2011 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 6, 2011. 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 former PNPF consists of a reactor containment building and an associated auxiliary building that are both used by Piqua Power Systems (PPS) as storage space, shops, and offices. The city will lease the property until radioactive decay allows the facility to be released for unrestricted use. At that time ownership reverts to the city.

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 found to be in good operating condition.

An annual radiological survey was also conducted during the annual inspection. Survey results from 103 locations revealed no removable contamination. Only one direct reading exceeded the minimum detectable activity (MDA): the floor drain at the 56 foot level (1,832 dpm/100 cm^2). 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^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, (Radiological Technician), and K. Payne (Quality Assurance/Quality Control) all of S.M. Stoller Corporation, the contractor for the DOE Office of Legacy Management, conducted the inspection on April 6, 2011. A. Kleinrath, with DOE LM, also participated in the inspection.

Mr. Wheelock, the Plant Manager, Power System Coordinator for the City of Piqua, was contacted at the start of the inspection and met with inspectors at the start of the inspection. A copy of this report will be forwarded to Mr. Wheelock.

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 are 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 shape

Surrounding Area
No changes in the area immediately surrounding the Piqua facility were observed.

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 is used to store cable spools (PL–1). The condition of peeling paint on the interior walls of the containment building remains unchanged from the 2010 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 (PL–2). 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.

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 of 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.

Room B-3 was not accessible due to the presence of approximately ½ inch of water on the floor (PL–3). Heavy rains occurred just prior to the inspection. It appears that ponded water next to the outside wall of the building managed to seep into the building. PPS personnel were unaware of the water and stated that they would determine the cause and correct the situation. A follow-up inspection is not required. Gamma readings could not be obtained in Room B-3 during this year's inspection due to the water. Previous year's results from this room have been below the minimum detectable level (MDA).

During the 2010 inspection water was observed to be slowly dripping down the outside surface of an aged sprinkler system pipe on the ceiling of Room B-5. The sprinkler system was no longer in use, so Piqua personnel removed it from the roof (PL–4).

Fresh water stains were noted on the wall of Room B-5 by Piqua personnel since the last inspection (PL–5). Piqua personnel reported that repairs were made to the outside seam of the roof just above the water stains (PL–6). Despite the heavy rain just prior to the inspection, inspection personnel did not notice any water dripping down the wall in the area of the stains, but water was observed on the floor of Room B-5 near the stained walls (PL–7). The areas with water on the floor are identified on the inspection maps and will be checked again next year.

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 from the loading dock. It is no longer used by Piqua personnel and is kept locked. Piqua personnel repaired the outside corner of the room (PL–8) and corrected the roof drainage problem above the room (PL–9). A small amount of water was present on the floor of Room 125 during this year's inspection. The area with the water on the floor has been noted on the inspection maps and will be checked again next year.

During the 2010 inspection, the concrete around the base of the outside wall of the containment structure was cracking in several places. The cracks appeared to be allowing water to enter, freeze and expand, and further damage the concrete. Piqua personnel sealed the cracks and repaired the damaged concrete (PL–10). Also during the 2010 inspection, a marked emergency exit was found to be blocked by some boxes. PPS personnel moved the boxes that were blocking the exit. No further action is required.

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 (PL–11). 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 4 of the last 12 monthly log entries were missing. Piqua plant personnel were notified of the missing log entries.

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–12). 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 the entry for the February 2011 check was missing from the log. Piqua plant personnel were notified of the missing log entry. 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. A total of 103 sample locations were investigated 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 66–68 were inaccessible this year due to water on the floor of Room B-3 on the 79-foot level.

PPS did some minor modifications to rooms R-6 and R-7 in 2009, including 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.

PPS prefers to keep the door to Room 125 on the 100 foot level locked. Inspectors need to get the door unlocked to get radiation sample 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 4.5 to 12.5 μrem/hr. The highest gamma reading was 1.5 μrem/hr greater than 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 cm²	8 alpha	68 dpm/ 100 cm²
Surface Activity	Beta	Ludlum 43-89 #5785	Ludlum 2360 #5751	112 cpm/100 cm²	4 beta	311 dpm/ 100 cm²
Exposure Rate	Gamma	N/A	Eberline FH40 GL #016191	11 μrem/hr	N/A	1 μrem/hr
Removable Activity	Alpha	N/A	Ludlum 3030/ #5899	0.0 cpm	Efficiency 39.3%	7.0 dpm/ 100 cm²
Removable Activity	Beta	N/A	Ludlum 3030/ #5899	27.0 cpm	Efficiency 29.9%	86.0 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 the floor drain at the lowest level of the containment building exhibited a direct beta activity of 1,832 disintegrations per minute per 100 square centimeters (dpm/100 cm^2). 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 103 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 2011 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	**1,832**	<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

Location/ Building	Elevation[a]	Direct/ Smear #	Direct Reading Activity dpm/100 cm^2 Alpha / Beta		Removable Activity dpm/100 cm^2 Alpha / Beta		Remarks
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
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	NA	NA	NA	Floor
Aux. Bldg.	79 ft.	67	NA	NA	NA	NA	Inside HVAC on floor
Aux. Bldg.	79 ft.	68	NA	NA	NA	NA	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

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.	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	<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

[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

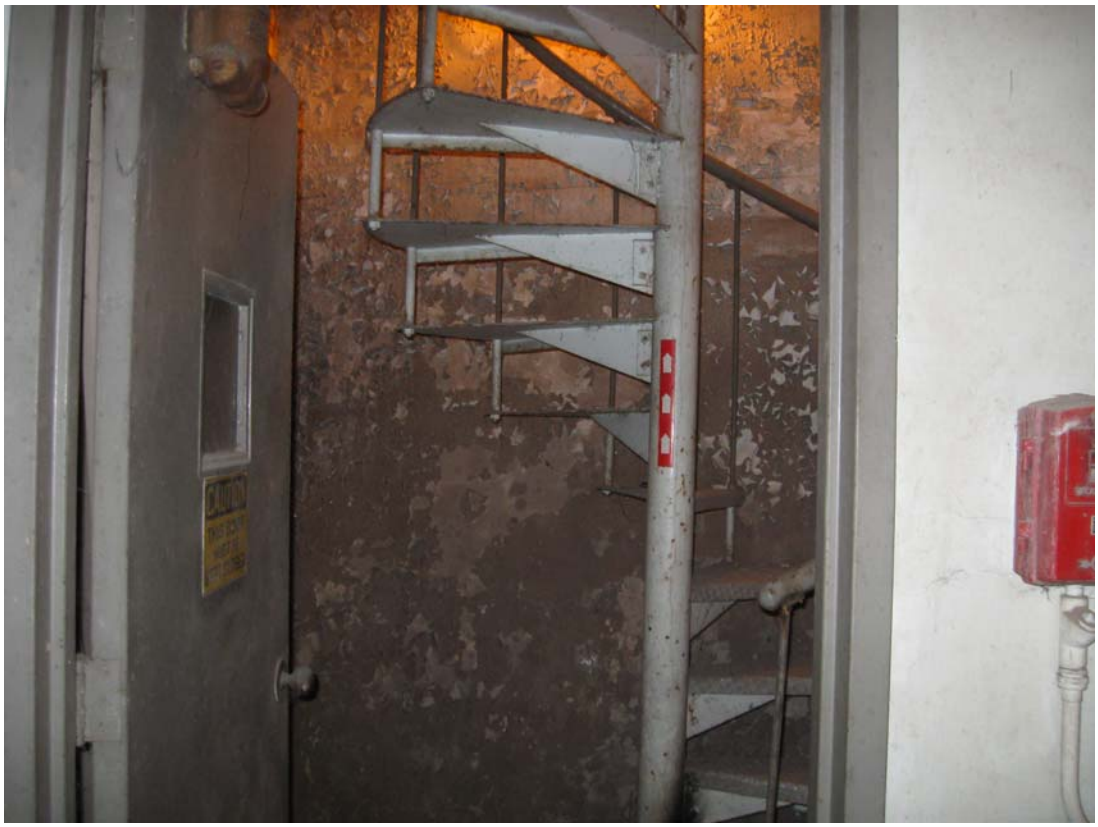
3.0 Recommendations

No recommendations to report.

4.0 Photographs

Photograph Location Number	Azimuth	Elevation	Photograph Description
PL–1	45	56 foot level	Cable spools stored on 56-foot level of containment structure.
PL–2	260	56 foot level	Base of spiral staircase.
PL–3	345	79 foot level	Water on floor of Room B-3.
PL–4	NA	79 foot level	Old pipes from sprinkler system removed.
PL–5	240	79 foot level	Fresh water stains on wall of Room B-5.
PL–6	59	Roof	Repair to roof. Above fresh water stains on wall of Room B-5.
PL–7	240	79 foot level	Water of floor of Room B-5.
PL–8	315	Outside	Repairs made to corner of Room 125.
PL–9	170	Roof	Repair made to corner of roof above Room 125. Water no longer ponding on area of roof.
PL–10	135	Outside	Repair made to concrete at base of containment dome.
PL–11	315	100 foot level	Rectifier Unit Control Box.
PL–12	350	56 foot level	Sump in basement of containment structure.

PIQ 4/2011. PL–1. Cable spools stored on 56-foot level of containment structure.



PIQ 4/2011. PL–2. Base of spiral staircase.

PIQ 4/2011. PL–3. Water on floor of Room B-3.

PIQ 4/2011. PL–4. Old pipes from sprinkler system removed.

PIQ 4/2011. PL–5. Fresh water stains on wall of Room B-5.

PIQ 4/2011. PL–6. Repair to roof. Above fresh water stains on wall of Room B-5.

PIQ 4/2011. PL–7. Water of floor of Room B-5.

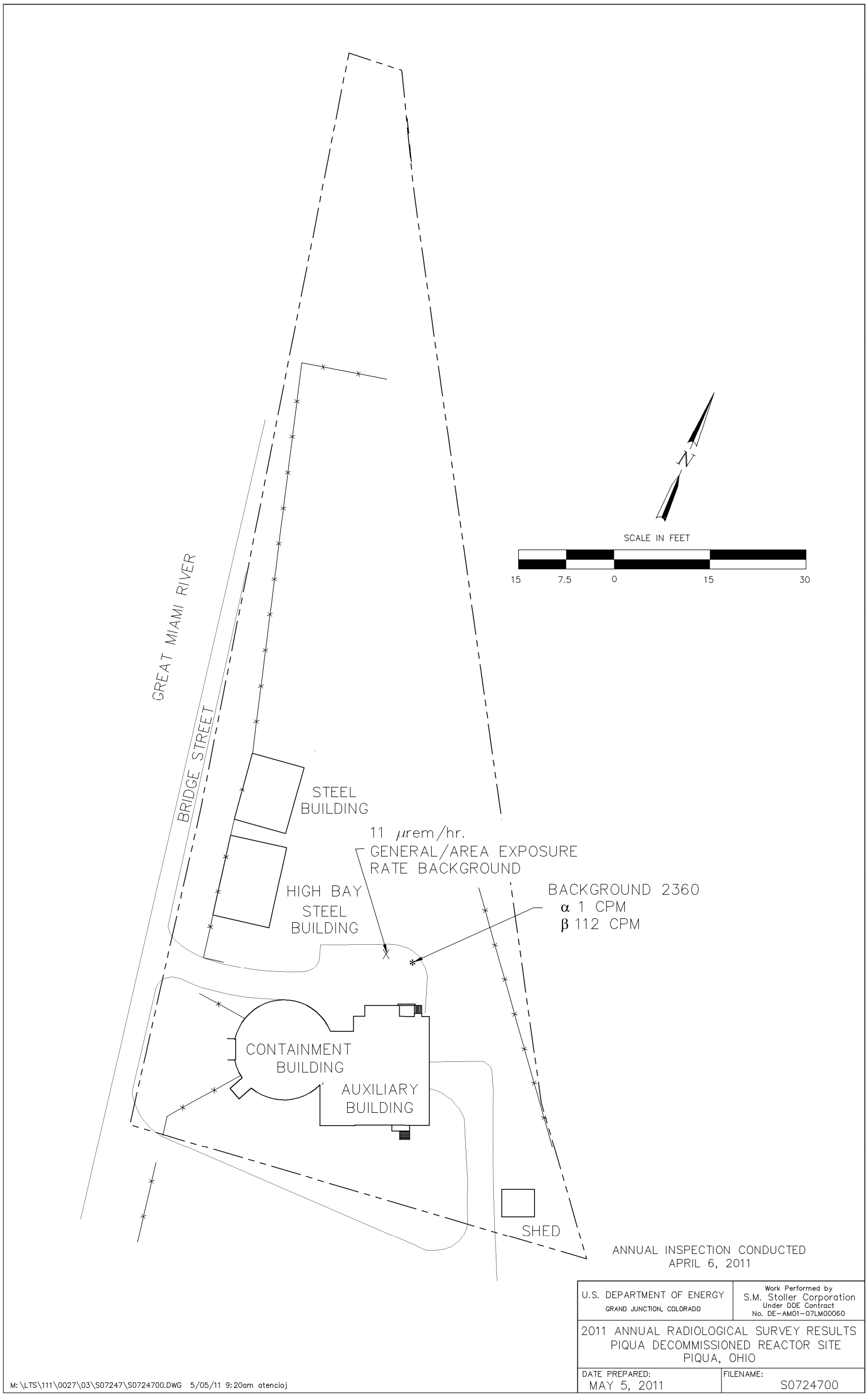
PIQ 4/2011. PL–8. Repairs made to corner of Room 125.

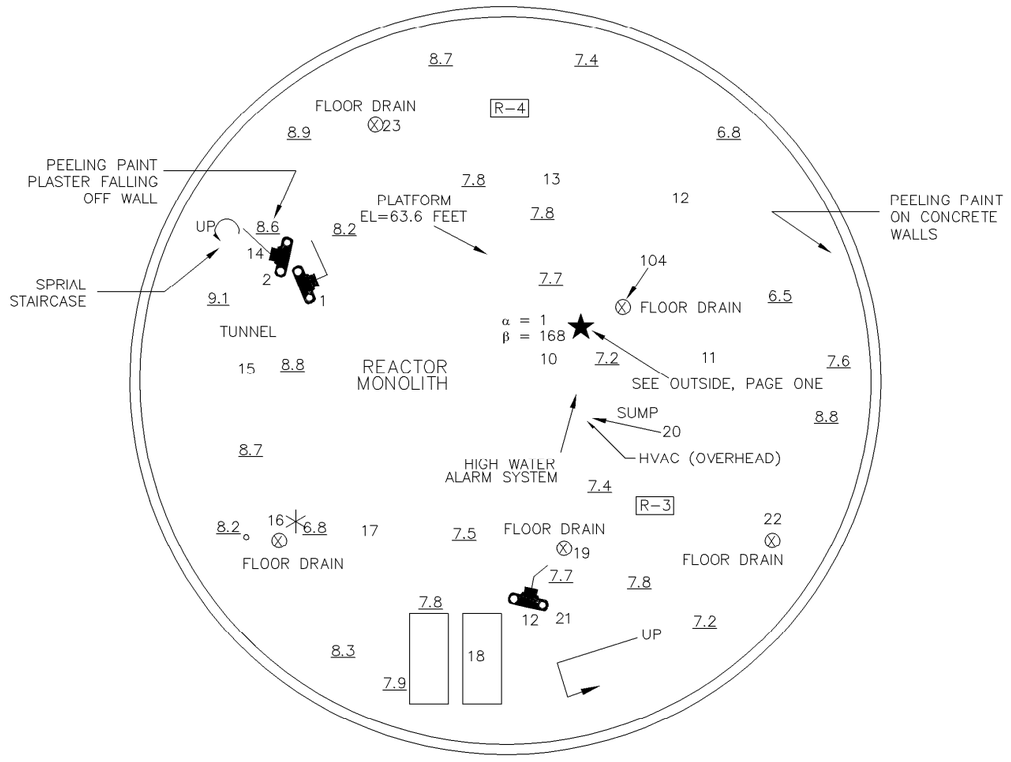
PIQ 4/2011. PL–9. Repair made to corner of roof above Room 125. Water no longer ponding on area of roof.

PIQ 4/2011. PL–10. Repair made to concrete at base of containment dome.

PIQ 4/2011. PL–11. Rectifier Unit Control Box.

PIQ 4/2011. PL–12. Sump in basement of containment structure.


N
SCALE IN FEET
15
7.5
0
15
30
GREAT MIAMI RIVER
BRIDGE STREET
STEEL BUILDING
HIGH BAY STEEL BUILDING
11 μrem/hr.
GENERAL/AREA EXPOSURE RATE BACKGROUND
BACKGROUND 2360
α 1 CPM
β 112 CPM
CONTAINMENT BUILDING
AUXILIARY BUILDING
SHED
ANNUAL INSPECTION CONDUCTED
APRIL 6, 2011
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION, COLORADO
Work Performed by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AM01-07LM00060
2011 ANNUAL RADIOLOGICAL SURVEY RESULTS
PIQUA DECOMMISSIONED REACTOR SITE
PIQUA, OHIO
DATE PREPARED:
MAY 5, 2011
FILENAME:
S0724700
M:\LTS\111\0027\03\S07247\S0724700.DWG 5/05/11 9:20am atencioj



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 FIIIOG-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	9-8-11	6-30-2011	3-4-2012
CORRECTION FACTORS	α 8 β 4	α EFF. 39.3% β EFF. 29.9%	N/A
BACKGROUND	α 1 β 112	α 0.0 CPM β 27.0 CPM	11 μrem/hr

KEY:

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

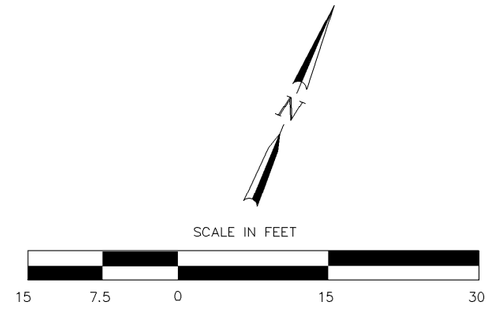
✳NO. =CONTACT EXPOSURE RATE (μrem/hr)

NO. =SMEAR/DIRECT LOCATION

R-4 = ROOM NUMBER

SURVEYED BY:	DATE:
ROY L. MOWEN	4/6/11
REVIEWED BY:	DATE:

★ = BACKGROUND DETERMINATION LOCATION OUTSIDE
2360 α = 1 cpm
β = 112 cpm



NOTE: ALL 2011 GAMMA CONTACT AND GENERAL AREA READINGS WERE ≤ BKGD ON THE 56-FOOT LEVEL.

ANNUAL INSPECTION CONDUCTED
APRIL 6, 2011

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
2011 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 5, 2011	FILENAME: S0724700

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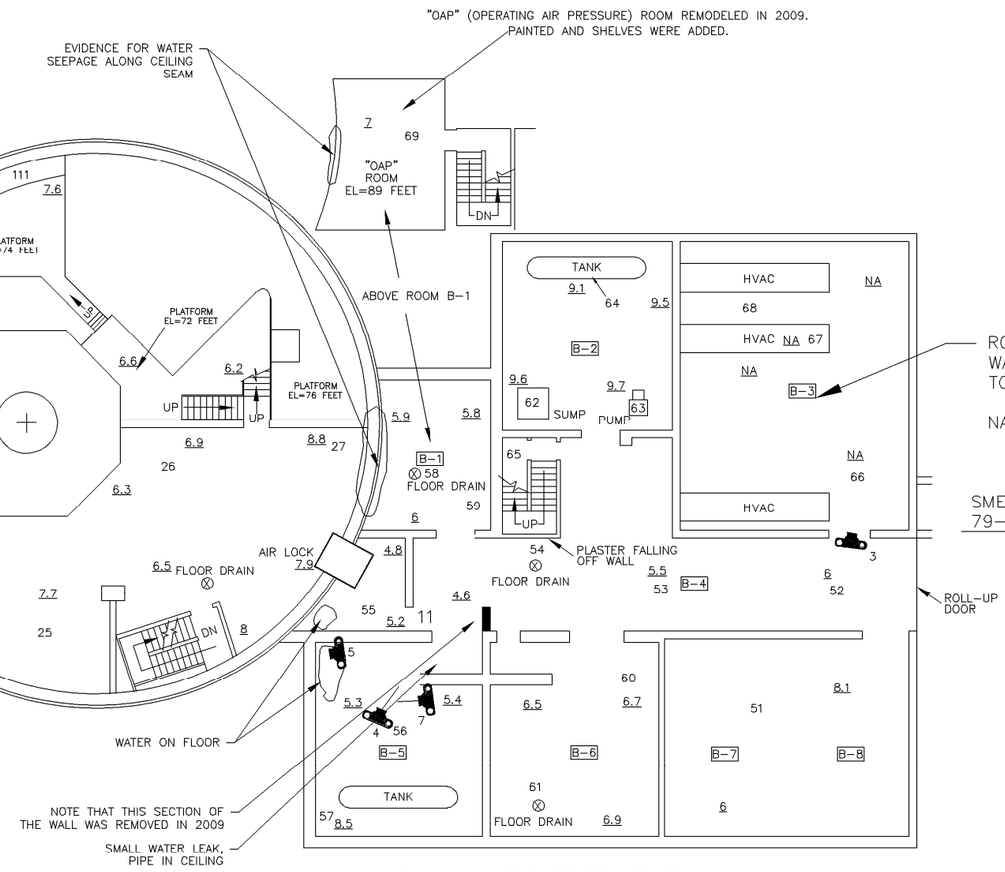
SMEAR/DIRECT LOCATIONS ON THE
79–FOOT LEVEL IN CONTAINMENT STRUCTURE

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



PLAN – 79 FOOT LEVEL

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G–L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	9–8–11	6–30–2011	3–4–2012
CORRECTION FACTORS	α 8 β 4	α EFF. 39.3% β EFF. 29.9%	N/A
BACKGROUND	α 1 β 112	α 0.0 CPM β 27.0 CPM	11 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:	DATE:
ROY L. MOWEN	4/6/11
REVIEWED BY:	DATE:

ALL 2011 GAMMA CONTACT AND GENERAL AREA READINGS WERE ≤ BKGD ON THE 79 FOOT LEVEL

ROOM B–3 WAS NOT ACCESSIBLE DUE TO WATER ON FLOOR

NA=NOT ACCESSIBLE

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 6, 2011

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE–AM01–07LM00060
2011 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 5, 2011	FILENAME: S0724700

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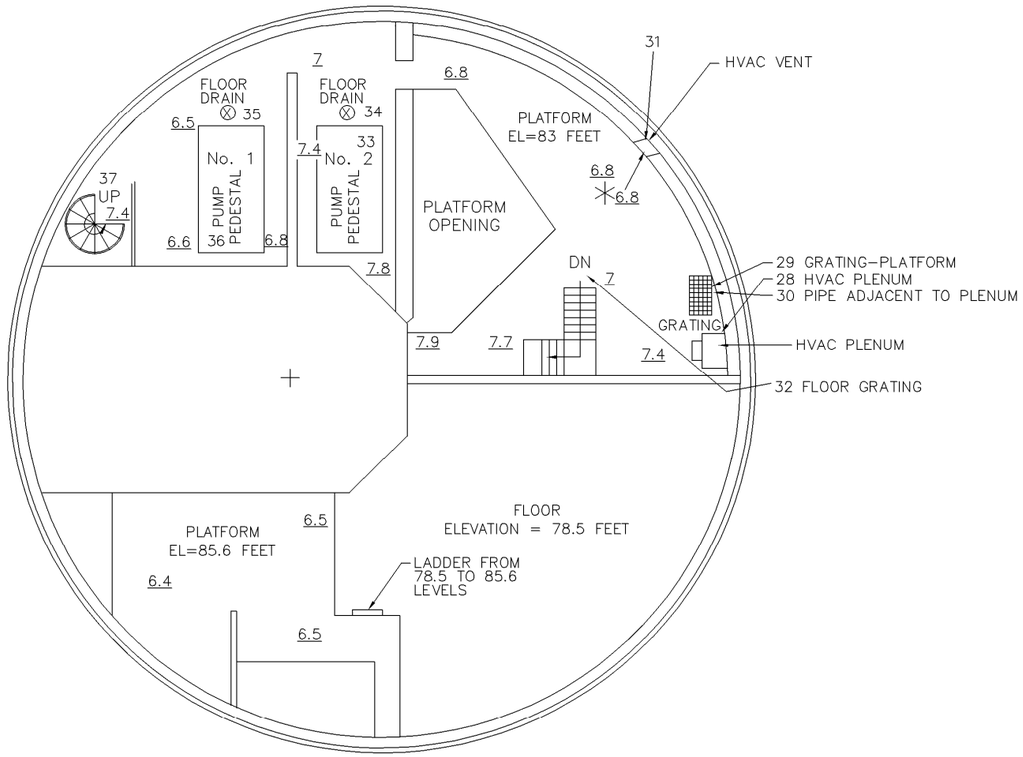


PLAN – 83 FOOT LEVEL

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	S016191
CAL. DUE	9–8–11	6–30–2011	3–4–2012
CORRECTION FACTORS	α 8 β 4	α EFF. 39.3% β EFF. 29.9%	N/A
BACKGROUND	α 1 β 112	α 0.0 CPM β 27.0 CPM	11 µrem/hr

KEY:

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

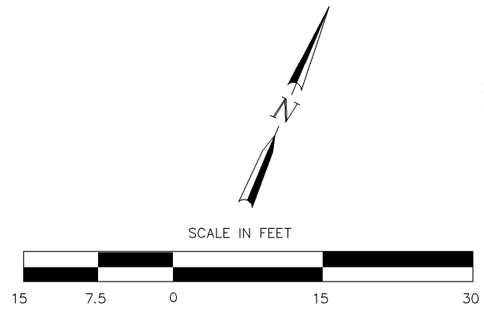
NO. =CONTACT EXPOSURE RATE (µrem/hr)

NO. =SMEAR/DIRECT LOCATION

R–4 = ROOM NUMBER

SURVEYED BY: ROY L. MOWEN DATE: 4/6/11

REVIEWED BY: DATE:



NOTE: ALL 2011 GAMMA CONTACT AND GENERAL AREA READINGS WERE ≤ BKGD ON THE 83–FOOT LEVEL.

ANNUAL INSPECTION CONDUCTED
APRIL 6, 2011

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE–AM01–07LM00060
2011 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 5, 2011	FILENAME: S0724700

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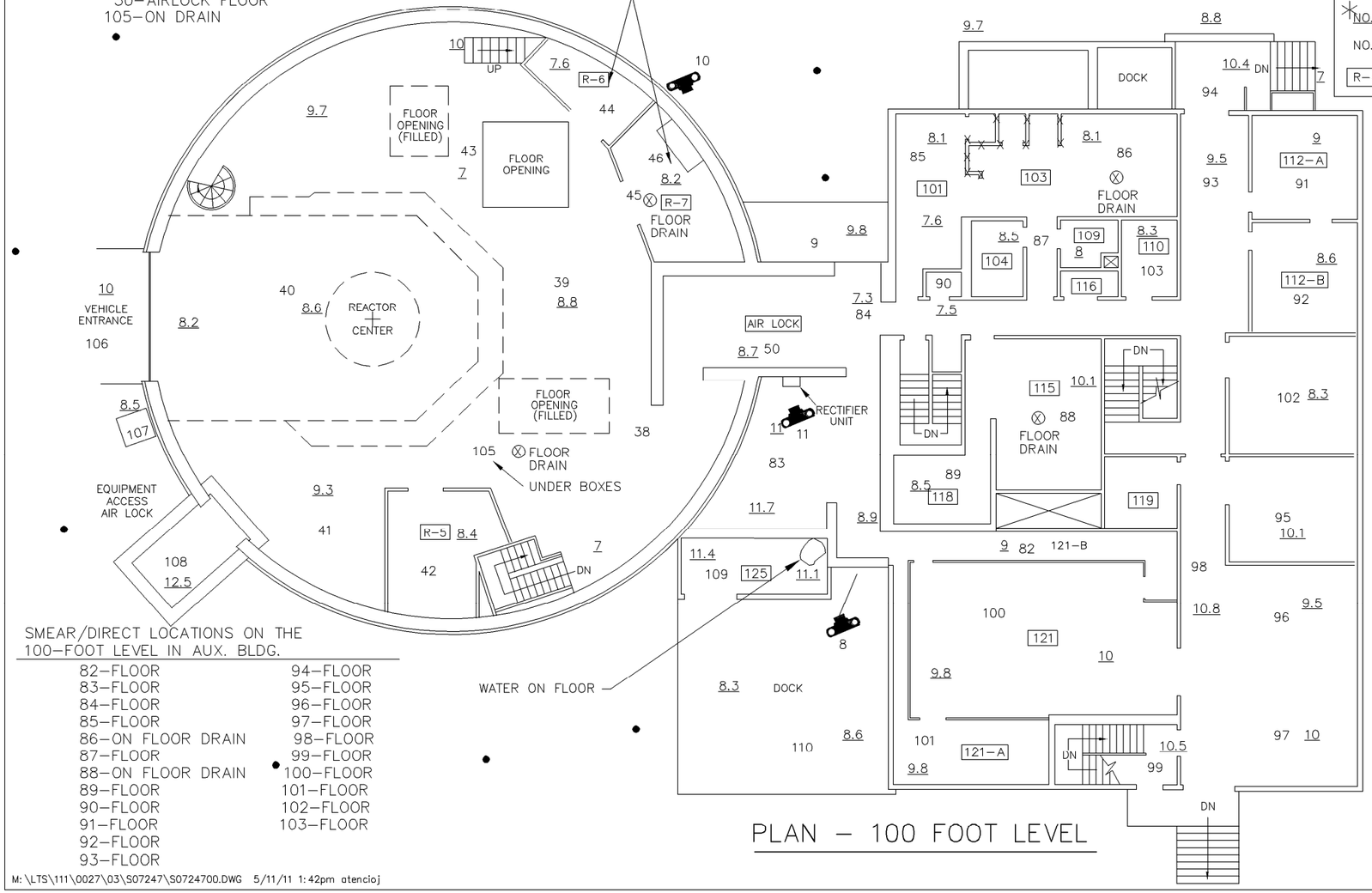
SMEAR/DIRECT LOCATIONS ON THE
100-FOOT LEVEL IN CONTAINMENT STRUCTURE

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

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.



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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INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G-L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	9-8-11	6-30-2011	3-4-2012
CORRECTION FACTORS	α 8 β 4	α EFF. 39.3% β EFF. 29.9%	N/A
BACKGROUND	α 1 β 112	α 0.0 CPM β 27.0 CPM	11 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: 4/6/11

REVIEWED BY: DATE:

HIGHEST GAMMA READING ON THIS LEVEL IS 1.5μrem/hr > BKGD-OUTSIDE, SW CORNER

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

N

SCALE IN FEET

15 7.5 0 15 30

ANNUAL INSPECTION CONDUCTED
APRIL 6, 2011

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
2011 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 5, 2011	FILENAME: S0724700

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
9–ON CONCRETE PLATFORM

INSTRUMENT	LUDLUM 2360	LUDLUM 3030	Eberline FH40G–L
SERIAL #	5751/5785	5899	S016191
CAL. DUE	9–8–11	6–30–2011	3–4–2012
CORRECTION FACTORS	α 8 β 4	α EFF. 39.3% β EFF. 29.9%	N/A
BACKGROUND	α 1 β 112	α 0.0 CPM β 27.0 CPM	11 µrem/hr

KEY:

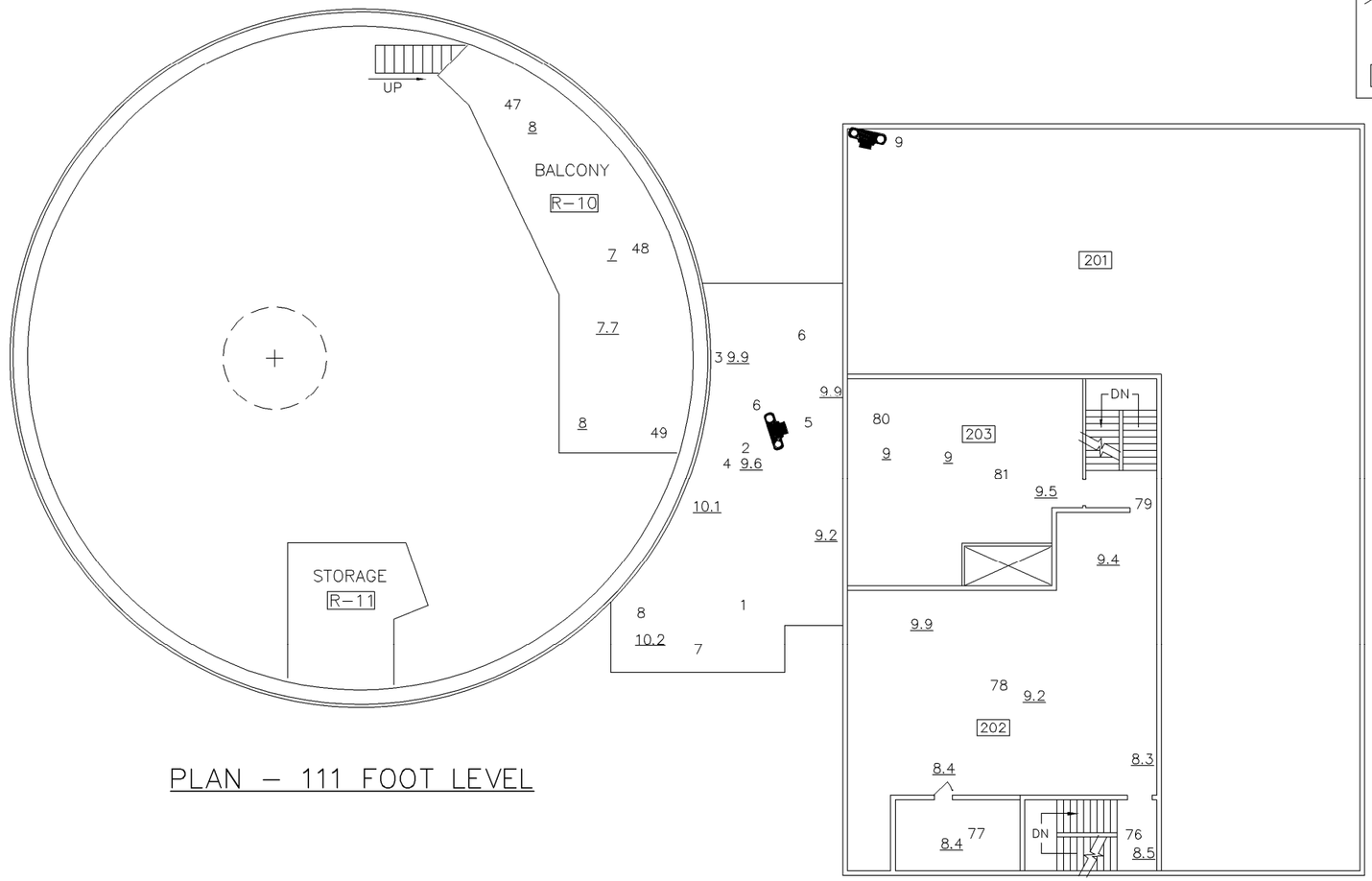
NO. =GENERAL AREA EXPOSURE RATE (µrem/hr)

*NO. =CONTACT EXPOSURE RATE (µrem/hr)

NO. =SMEAR/DIRECT LOCATION

R–4 = ROOM NUMBER

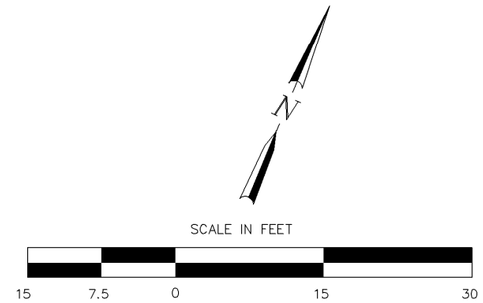
SURVEYED BY:	DATE:
ROY L. MOWEN	4/6/11
REVIEWED BY:	DATE:



PLAN – 111 FOOT LEVEL

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

ALL 2011 GAMMA CONTACT AND GENERAL AREA READINGS WERE ≤ BKGD ON THE 111 FOOT LEVEL



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2011 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 5, 2011	FILENAME: S0724700

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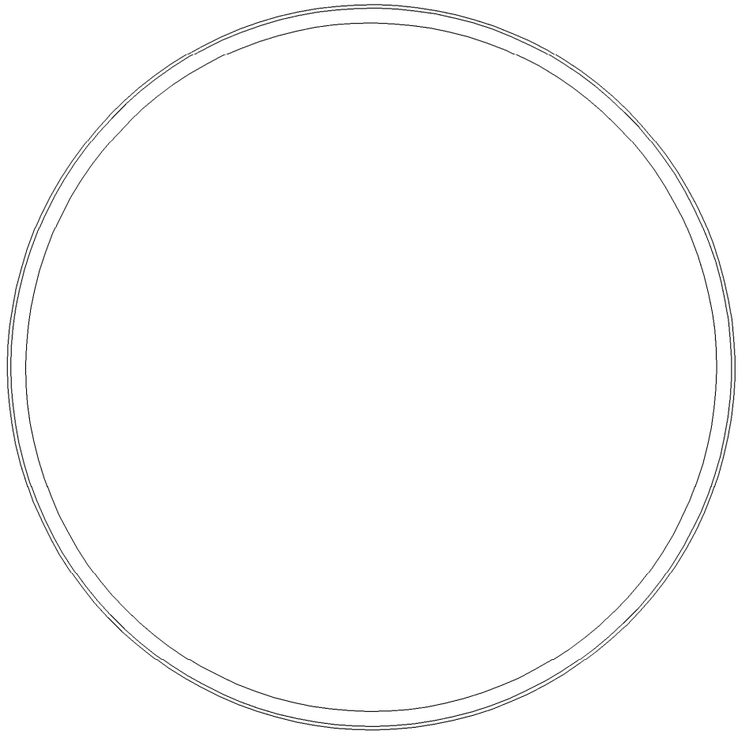
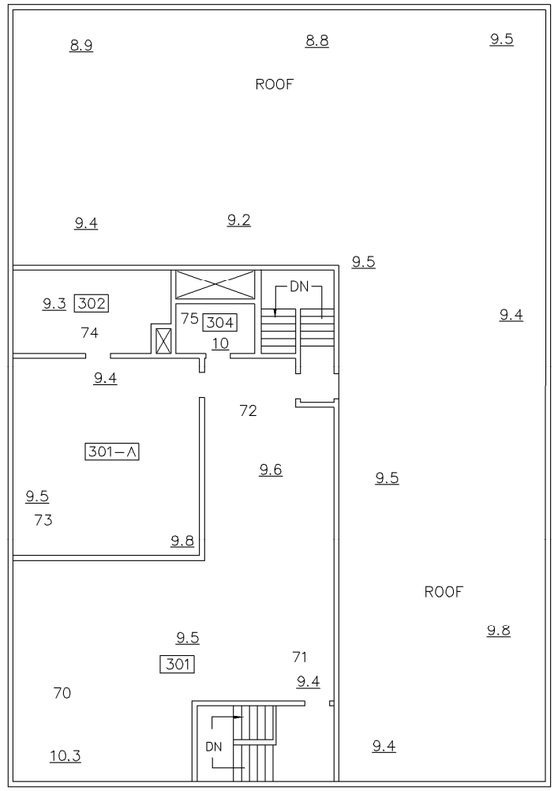
SMEAR/DIRECT LOCATIONS ON THE
121–FOOT LEVEL IN THE AUX. BLDG.

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	S016191
CAL. DUE	9–8–11	6–30–2011	3–4–2012
CORRECTION FACTORS	α 8 β 4	α EFF. 39.3% β EFF. 29.9%	N/A
BACKGROUND	α 1 β 112	α 0.0 CPM β 27.0 CPM	11 µrem/hr

KEY:

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

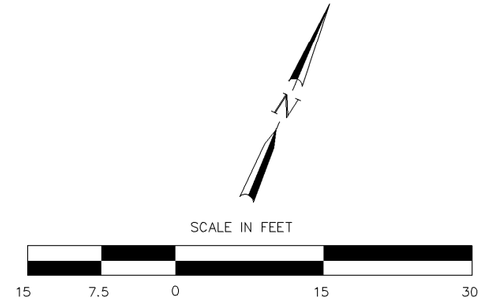
✳NO. =CONTACT EXPOSURE RATE (µrem/hr)

NO. =SMEAR/DIRECT LOCATION

R–4 = ROOM NUMBER

SURVEYED BY:	DATE:
ROY L. MOWEN	4/6/11
REVIEWED BY:	DATE:

ALL 2011 GAMMA CONTACT AND GENERAL AREA READINGS WERE ≤ BKGD ON THE 121 FOOT LEVEL



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2011 ANNUAL RADIOLOGICAL SURVEY RESULTS PIQUA DECOMMISSIONED REACTOR SITE PIQUA, OHIO	
DATE PREPARED: MAY 5, 2011	FILENAME: S0724700

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