125 on the 100 foot level locked. Inspectors need to get the door unlocked to get radiological location 109 and gamma readings from inside the room.

Table 1 presents information on the instrumentation used to perform the survey. General area gamma exposure rates measured throughout the facility ranged from 4.7 to 13.0  $\mu\text{rem/hr}$ . The highest gamma reading was 2.5  $\mu\text{rem/hr}$  > 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	1 cpm/100 cm <sup>2</sup>	8 alpha	34 dpm/100 cm <sup>2</sup>
Surface Activity	Beta	Ludlum 43-89 #5785	Ludlum 2360 #5751	110 cpm/100 cm <sup>2</sup>	4 beta	352 dpm/100 cm <sup>2</sup>
Exposure Rate	Gamma	N/A	Eberline FH40 GL #016191	10.5 $\mu\text{rem/hr}$	N/A	1 $\mu\text{rem/hr}$
Removable Activity	Alpha	N/A	Ludlum 3030/#5899	0.0 cpm	Efficiency 42.3%	7.0 dpm/100 cm <sup>2</sup>
Removable Activity	Beta	N/A	Ludlum 3030/#5899	36.0 cpm	Efficiency 36.0%	94 dpm/100 cm <sup>2</sup>

Key: cpm = counts per minute; dpm = disintegrations per minute; cm<sup>2</sup> = square centimeters;  $\mu\text{rem/hr}$  = microrem per hour

Table 2 presents direct surface and removable activity results. Direct surface measurement results indicate the floor drain at the lowest level of the containment building exhibited a direct beta activity of 1,584 disintegrations per minute per 100 square centimeters (dpm/100 cm<sup>2</sup>). The smear from this location indicated that no removable activity is present. This result is consistent with previous surveys. All other direct measurements were below the MDA.

No removable contamination was found at any of the 106 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 2013 Radiological Survey at the Piqua, Ohio, Decommissioned Reactor Site

Location/ Building	Elevation <sup>a</sup>	Direct/ Smear #	Direct Reading Activity dpm/100 cm <sup>2</sup> Alpha / Beta		Removable Activity dpm/100 cm <sup>2</sup> 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	1,584	<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	<MDA	<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

Table 2 (continued). Results of the 2013 Radiological Survey at the Piqua, Ohio, Decommissioned Reactor Site

Location/ Building	Elevation <sup>a</sup>	Direct/ Smear #	Direct Reading Activity dpm/100 cm <sup>2</sup> Alpha / Beta		Removable Activity dpm/100 cm <sup>2</sup> Alpha / Beta		Remarks
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
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	<MDA	<MDA	<MDA	<MDA	Floor
Aux. Bldg.	79 ft.	61	<MDA	<MDA	<MDA	<MDA	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	NA <sup>b</sup>	NA <sup>b</sup>	NA <sup>b</sup>	NA <sup>b</sup>	Water on floor
Aux. Bldg.	79 ft.	67	NA <sup>b</sup>	NA <sup>b</sup>	NA <sup>b</sup>	NA <sup>b</sup>	Water on floor
Aux. Bldg.	79 ft.	68	NA <sup>b</sup>	NA <sup>b</sup>	NA <sup>b</sup>	NA <sup>b</sup>	Water on 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

Table 2 (continued). Results of the 2013 Radiological Survey at the Piqua, Ohio, Decommissioned Reactor Site

Location/ Building	Elevation <sup>a</sup>	Direct/ Smear #	Direct Reading Activity dpm/100 cm <sup>2</sup> Alpha / Beta		Removable Activity dpm/100 cm <sup>2</sup> Alpha / Beta		Remarks
Outside	100 ft.	108	<MDA	<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

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

<sup>b</sup> No direct or removable readings taken due to standing water on the floor.

### 3.0 Recommendations

No recommendations to report.

### 4.0 Photographs

Photograph Location Number	Azimuth	Elevation	Photograph Description
PL-1	100	NA	Exterior of the Piqua containment building.
PL-2	60	56 foot level	Peeling paint on wall of 56 foot level.
PL-3	NA	56 foot level	Base of spiral staircase.
PL-4	260	56 foot level	Damaged wall near entrance to spiral staircase.
PL-5	80	100 foot level	Damp floor of Room 125.
PL-6	NA	56 foot level	Sump.
PL-7	310	79 foot level	Rad tech conducting radiation survey.



PIQ 4/2013. PL-1. Exterior of the Piqua containment building.



PIQ 4/2013. PL-2. Peeling paint on wall of 56 foot level.



PIQ 4/2013. PL-3. Base of spiral staircase.



PIQ 4/2013. PL-4. Damaged wall near entrance to spiral staircase.



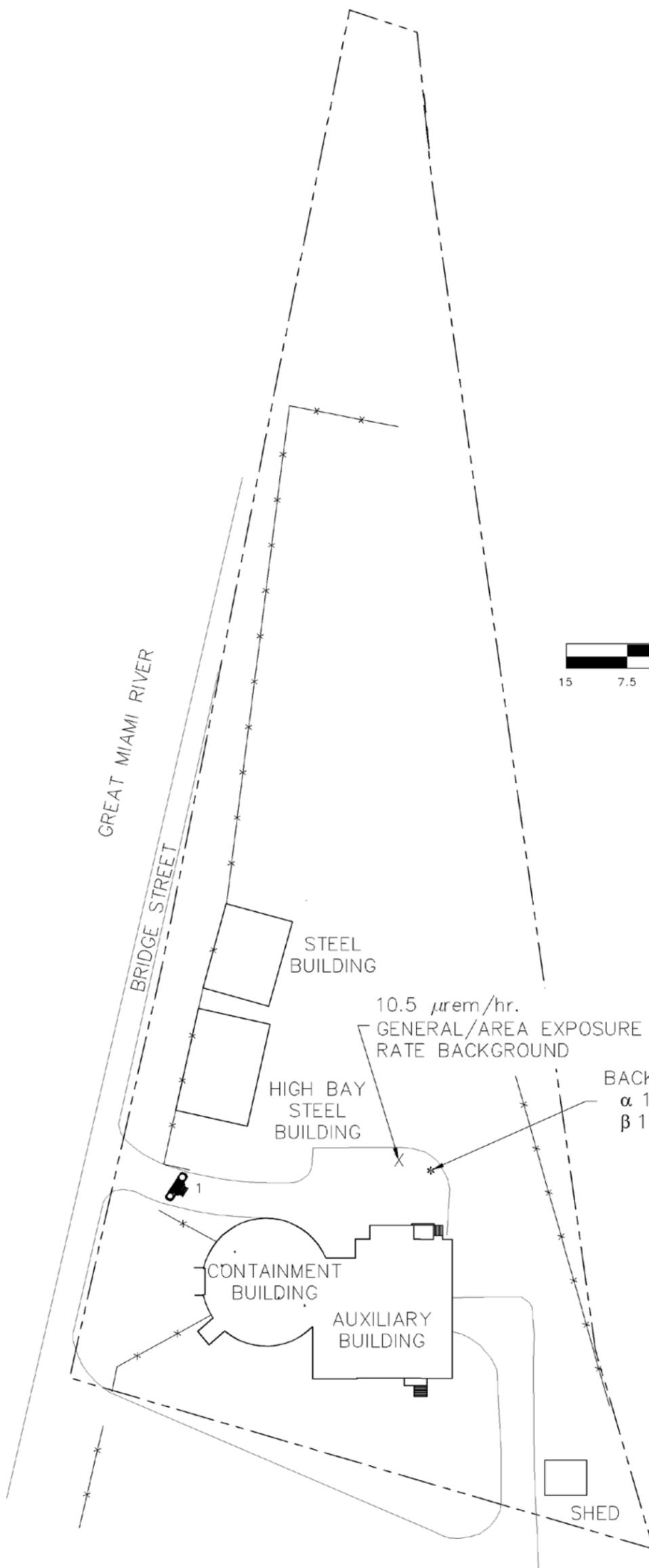
PIQ 4/2013. PL-5. Damp floor of Room 125.



PIQ 4/2013. PL-6. Sump.



PIQ 4/2013. PL-7. Rad tech conducting radiation survey.



ANNUAL INSPECTION CONDUCTED  
APRIL 18, 2013

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
2013 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 22, 2013	FILENAME: S0975800

SMEAR/DIRECT LOCATIONS ON THE 56-FOOT LEVEL

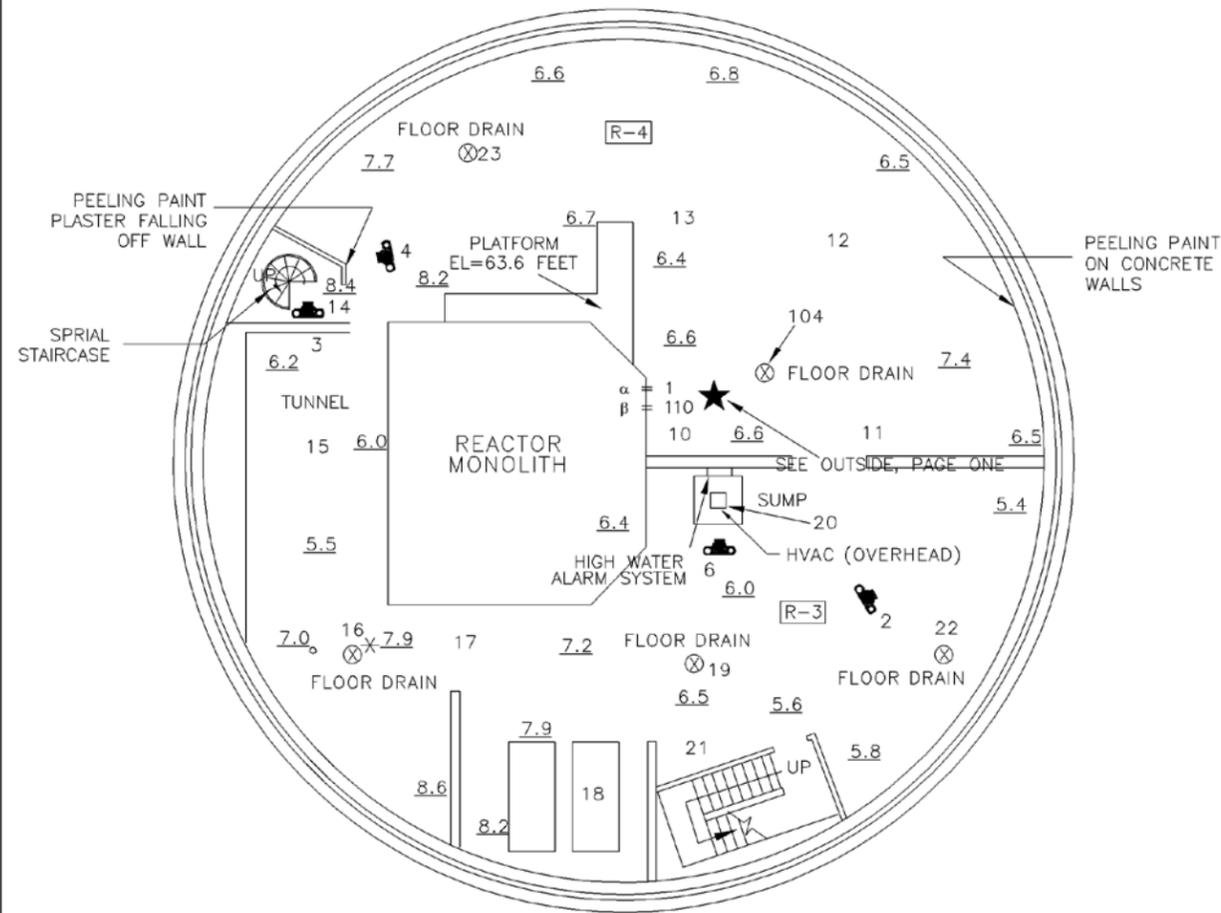
- 10-FLOOR
- 11-FLOOR
- 12-FLOOR
- 13-FLOOR
- 14-FLOOR
- 15-FLOOR
- 16-IN DRAIN
- 17-FLOOR
- 18-ON PEDESTAL
- 19-ON DRAIN
- 20-SUMP GRATING
- 21-ON VENT BY STAIRWELL
- 22-ON DRAIN
- 23-ON DRAIN
- 104-ON DRAIN

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	11-27-13	11-27-2013	3-27-2014
CORRECTION FACTORS	$\alpha$ 8 $\beta$ 4	$\alpha$ EFF. 42.3% $\beta$ EFF. 33.6%	N/A
BACKGROUND	$\alpha$ 1 $\beta$ 110	$\alpha$ 0.0 CPM $\beta$ 36.0 CPM	10.5 $\mu$ rem/hr
KEY:		SURVEYED BY: DATE:	
NO. = GENERAL AREA EXPOSURE RATE ( $\mu$ rem/hr)		ROY L. MOWEN 4/18/13	
$\times$ NO. = CONTACT EXPOSURE RATE ( $\mu$ rem/hr)		REVIEWED BY: DATE:	
NO. = SMEAR/DIRECT LOCATION			
R-4 = ROOM NUMBER			

★ = BACKGROUND DETERMINATION LOCATION OUTSIDE  
 2360  $\alpha$  = 1 cpm  
 $\beta$  = 110 cpm

📷<sub>1</sub> PHOTO LOCATION, ROTATION, AND NUMBER

NOTE: ALL 2013 GAMMA READINGS WERE < BKGD



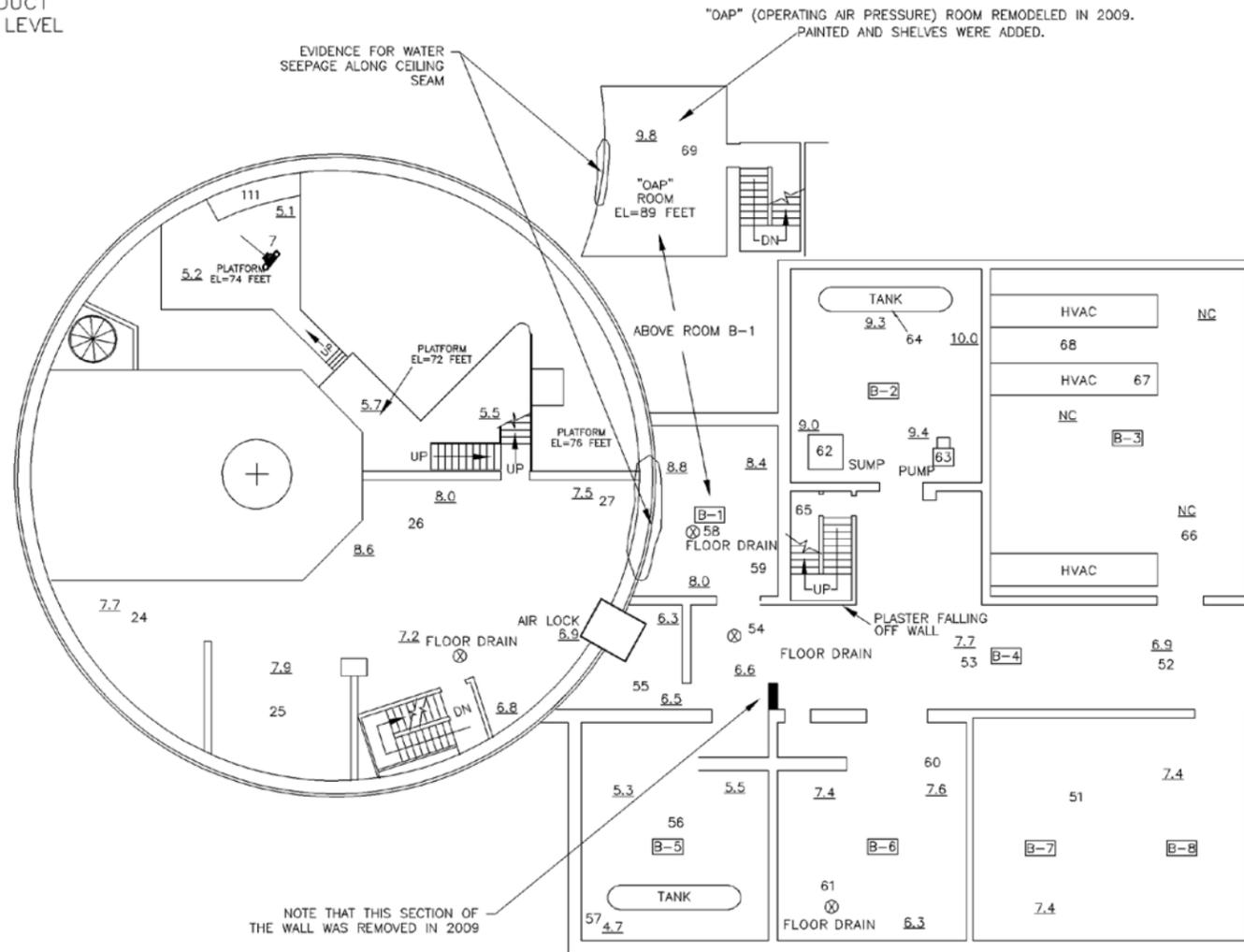
PLAN - 56 FOOT LEVEL

ANNUAL INSPECTION CONDUCTED  
 APRIL 18, 2013

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LMG0060
2013 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 22, 2013	FILENAME: S0975800

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



PLAN - 79 FOOT LEVEL

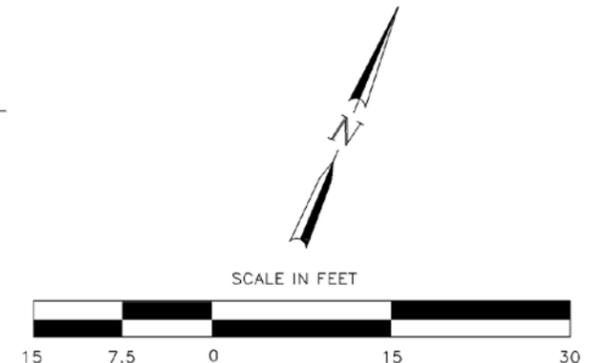
INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	11-27-13	11-27-2013	3-27-2014
CORRECTION FACTORS	$\alpha$ 8 $\beta$ 4	$\alpha$ EFF. 42.3% $\beta$ EFF. 33.6%	N/A
BACKGROUND	$\alpha$ 1 $\beta$ 110	$\alpha$ 0.0 CPM $\beta$ 36.0 CPM	10.5 $\mu$ rem/hr
KEY:	SURVEYED BY: DATE: ROY L. MOWEN 4/18/13		REVIEWED BY: DATE:
<p><u>NO.</u> = GENERAL AREA EXPOSURE RATE (<math>\mu</math>rem/hr)</p> <p><del>X</del>NO. = CONTACT EXPOSURE RATE (<math>\mu</math>rem/hr)</p> <p>NO. = SMEAR/DIRECT LOCATION</p> <p>R-4 = ROOM NUMBER</p>			

NOTE: SMEARS AT LOCATIONS 66,67 AND 68 NOT COLLECTED DUE TO WATER ON FLOOR OF ROOM B-3  
NC=NOT COLLECTED AIR EXPOSURE RATES.

ALL 2013 GAMMA READINGS  $\leq$  BKGD

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

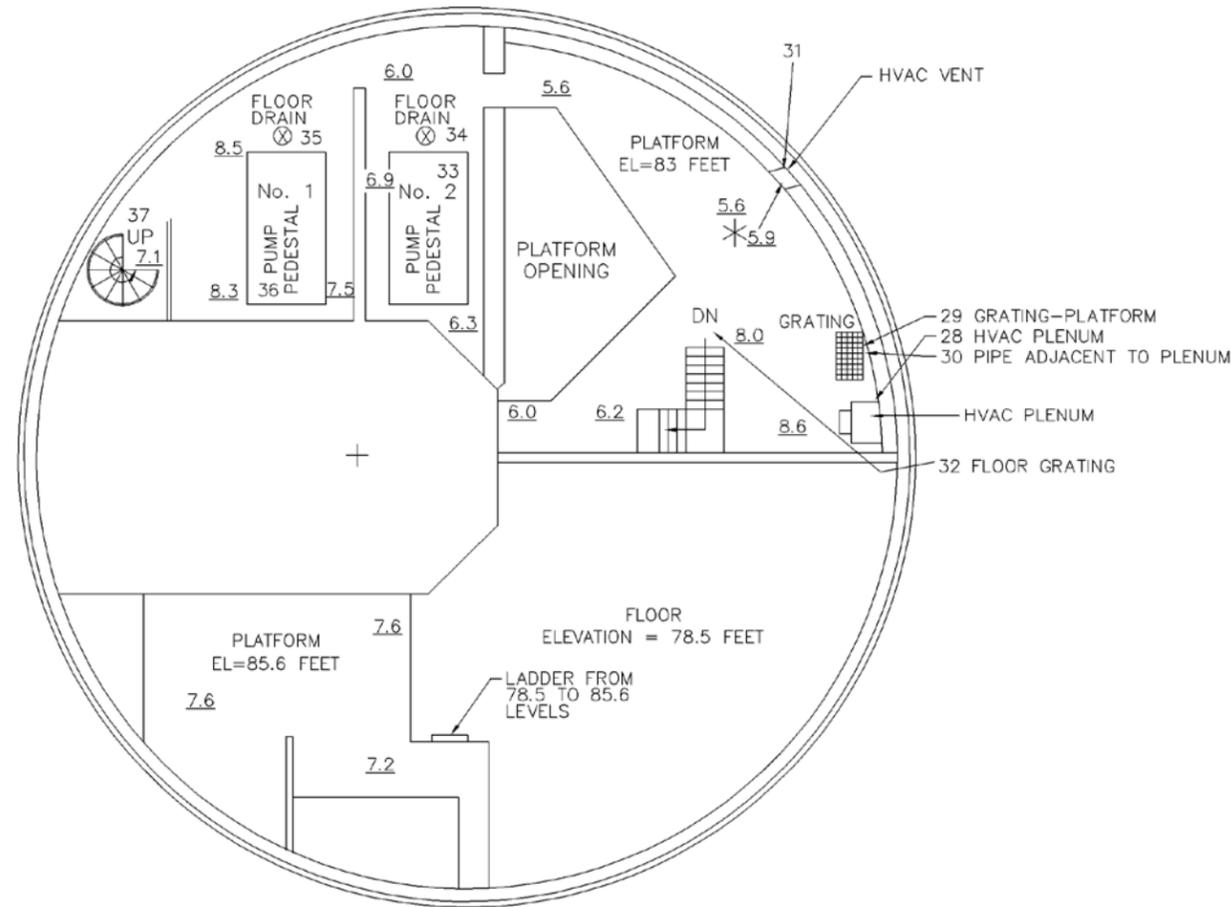


ANNUAL INSPECTION CONDUCTED  
APRIL 18, 2013

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
2013 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 22, 2013	FILENAME: S0975800

SMEAR/DIRECT LOCATIONS ON THE 83-FOOT LEVEL

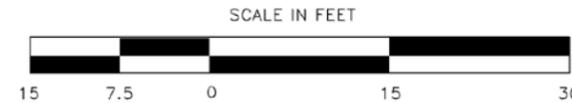
- 28-ON TOP OF HVAC UNIT
- 29-GRATING ON PLAT FORM
- 30-PIPE ADJACENT TO PLENUM
- 31-IN DUCT
- 32-FLOOR GRATING
- 33-PUMP PEDESTAL
- 34-IN DRAIN
- 35-IN DRAIN
- 36-PUMP PEDESTAL
- 37-STAIRWELL



PLAN - 83 FOOT LEVEL

INSTRUMENT	LUDDLUM 2360	LUDDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	11-27-13	11-27-2013	3-27-2014
CORRECTION FACTORS	$\alpha$ 8 $\beta$ 4	$\alpha$ EFF. 42.3% $\beta$ EFF. 33.6%	N/A
BACKGROUND	$\alpha$ 1 $\beta$ 110	$\alpha$ 0.0 CPM $\beta$ 36.0 CPM	10.5 $\mu$ rem/hr
KEY:		SURVEYED BY: DATE:	
NO. = GENERAL AREA EXPOSURE RATE ( $\mu$ rem/hr)		ROY L. MOWEN 4/18/13	
<del>NO.</del> = CONTACT EXPOSURE RATE ( $\mu$ rem/hr)		REVIEWED BY: DATE:	
NO. = SMEAR/DIRECT LOCATION			
R-4 = ROOM NUMBER			

NOTE: ALL 2013 GAMMA READINGS WERE < BKGD.



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DATE PREPARED: MAY 22, 2013	FILENAME: S0975800

**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

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.

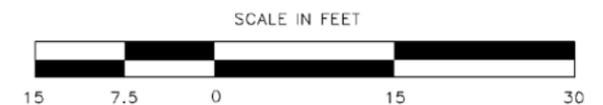
INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	11-27-13	11-27-2013	3-27-2014
CORRECTION FACTORS	$\alpha$ 8 $\beta$ 4	$\alpha$ EFF. 42.3% $\beta$ EFF. 33.6%	N/A
BACKGROUND	$\alpha$ 1 $\beta$ 110	$\alpha$ 0.0 CPM $\beta$ 36.0 CPM	10.5 $\mu$ rem/hr
KEY:	SURVEYED BY: DATE: ROY L. MOWEN 4/18/13 REVIEWED BY: DATE:		
NO. = GENERAL AREA EXPOSURE RATE ( $\mu$ rem/hr) *NO. = CONTACT EXPOSURE RATE ( $\mu$ rem/hr) NO. = SMEAR/DIRECT LOCATION R-4 = ROOM NUMBER			

HIGHEST GAMMA READING ON THIS LEVEL WAS 2.5  $\mu$ rem/hr ABOVE BKGD IN HALLWAY OUTSIDE OF ROOM 90.

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



**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**

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DATE PREPARED: MAY 22, 2013	FILENAME: S0975800

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

47-FLOOR  
48-FLOOR  
49-FLOOR

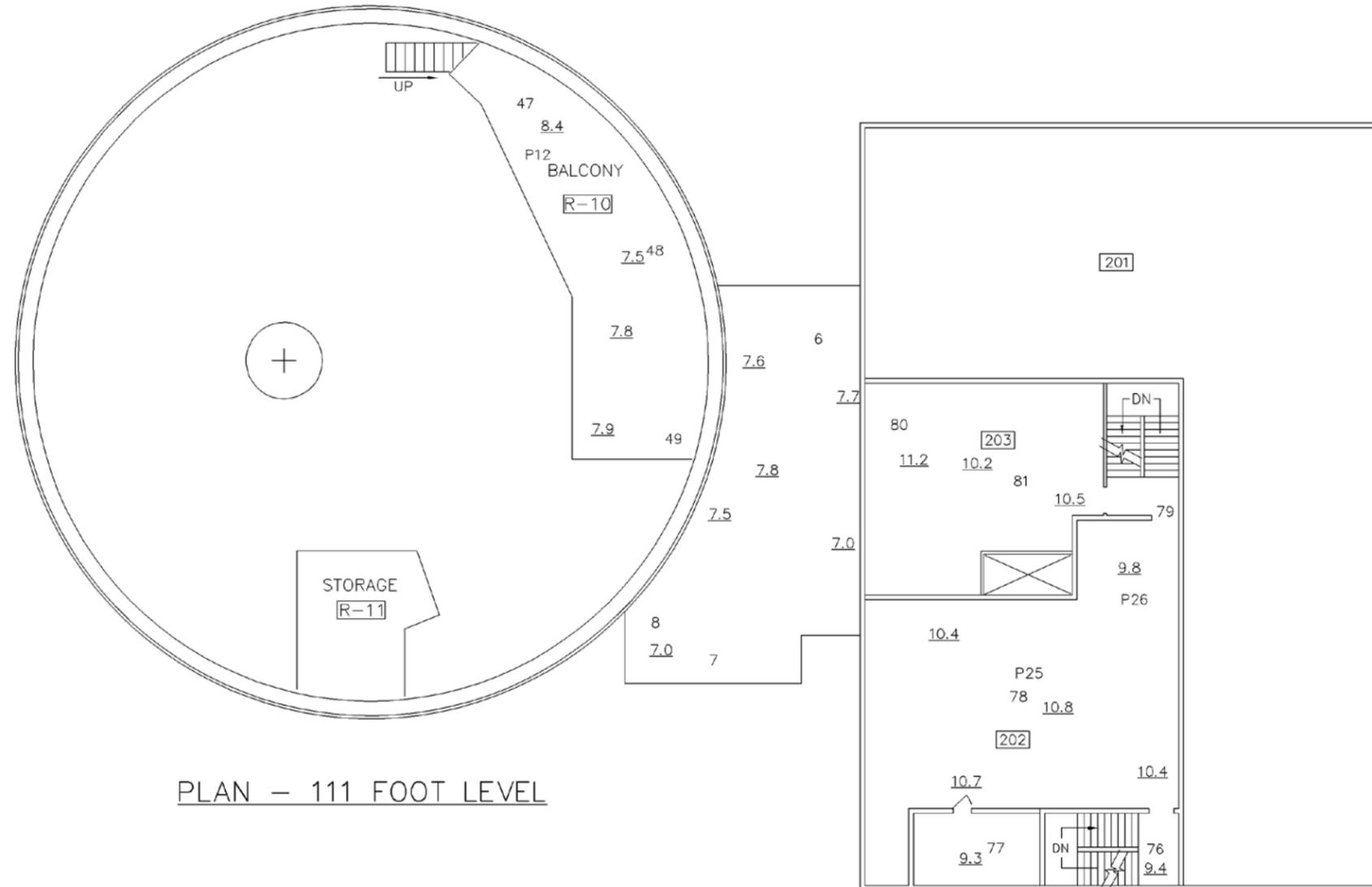
SMEAR/DIRECT LOCATIONS ON THE 111-FOOT LEVEL IN THE AUX. BLDG.

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

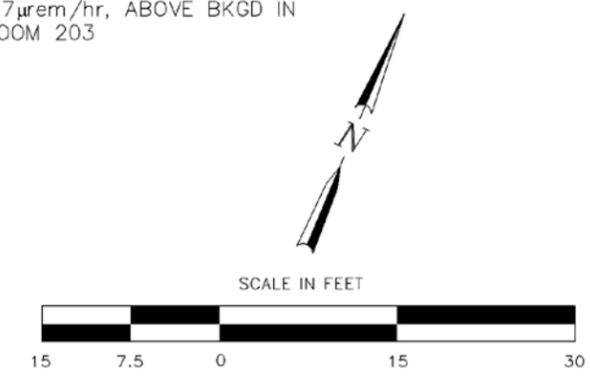
INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	11-27-13	11-27-2013	3-27-2014
CORRECTION FACTORS	$\alpha$ 8 $\beta$ 4	$\alpha$ EFF. 42.3% $\beta$ EFF. 33.6%	N/A
BACKGROUND	$\alpha$ 1 $\beta$ 110	$\alpha$ 0.0 CPM $\beta$ 36.0 CPM	10.5 $\mu$ rem/hr
KEY:	SURVEYED BY: DATE: ROY L. MOWEN 4/18/13		REVIEWED BY: DATE:
<p>NO. = GENERAL AREA EXPOSURE RATE (<math>\mu</math>rem/hr)</p> <p><del>X</del>NO. = CONTACT EXPOSURE RATE (<math>\mu</math>rem/hr)</p> <p>NO. = SMEAR/DIRECT LOCATION</p> <p>R-4 = ROOM NUMBER</p>			



PLAN - 111 FOOT LEVEL

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

HIGHEST GAMMA CONTACT READING ON THIS LEVEL WAS 0.7  $\mu$ rem/hr, ABOVE BKGD IN ROOM 203

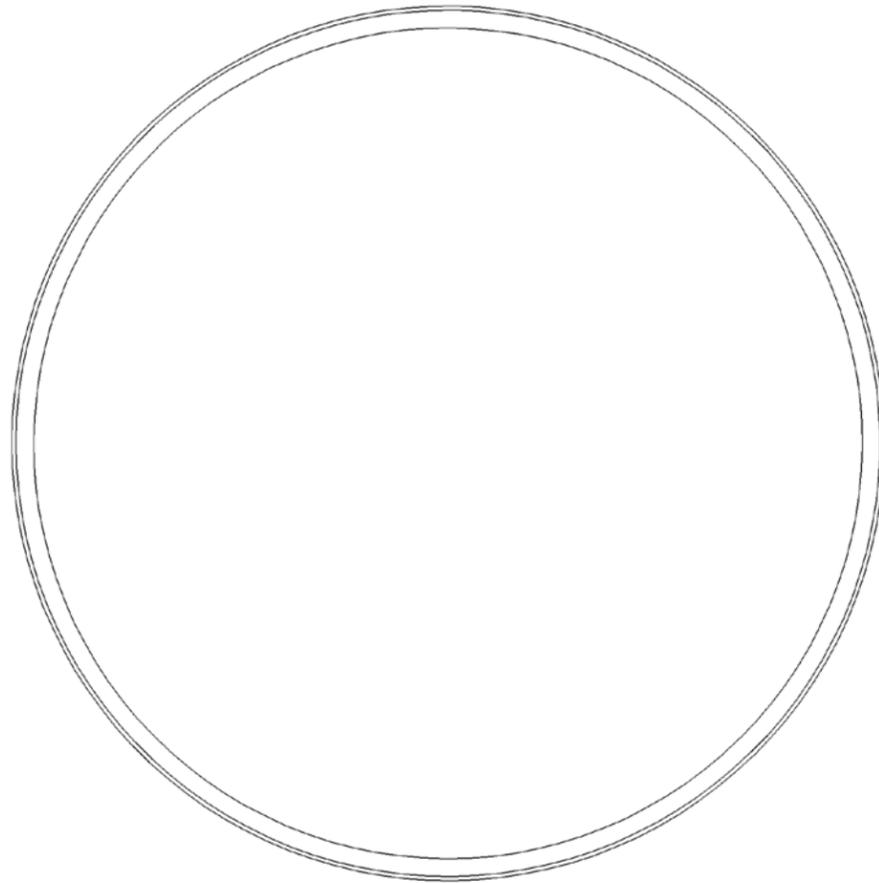


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DATE PREPARED: MAY 22, 2013	FILENAME: S0975800

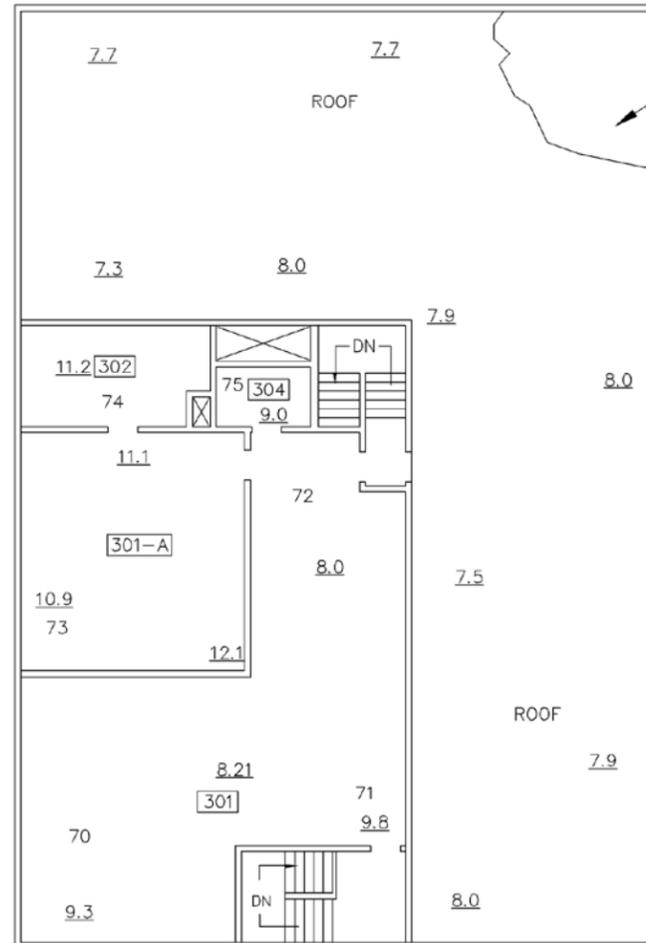
SMEAR/DIRECT LOCATIONS ON THE  
121-FOOT LEVEL IN THE AUX. BLDG.

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



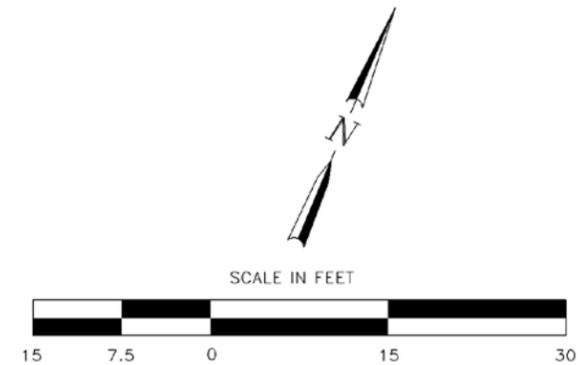
PLAN - 121 FOOT LEVEL

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	11-27-13	11-27-2013	3-27-2014
CORRECTION FACTORS	$\alpha$ 8 $\beta$ 4	$\alpha$ EFF. 42.3% $\beta$ EFF. 33.6%	N/A
BACKGROUND	$\alpha$ 1 $\beta$ 110	$\alpha$ 0.0 CPM $\beta$ 36.0 CPM	10.5 $\mu$ rem/hr
KEY:		SURVEYED BY: DATE:	
<u>NO.</u> = GENERAL AREA EXPOSURE RATE ( $\mu$ rem/hr)		ROY L. MOWEN 4/18/13	
<del>X</del> <u>NO.</u> = CONTACT EXPOSURE RATE ( $\mu$ rem/hr)		REVIEWED BY: DATE:	
NO. = SMEAR/DIRECT LOCATION			
<span style="border: 1px solid black; padding: 0 2px;">R-4</span> = ROOM NUMBER			



PONDED WATER ON ROOF

HIGHEST GAMMA CONTACT READING WAS 1.6  $\mu$ rem/hr,  
ABOVE BKGD IN ROOM 301-A



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DATE PREPARED: MAY 22, 2013	FILENAME: S0975800