300502-0605080007

CH2M HILL Mound, Inc.
1075 Mound Road
P.O. Box 750
Miamisburg, OH 45343-0750

CH2MHILL

SMO-057/06
January 23, 2006

Mr. Don Pfister, Director
Miamisburg Closure Project
U. S. Department of Energy
175 Tri-County Parkway
Springdale, OH 45246

ATTENTION: Paul Lucas

**SUBJECT:** **Contract No. DE-AC24-03OH20152:** Deliverable #39 Potential release site and removal action documentation; Section C.2.1.1 Facility Demolition; PRS 101/102 PRS Package, Final

Dear Mr. Pfister:

Attached is the following Final document for your records:

- PRS 101/102 PRS Package, Final

If you or members of your staff have any questions regarding the document, or if additional support is needed, please contact Dave Rakel at 937-865-4203.

Sincerely,

John Lehew
Site Manager

JL/jg

Enclosures

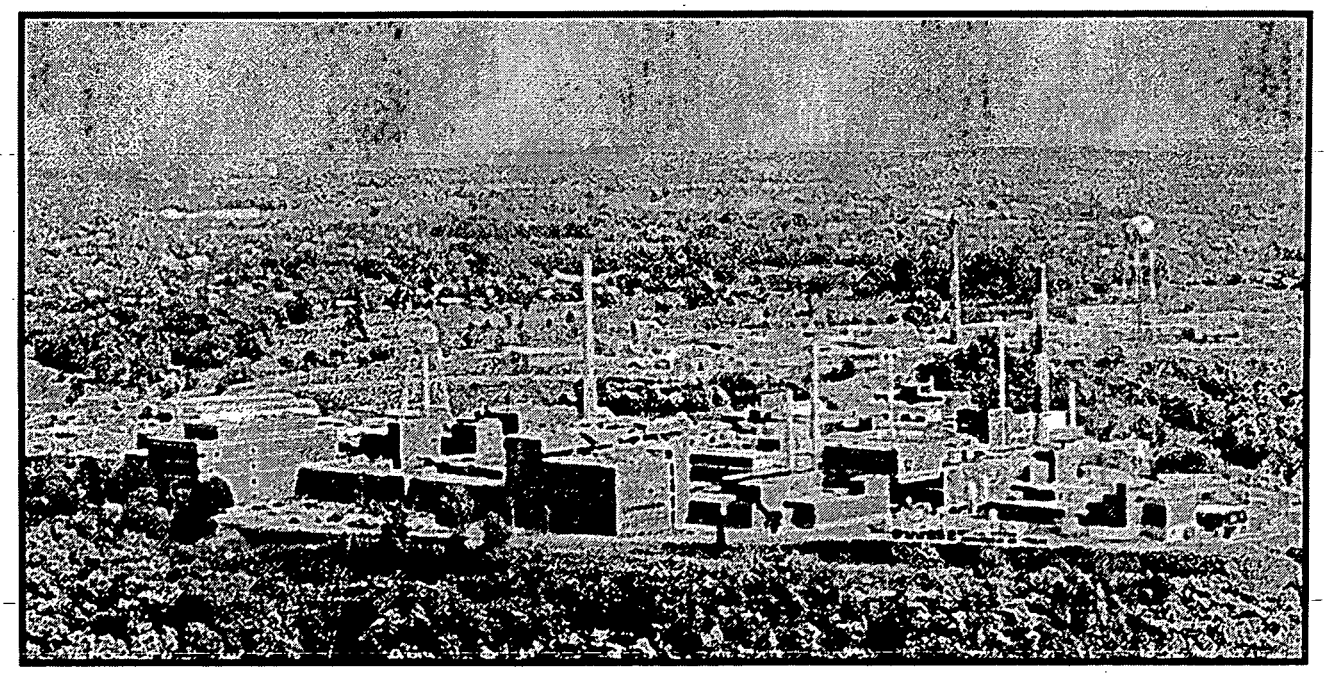
cc: T. Fischer, USEPA, (1) w/attachments
B. Nickel, OEPA, (1) w/attachments
R. Vandegrift, ODH, (1) w/attachments
J. Webb, ODH, (1) w/attachments
M. Wojciechowski, Tetra Tech, (1) w/attach
G. Gorsuch, DOE/MCP, (1) w/attachments
R. Tormey, DOE/OH, (1) w/attachments
G. Desai, DOE/HQ, (1) w/attachments
F. Bullock, MMCIC, (3) w/attachments
Public Reading Room, (1) w/attachments
S. Parfitt, CH2M Hill, (1) w/attachments
C. Kline, CH2M Hill, (1) w/attachments
Admin Record, (2) w/attachments
ER Records, CH2M Hill, (1) w/attachs
DCC (1) w/attachments
J. Lehew, CH2M Hill, w/o attachments
K. Armstrong, CH2M Hill, w/o attachments
D. Rakel, CH2M Hill, w/o attachments
D. Kramer, CH2M Hill, w/o attachments
MOAT Coordinator, CH2M Hill, w/o attachs
S. Barr, CH2M Hill, w/o attachments
M. McDougal, CH2M Hill, w/o attachments
file, CH2M Hill, w/o attachments

Environmental
Restoration
Program

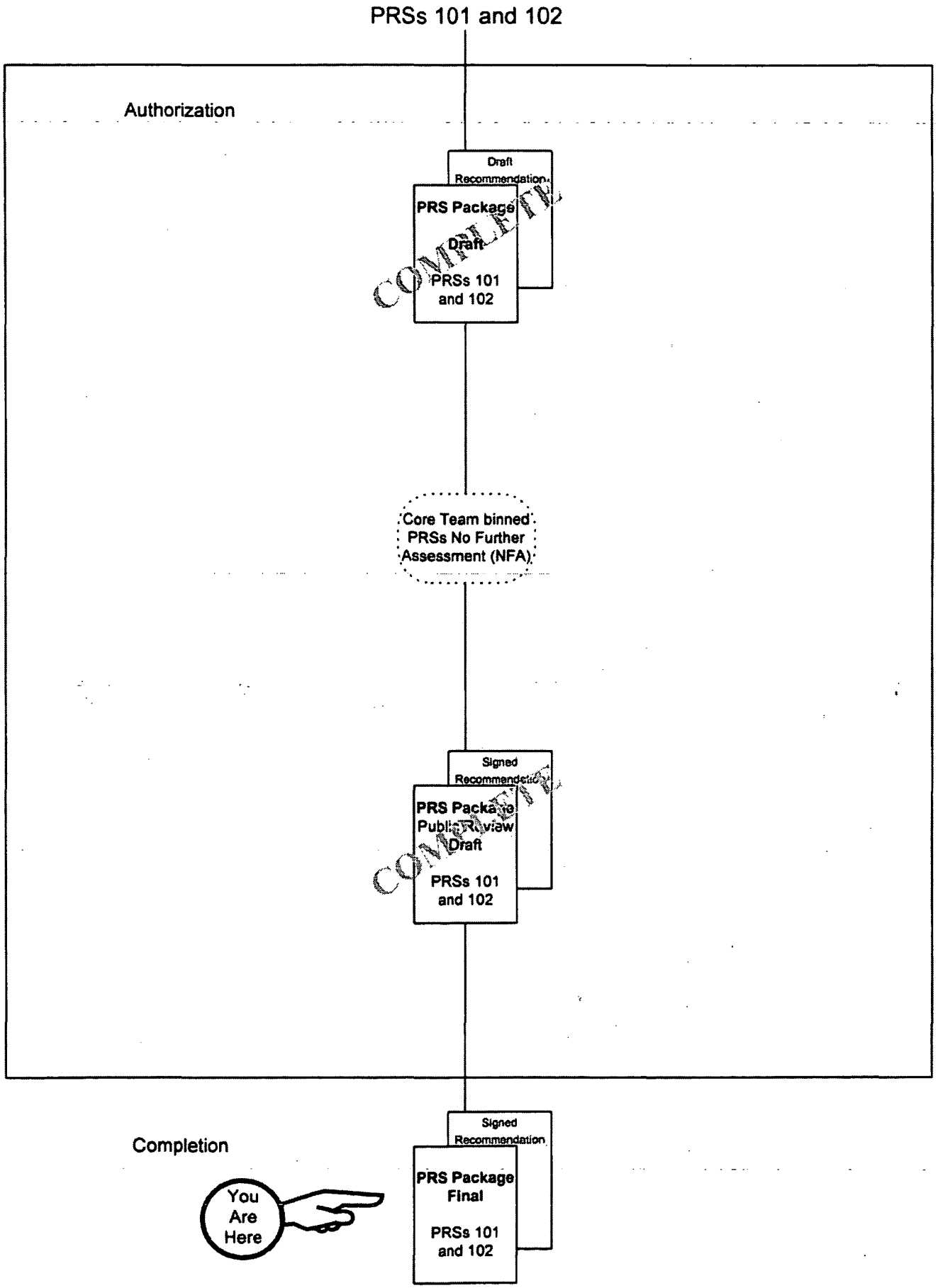
# Miamisburg Closure Project
## Potential Release Site Package

# PRS 101/102

Final
January 2006



# PRSs 101 and 102




COMPLETE
COMPLETE

This page intentionally left blank

**The Mound Core Team**
500 Capstone Circle
Miamisburg, OH 45342

October 2005

Mr. Frank Bullock, PE
Director of Operations
Miamisburg Mound Community Improvement Corporation
720 Mound Road
COS Bldg. 4221
Miamisburg, Ohio 45342-6714

Dear Mr. Bullock:

The Core Team, consisting of the U.S. Department of Energy Miamisburg Closure Project (DOE-MCP), U.S. Environmental Protection Agency (USEPA), and the Ohio Environmental Protection Agency (OEPA), appreciates your concurrence with the PRS 101, & 102 PRS Package, Public Review Draft, September 2005.

Should the responses to comments require additional detail, please contact Paul Lucas at (513) 246-0071, and we will gladly arrange a meeting or telephone conference.

Sincerely,

| | | |
|---|---|---|
| DOE/MCP: | Paul Lucas, Remedial Project Manager | 10/11/05 date |
| USEPA: | Timothy J. Fischer, Remedial Project Manager | 10/18/05 date |
| OEPA: | Brian K. Nickel, Project Manager | 10/12/05 date |

This page intentionally left blank

# Technical Review of the Mound Site
# Summary
by EHS **TECHNOLOGY GROUP, LLC**

**Reference Document**: Potential Release Site 101 and 102; Public Review Draft, September 2005

**Purpose**: The purpose of this document is to notify the public of the No Further Assessment Recommendation for Potential Release Sites 101 (Cooling Tower Basins) and Potential Release Site 102 (Cooling Tower Drum Storage Area).

**Assessment of Review**: EHS has had the opportunity to review and comment on this Potential Release Site Data Package. We concur with the No Further Assessment recommendation for the Potential Release Sites 101 and 102. This data package was prepared in accordance with the requirements specified in the *Work Plan for Environmental Restoration (ER) of the DOE Mound Site, The Mound 2000 Approach.* As such, all appropriate inquiry was made into the condition of the PRS and any associated environmental concerns that would impact the demolition activities were assessed.

**Technical Analysis**: Potential Release Site 101 consists of five cooling tower basins/sumps that were installed over the course of 56 years (1948-1989). These concrete-covered, below ground concrete basins contain circulating pumps used to collect cooled water from ten cooling towers and recycle it back through the powerhouse cooling system. This closed-loop system serves only as a heat exchanger for condensers within the powerhouse. As part of regular maintenance to the cooling towers, blowdown water (consisting of cooling water, scale deposits, and sediment) was periodically released through the storm sewer to the drainage ditch that empties into Outfall 002. The release of blowdown water is regulated through Mound's National Pollutant Discharge Elimination System (NPDES) permit. The cooling water used in the cooling towers over the past 21 years has consisted of water containing additives such as biocides, microbiocides, algaecides, surfactants, de-scaling, and anticorrosion chemicals. There have been no reported spills or unauthorized release of chemicals in the PRS 101 area. Immediately prior to demolition, the basins contained approximately two feet of standing rainwater. This supports the assertion that the basins are watertight and had not leaked. Direct readings, swipes, water and sediment samples all indicate no radiological contamination above environmental background samples. Historical sampling in the area indicate all results are below the $10^{-6}$ risk based Soil Screening Level.

The PRS 102 consists of a cooling tower drum storage area associated with the Powerhouse Building (P Building). This area is located south and west of the cooling towers. This area was built in the early 1970's and consists of an asphalt and concrete pad used for staging containers of biocides, algaecides, anticorrosion chemicals, boiler treatment chemicals, ethylene glycol, and other powerhouse water treatment chemicals. There have been no reported spills or releases of chemicals stored in drums or bulk containers within the cooling tower drum storage area. Historical sampling in the area indicate all results are below the $10^{-6}$ risk based Soil Screening Level.

Both PRS are located approximately 50 feet south of P building. Both were assigned as potential release sites due to their designation as area of concern (AOC) and solid waste management units (SWMU). The cooling tower basins were designated as an SWMU based on the periodic release of blowdown water to the storm sewer and drainage ditch that empties into Outfall 002. The cooing tower drum storage area was designated as an SWMU based on the storage of 55-gallon drums and 300 gallon cube container of chemicals used for the processes within the powerhouse and cooling towers. There is no evidence through historical or recent sampling events, or from visual and olfactory observations during the recent P Building demolition activities that any contamination was or is in this area.

**Substantive Comments**: EHS concurs with the No Further Assessment recommendation for PRS 101 and 102. We understand that these PRS were removed as part of the P Building demolition.

Coordination between CH2M Hill, the DOE and MMCIC is important to ensure that the PRS 101 and 102 areas be left in a condition consistent with the Mound Reuse Plan.

**From:** "Frank Bullock" <FBullock@mound.com>
**To:** "Paul Lucas (E-mail)" <Paul.Lucas@ohio.doe.gov>, "David Rakel (E-mail)" <RAKEDA@doe-md.gov>
**Date:** 10/6/05 8:27AM
**Subject:** PRS 101 & 102 Comments

Paul,

MMCIC appreciates the opportunity to review the PRS package. Attached are the comments from EHS & we concur with their comments.

Thanks & if you have any questions, Please feel free to contact me.

Frank Bullock, PE
MMCIC
Director of Operations
Miamisburg, Oh 45342
(937) 865-4052
www.Mound.com

<<Expericenter - PRS 101 102 - Oct 05.pdf>>

**CC:** "Beth Moore (E-mail 2)" <beth.moore@cityofmiamisburg.com>, "Ellen Stanifer (E-mail)" <estanifer@ehstech.com>, "Becky Burrell (E-mail)" <bburrell@expericenter.com>, "Joan Wysong" <JWysong@mound.com>

# Dayton Daily News

**AFFIDAVIT OF PUBLICATION**
**PO BOX 2805**
**DAYTON, OH 45401-2805**
**937-225-7313**

State of Ohio
Montgomery County

MIAMISBURG CLOSURE PROJECT

**BUILDING DATA PACKAGE**

The following document is available (September 12, 2005) for public information in the CERCLA Public Reading Room, 305 E. Central Ave., Miamisburg, Ohio.

**PRS 101 (Cooling Tower Basins)**
**PRS 102 (Cooling Tower Drum Storage Area), Areas associated with Bldg. P**

Questions can be referred to Paul Lucas at (513) 246-0071

U.S. Department of Energy
U.S. Environmental Protection Agency
Ohio Environmental Protection Agency

5974308 9-9/05

MIAMISBURG CLOSURE PROJECT
BUILDING DATA PACKAGE
The following document is available (September 12, 2005) for public information in the CERCLA Public Reading Room, 305 E. Central Ave., Miamisburg, Ohio.
PRS 101 (Cooling Tower Basins)
PRS 102 (Cooling Tower Drum Storage Area), Areas associated with Bldg. P
Questions can be referred to Paul Lucas at (513) 246-0071
U.S. Department of Energy
U.S. Environmental Protection Agency
Ohio Environmental Protection Agency
5974308 9-9/05

Signed Tina Kimball

Sworn or affirmed to, and subscribed before me, this 9/6/2005.
In Testimony Whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

Lorna M. Foer

Notary Public in and for the State of Ohio

LORNA M. FOER, Notary Public
In and for the State of Ohio
My Commission Expires July 4, 2010

Before me, the undersigned, a Notary public in and for said County, personally came

Tina Kimball,

who being first duly sworn says he/she is the Legal Advertising Agent of the

Dayton Daily News,

which he/she says is a newspaper of general circulation in Montgomery, Clark, Warren, Butler, Clinton, Greene, Preble, Miami, Darke, Mercer, Shelby, Fayette, Logan, Hamilton, Clermont, Auglaize, and Champaign Counties, and State of Ohio, and he/she further says that the Legal Advertisement, a copy of which is hereunto attached, has been published in the said

Dayton Daily News

20.0 Lines, 1 Time(s), last day of publication being 9/9/2005,
and he/she further says that the bona fide daily paid circulation of the said
Dayton Daily News
was over (25,000) at the time the said advertisement was published, and that the price charged for same does not exceed the rates charged on annual contract for the like amount of space to other advertisers in the general display advertising columns.

[redacted]

This page intentionally left blank

**Update to PRS 101/102 PRS Package:**

The PRS 101/102 PRS Package was submitted to the Department of Energy (DOE) within days of the start of the P Building demolition activities. Information presented in the main body of this PRS Package correctly reflects the information available at the time of document preparation. This update provides additional information that was gained during the P Building demolition activities, and supplements the information provided in the main body of this PRS Package.

---

On April 28, 2005, the cooling tower basins (PRS 101), and the cooling tower drum storage area (PRS 102) were demolished and the resulting debris removed.

PRS 101. Prior to demolition, the field superintendent observed approximately two feet of standing rainwater in the cooling tower basins (PRS 101) [15]. Because groundwater in the area is at a depth of 30 feet, the water could not have resulted from infiltration, but was concluded to be rainwater. The fact that the basins retained water supports the assertion that the basins were water-tight and had not leaked (when in use), and that the structural integrity of the basins was maintained until their demolition. Following removal of the basins, the field superintendent did not detect any odors or observe any staining or discoloration of the soil in the area. Because the cooling tower basins extended approximately four feet below ground surface, the PRS 101 area was backfilled for the safety of the demolition personnel and to prevent destabilizing the adjacent road.

PRS 102. The field superintendent noted that the pad on the north side of the cooling towers was comprised of two inches of concrete, while the pad on the south and west sides was comprised of three inches of asphalt. He evaluated the pad for cracks and observed none. Following removal of the pad, no soil stains or odors were observed. The PRS 102 area currently consists of the soil that was below the pad.

The field observations made during and after P Building demolition activities support the assertion that the integrity of the basins and storage area had not been impaired. Therefore, because no potential pathway for any contaminants to have migrated to the surrounding soil could be identified, no additional soil sampling in this area is indicated.

Figure 8 has been added to the package to show the locations and current status of the PRSs in the vicinity. No other PRSs overlap the area designated as PRSs 101 and 102.

This page intentionally left blank

## PRS HISTORY:

PRSs 101 and 102 are assigned to the cooling tower basins (PRS 101) and cooling tower drum storage area (PRS 102) associated with the powerhouse (P Building) [1]. Both PRSs are located approximately 50 feet south of P Building (see Figure 1). The cooling tower basins are comprised of five (currently) concrete-covered, below ground concrete basins and sumps (see Figures 2, 3, & 4). The cooling tower drum storage area is located on the south and west sides of the cooling towers (see Figure 5). The cooling tower basins and cooling tower drum storage area were assigned as potential release sites due to their designation as areas of concern (AOC) and solid waste management units (SWMU). The cooling tower basins were designated as an SWMU based on the periodic release of blowdown water to the storm sewer and drainage ditch that empties into Outfall 002. The cooling tower drum storage area was designated as an SWMU based on the storage of 55-gallon drums and 300-gallon cube containers of chemicals used for processes within the powerhouse and cooling towers [1] (see Attachment 1, pages 1 & 2).

## PRS101:

The five cooling tower basins/sumps were installed over the course of 56 years. These basins contain circulating pumps used to collect cooled water from ten cooling towers and recycle it back through the powerhouse cooling system [2]. This closed-loop system serves only as a heat exchanger for condensers within the powerhouse [2,3]. The following paragraphs describe the construction of the five basins currently in the area, and the removal of the original cooling tower basin (installed in 1948). For the purpose of this document, the basins will be given numbers 1-5 based on their dates of construction.

- The first basin and cooling tower were constructed in 1948 and situated 60 feet southeast of P building [4]. The basin was designed with 12 inch concrete sidewalls resting on a 10 inch concrete slab with support piers and footers. The basin was situated directly under the cooling tower at a depth of approximately 3 to 4 feet below ground surface [5].

- In 1972, the original cooling tower and basin (from 1948) were removed and replaced with two new basins #1 and #2, located directly under cooling towers #1-4 [4]. The new basins were designed with 10 inch reinforced concrete sidewalls situated on an 8 inch reinforced concrete slab with support piers and footers. Continuous water stops were placed at all tank joints to prevent leakage and groundwater infiltration [3,6].

- In 1983, four additional cooling towers (#5-8) and one new basin #3 with sump pump were added [7]. The four towers rest on steel frames directly east of tower #4. Basin #3 is located approximately 9 feet north of tower #5 and is constructed

of 12 inch reinforced concrete sidewalls situated on an 8 inch slab of reinforced concrete [3,8].

- In 1987, two additional cooling towers (#9-10) and one new basin #4 with sump pump were added (see Figures 2, & 6). The two towers rest on steel frames directly east of tower #8 [9]. Basin #4 is located approximately 8 feet north of tower #7 and is constructed of 12 inch reinforced concrete sidewalls and slab with support piers and footers. A concrete waterproofing agent was applied to all grouted and concrete surfaces to provide water resistance [10]. Plant drawings indicate that between 1987 and 1989 cooling tower #1 was removed.

- In 1989, an additional basin #5 with sump pump was constructed to support towers #2-4 (see Figures 3, 4 & 7). Basin #5 is located directly across from tower #3. The basin is constructed of 15 inch reinforced concrete sidewalls and slab with rubber stops at key joints, and support piers. A concrete waterproofing agent was applied to all grouted and concrete surfaces to provide water resistance. At this time, basins #1 and #2 (1972) were cleaned, any cracks patched, and coated with concrete waterproofing agent [3,11]

As part of regular maintenance to the cooling towers, blowdown water (consisting of cooling water, scale deposits, and sediment) was periodically released through the storm sewer to the drainage ditch that empties into Outfall 002. The release of blowdown water is regulated through Mound's National Pollutant Discharge Elimination System (NPDES) permit [1,12]. Cooling water used in the cooling towers over the past 21 years has consisted of water containing additives such as: biocides, microbicides, algaecides, surfactants, de-scaling, and anticorrosion chemicals [2]. There have been no reported spills or unauthorized release of chemicals in the PRS 101 area [13].

The cooling towers were shut down in August of 2004 [3]. The cooling tower basins will be removed during the demolition of P Building in February 2005 [13]. After completion of the Multi-Agency Radiation Survey and Site Investigation (MARSSIM) radiological sampling in December 2004, and with permission from Mound Waste Management, cooling water contained in the cooling towers was discharged into the storm sewer (see results of Recent Structure Sampling pages 3 & 4). Sediment inside the cooling towers was also radiologically evaluated and results were below the Soil Screening Level.

**PRS 102:**

The cooling tower drum storage area is located on the south and west sides of the cooling towers, and was built in the early 1970s (see Figure 5). The cooling tower drum storage area consists of an asphalt and concrete pad used for staging containers of biocides, algaecides, anticorrosion chemicals, boiler treatment chemicals, ethylene glycol, and other powerhouse water treatment chemicals [2]. There have been no reported spills or releases of chemicals stored in drums or bulk containers within the cooling tower drum storage area [13]. The asphalt and concrete pad will be removed during the demolition of P Building in February 2005 [13].

## ANALYTICAL INFORMATION:

*Historic Radiological Information*

The cooling tower basins were used to collect cooled water from the cooling towers, and recycle it back into the plant cooling system. The cooling tower drum storage area only contained drums of chemicals specifically used for the cooling tower or powerhouse. The cooling tower basins, drum storage area, and P Building have been used for the same purpose since construction and no research, development, or production activities using radioactive or energetic materials has occurred in these areas [13].

*Historic Chemical Information*

Information obtained from the *OU9, Site Scoping Report Volume 7* entitled *Waste Management*, provides a chronological description of chemical constituents used over the last 56 years in the cooling tower water, and is reported in Attachment 2, pages 1-3. A list of standard chemicals used for the past 10-15 years in the cooling towers and powerhouse, and stored within the cooling tower drum storage area are reported in Attachment 2, page 4. Chemical additives used in the cooling towers were calculated and dispensed by Mound Plant Operations based on the average flow rate of Outfall #002, in order to adhere with NPDES permit limits.

*Soil Sampling*

As part of the Radiological Site Survey in 1983 and 1984, seven surface soil samples were collected and analyzed for Th-232 and Pu-238. The data collection points are located approximately 25 to 50 feet to the north, east, and south of PRS 101/102. (Attachment 3, page 1). Thorium results were all non-detect. The plutonium results were below the Soil Screening Level (Attachment 3, page 2).

No soil sampling for chemical analysis has been conducted in the PRS 101/102 areas.

*Recent Structure Sampling*

During the week of December 24$^{th}$ 2004, as part of the MARSSIM Final Status Survey for P Building, a radiological assessment was performed. This summary is documented in the Building P, Building Data Package, Appendix G. The following information summarizes the findings of that report.

Direct readings, swipes, and one acid etched sample were taken on exterior and interior surfaces of the cooling towers and basins. In addition, two water samples were taken (one composite from basins #1 and #2, and the other from basin #3), and one composite sediment sample taken from inside four cooling towers (Attachments 4 and 5, respectively).

Analytical results for the water sample from basins #1 and #2 showed 1.48 nCi/L tritium and 0.3 pCi/ml gross alpha (Attachment 4, page 7). Analytical results for the water sample from basin #3 showed 6.79 nCi/L tritium and 0.3 pCi/ml gross alpha (Attachment 5, page 5). Based on these results, permission was received from Waste Management to discharge cooling water from the towers into the storm sewer.

One composite sediment sample from cooling towers #4, #6, #8, and #9 was analyzed. Detected radionuclides (Pu-238, Th-228, Th-230, Th-232 & U-238) were below the Soil Screening Level (Attachment 4, pages 8 & 9).

The results from swipe and direct surveys of 20 data points taken from the exterior and interior of the cooling towers, the concrete pad, pillar, and tower base, were below DOE Order 5400.5 release criteria (Attachment 4, pages 3-6). Direct surveys and swipes of 14 data points were taken of the interior walls, floor, inlet pipe, and sump pump within basin #4. All direct readings were below detectable activity, and therefore did not require an integrated count per Mound procedure MD-30030. All swipes taken within the basin were below DOE Order 5400.5 release criteria (Attachment 5, pages 1-4).

While performing the Final Status Survey of P Building several areas outside the building had fixed alpha contamination >100 dpm/100cm2. The areas surveyed were consistent with alpha readings found elsewhere onsite when surveying rust stained surfaces. Four separate representative areas were selected for acid-etch sampling to identify isotopes of concern, including the cooling towers. The first isotopic result obtained from the roof of P Building (an actual piece of the roof was submitted) was indicative of Group 3 surface activity while three samples taken directly from the surface of the cooling tower, fuel tank, and switchgear area (manhole cover) showed little activity. The acid etch collection method used on the cooling tower, fuel tank and switchgear area yielded questionable results. When an actual piece of the cooling tower coupon and paint scrapings from the fuel oil tank were obtained and submitted for isotopic analysis by alpha spectroscopy the results indicated naturally occurring polonium-210 as a result of the rusted surfaces attracting both radon and thoron daughter particulates. The parent radionuclides do not emit alpha particles and therefore are not listed on the alpha spectroscopy report however these parent radionuclides are assumed to also be present. The results of the analysis, follow-up direct alpha readings and an evaluation of the previously sampled areas are reported in P Building Final Status Survey Addendum 1 reported in Attachment 6, pages 1-2. The analysis and evaluation of sampled data points on exterior surfaces of P Building support defining the alpha surface activity as Group 3.

**DISCUSSION:**

Because no research, development, or production activities using radioactive or energetic materials has occurred within P Building, the cooling towers, cooling tower basins, and drum storage area, radiological or energetic contamination of soils beneath these areas is unlikely. Based on results from direct surveys and swipes taken inside the basin (which were below DOE Order 5400 release criteria), radiological contamination of soils directly below PRS 101 is improbable. Therefore, additional radiological sampling of soils below the PRS 101 area is not warranted.

Historic sampling within the area as depicted in Attachment 3, pages 1 & 2, confirms all thorium results as non-detects and plutonium results as below the Soil Screening Level. Accordingly, additional radiological sampling of soils surrounding the PRS 101/102 areas is not warranted.

Direct surveys and swipes within basin #4 were below DOE Order 5400.5 release criteria. The basins will be removed, demolished, and disposed of per the P Building Demolition Work Package [13].

Because the cooling tower basins (PRS 101) were constructed of reinforced concrete of 8 to 15 inch thickness, continuous water stops placed at tank joints, and waterproof applied to concrete and grouted surfaces, leakage of basin contents is improbable. Groundwater in the area of P Building and PRSs 101/102 is at a depth of 30 feet below ground surface, making infiltration of groundwater into the basins (and thereby compromising the basin's structural integrity) impossible [14]. Because the structural integrity of the cooling tower basins (PRS 101) was both engineered and maintained, chemical sampling of soils both under and surrounding the basins is not warranted.

Because both the 1994 *OU9 Site Scoping Report* and occurrence reports maintained by building supervisors since 1993 have indicated that no reported spill(s) or unauthorized release of chemicals maintained within the cooling tower drum storage area (PRS 102), has occurred, chemical sampling of soils both under and surrounding the PRS 102 area is not warranted [1, 13].

**REFERENCES:**

[1] Operable Unit 9 Site Scoping Report: Volume 12 – Site Summary Report, Mound Plant, Miamisburg, Ohio, December 1994, page A.1-24.

[2] Operable Unit 9 Site Scoping Report: Volume 7 – Waste Management, Mound Plant, Miamisburg, Ohio, February 1993, section 3.4 pages 99 -101.

[3] Personal communication, Alan Upshaw, January 2005.

[4] Drawing 2, Bldg Code 351104, "Replacement of Cooling Tower Powerhouse, Site Plan & Soil Information." 1972

[5] Drawing 3, Bldg. Code 351104, Sheet Number 02001 "Replacement of Cooling Tower Powerhouse, Removals." 1972

[6] Drawing 4, Bldg. Code 351104, Sheet Number 02002, "Replacement of Cooling Tower Powerhouse, Structural." 1972

[7] Drawing M-2, Bldg. Code 351113, Sheet Number M-04002, "Mechanical Site Detail." 1983

[8] Drawing S-1, Bldg. Code 351113, Sheet Number S-03001, "Partial General Site Plan." 1983

[9] Drawing M3, Bldg. Code 351114, Sheet Number 04003, "Partial Mechanical Site Plan." 1987

[10] Drawing S-1, Bldg. Code 35114, Sheet Number 03001, "Site Plan & Sections." 1987

[11] Drawing S2, Bldg. Code 35115, Sheet Number 03002, "Building P Enlarged Site Plan." 1989

[12] Personal communication, Ron Paulick, January 2005

[13] Miamisburg Closure Project - Building Data Package, P Building, Public Review Draft, January 2005, pages 7, 10, 15-16, F1-F7, and O6-O13.

[14] Personal communication, Mark Gilliat January 2005.

[15] Personal communication, James Harvey May 2005.

**ATTACHMENTS:**

1.) Summary Tables: OU 9 Site Scoping Report (Tables relevant to PRS 101/102)

2.) Historic Chemical Information, OU9, Site Scoping Report (dated February 1993, pages 99-100) and the Building Data Package, P Building (dated January 2005, page K4

3.) Historic Soil Sampling Information

4.) Radiological Survey Data Sheet #04-TF-0434

5.) Radiological Survey Data Sheet #04-TF-0443

6.) P Building Final Status Survey Addendum 1

**PREPARED BY:**

Stephanie Parfitt, CH2MHill, ER Technical Staff

This page intentionally left blank

## MIAMISBURG CLOSURE PROJECT
## PRS 101/102

**RECOMMENDATION:**

PRSs 101/102 are areas where solid waste management units (SWMU) associated with P Building had been located. The designation of PRS 101 as an SWMU is based on the discharge of cooling tower blowdown water into the storm water drain to Outfall 002. The designation of PRS 102 as a SWMU is based on its use as a storage area for chemical constituents used in processes to support both the powerhouse and cooling towers. There have been no reported spills or unauthorized release of chemicals in the PRS 101/102 areas. The cooling tower basins, drum storage area, and P Building were never used for research, development, or production activities directly involving the use of radioactive materials. The P Building Final Status Report (which included a radiological evaluation of the PRS 101 and 102 structures) concludes that all surfaces met the release criteria established by DOE Order 5400.5 and Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, February 1999, Final, and that no activity above environmental background levels was found in sediment smear samples, sediment samples, and drain and sump water samples. The results of historic soil sampling conducted around PRS 101/102 indicate all results are below the $10^{-6}$ risk-based Soil Screening Level. The PRS 101 and 102 structures were removed as part of the P Building demolition activities in April 2005; no evidence of any cracks or leaks, or soil staining or odors was observed during or after demolition activities.

The Core Team recommends No Further Assessment.

**CONCURRENCE:**

DOE/MCP: Paul Lucas 8/31/05
Paul Lucas, On-Scene Coordinator (date)

USEPA: Timothy J. Fischer 9/1/05
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: 9/1/05
Brian K. Nickel, Project Manager (date)

This page intentionally left blank

# FIGURE 1: Location of PRSs 101/102

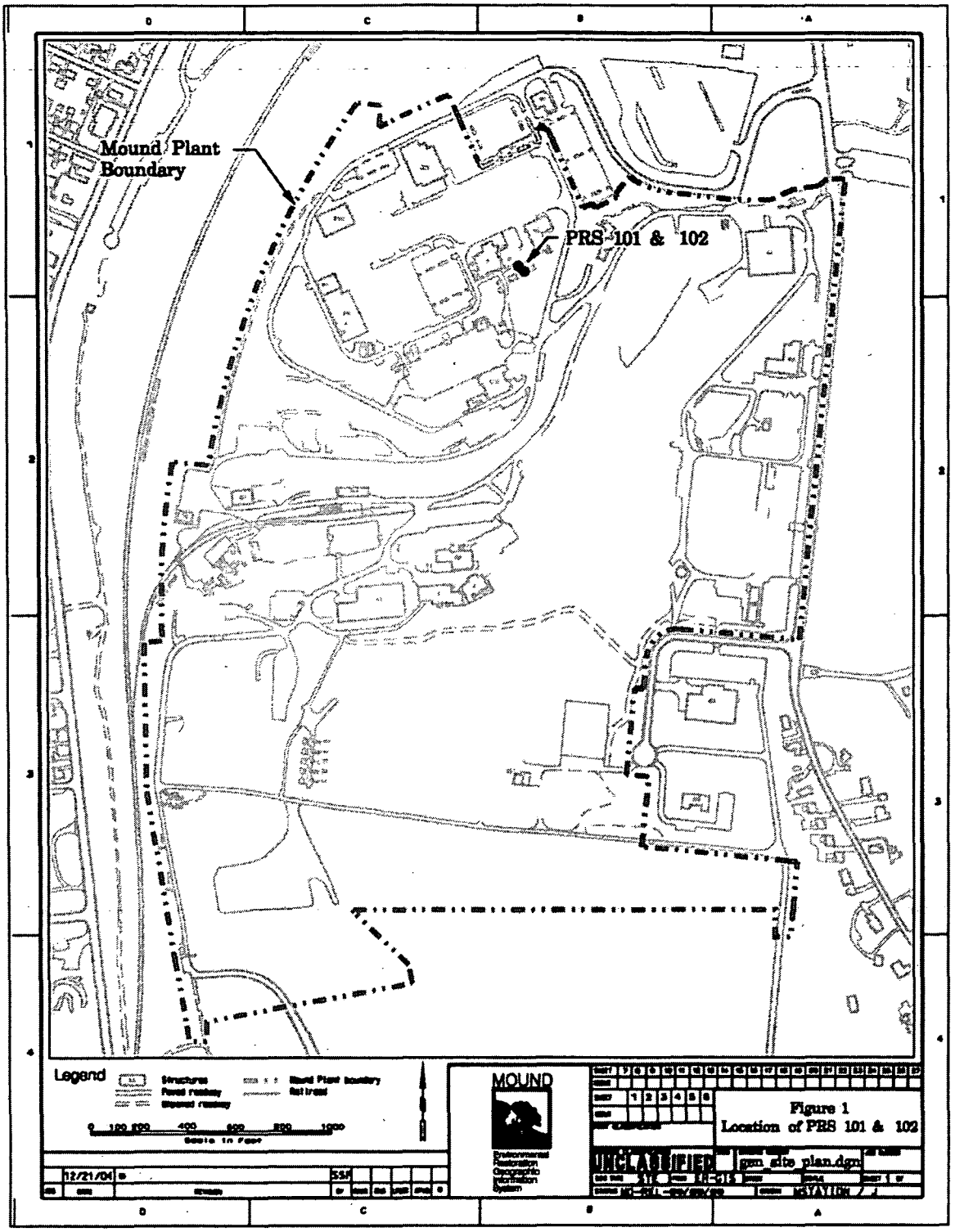


**FIGURE 2: PRS 101, historical (2000) view of Cooling Towers #1-10, and Cooling Tower Basins #3 & #4 (looking south)**

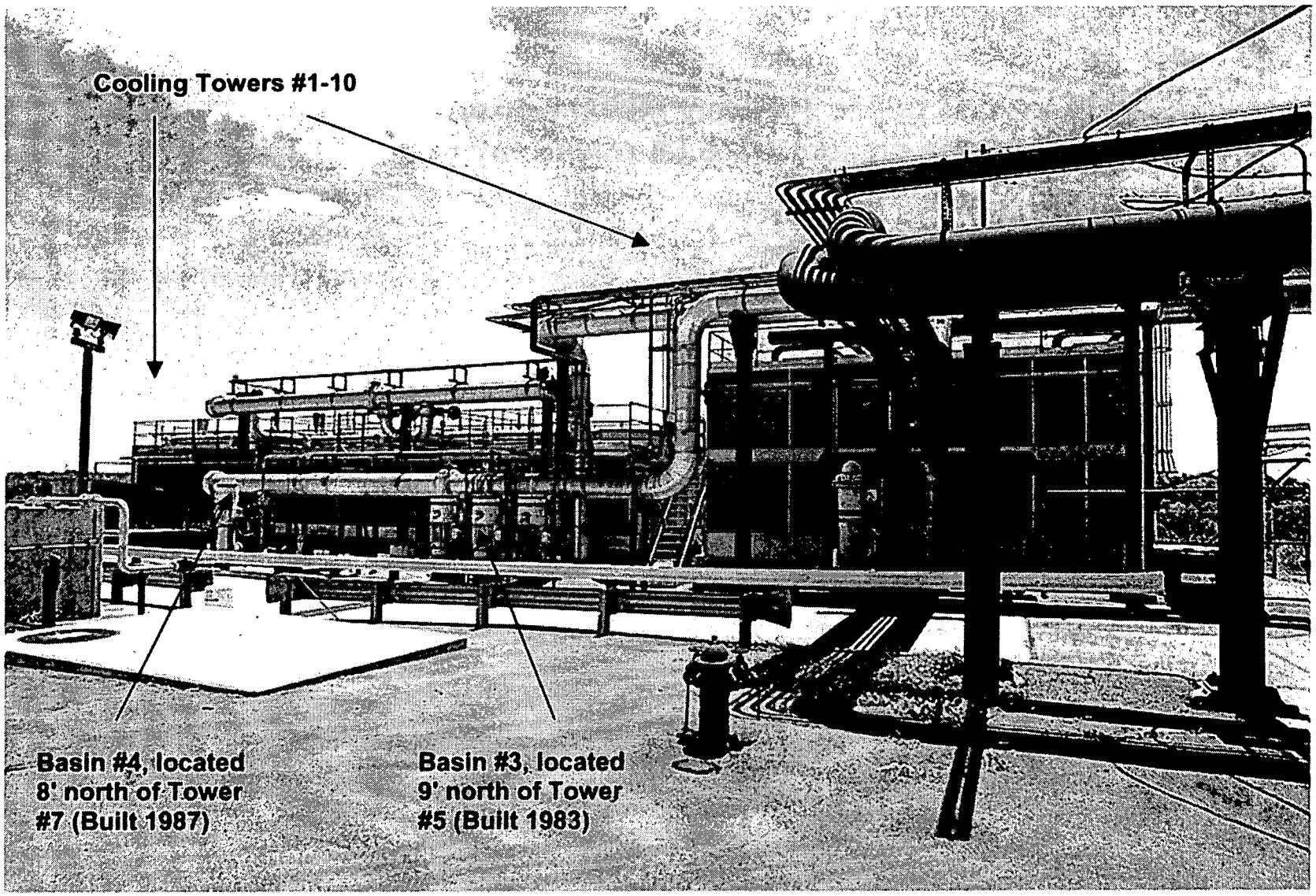


**FIGURE 3: PRS 101, historical (2000) view of Cooling Towers #1-4 (looking southeast), and Cooling Tower Basins #1, #2 & #5**

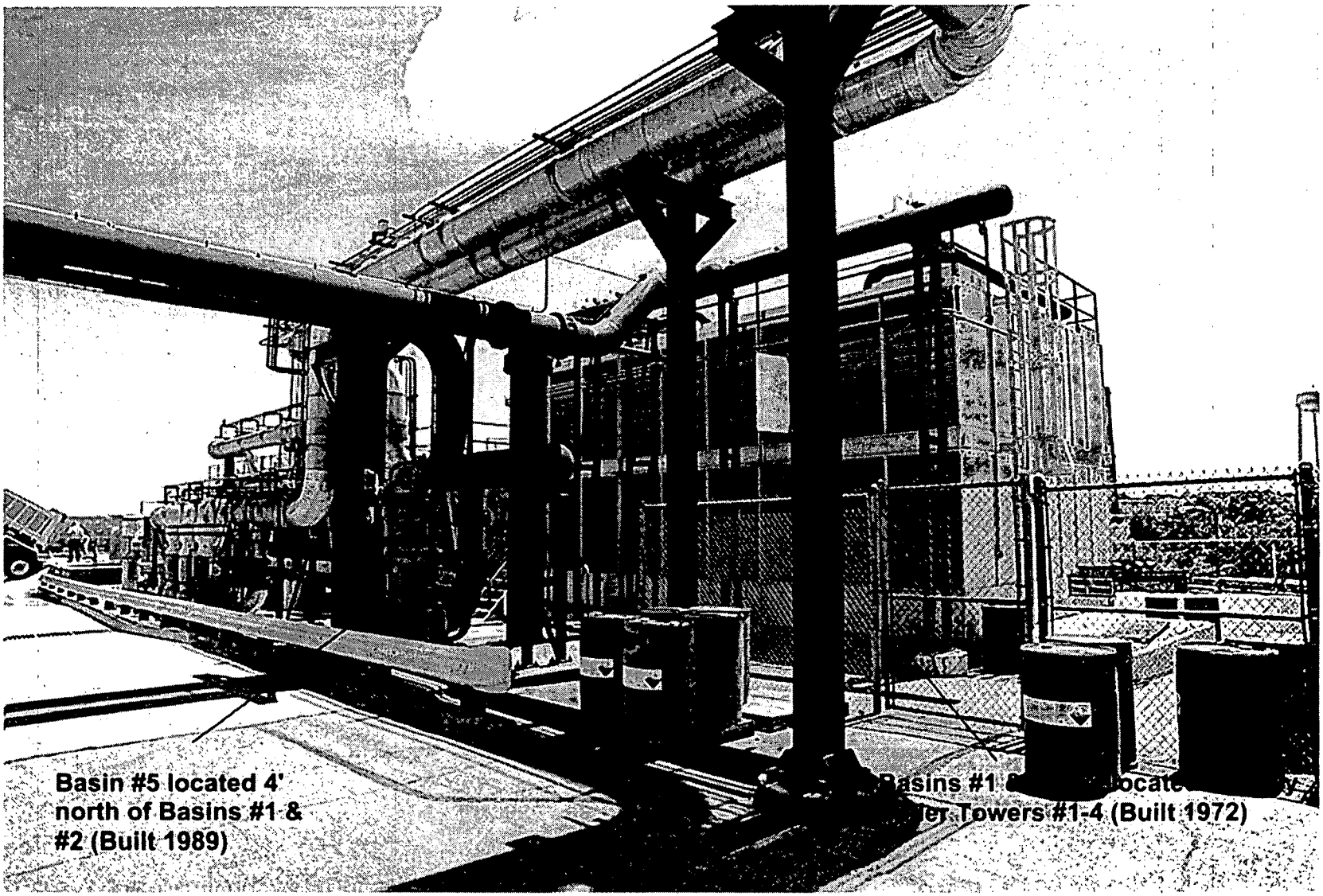
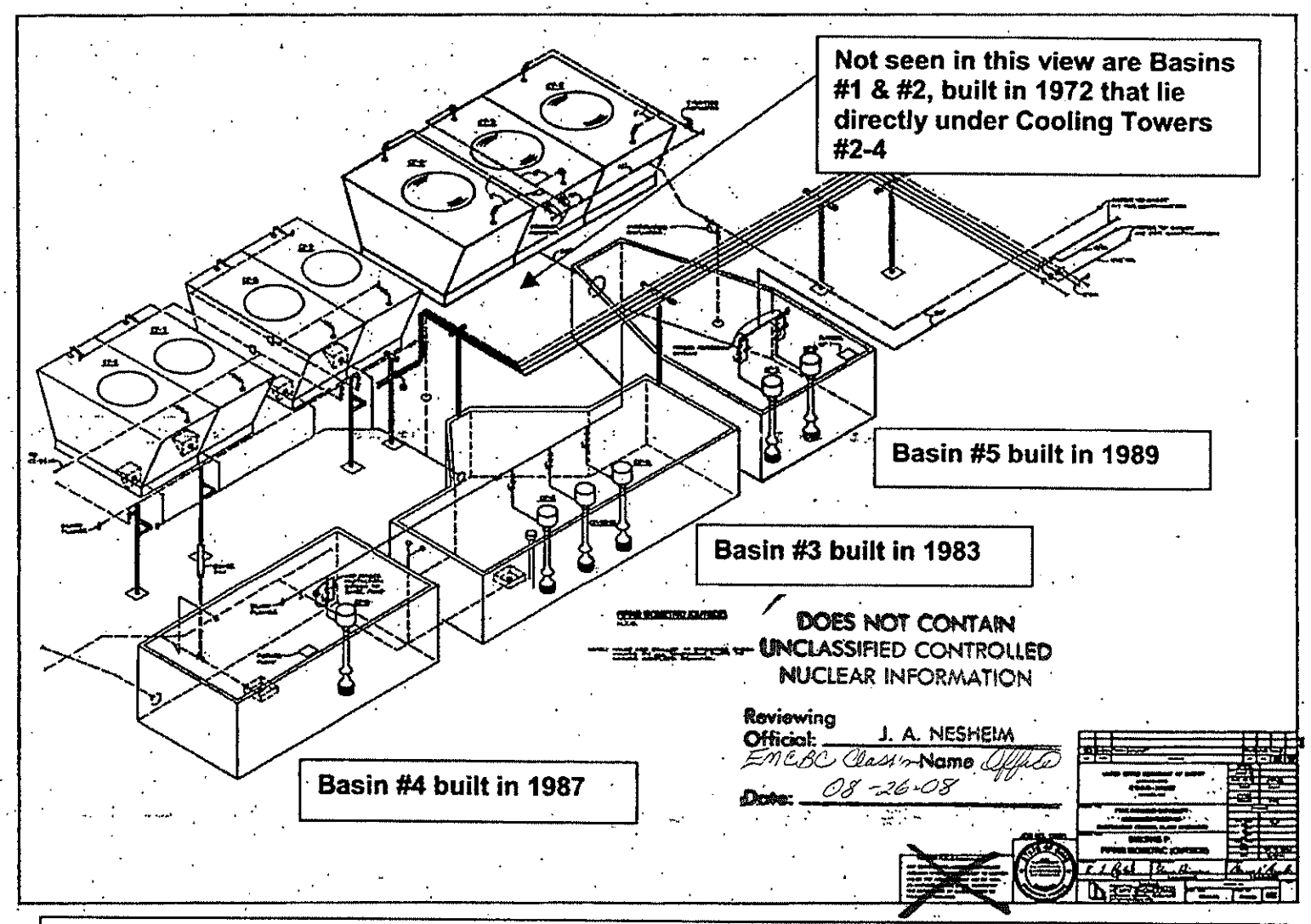


**FIGURE 4: Drawing M8, 1989 (as built), drawing shows the locations of basins associated with PRS 101 (looking south).**




Taken From Drawing M8, Bldg. Code 351115, Sheet Number 04008, "Building P Piping Isometric (Outside)." 1989.

**FIGURE 5: PRS 102 historical (2000) view of Cooling Tower Drum Storage Area (looking northeast)**

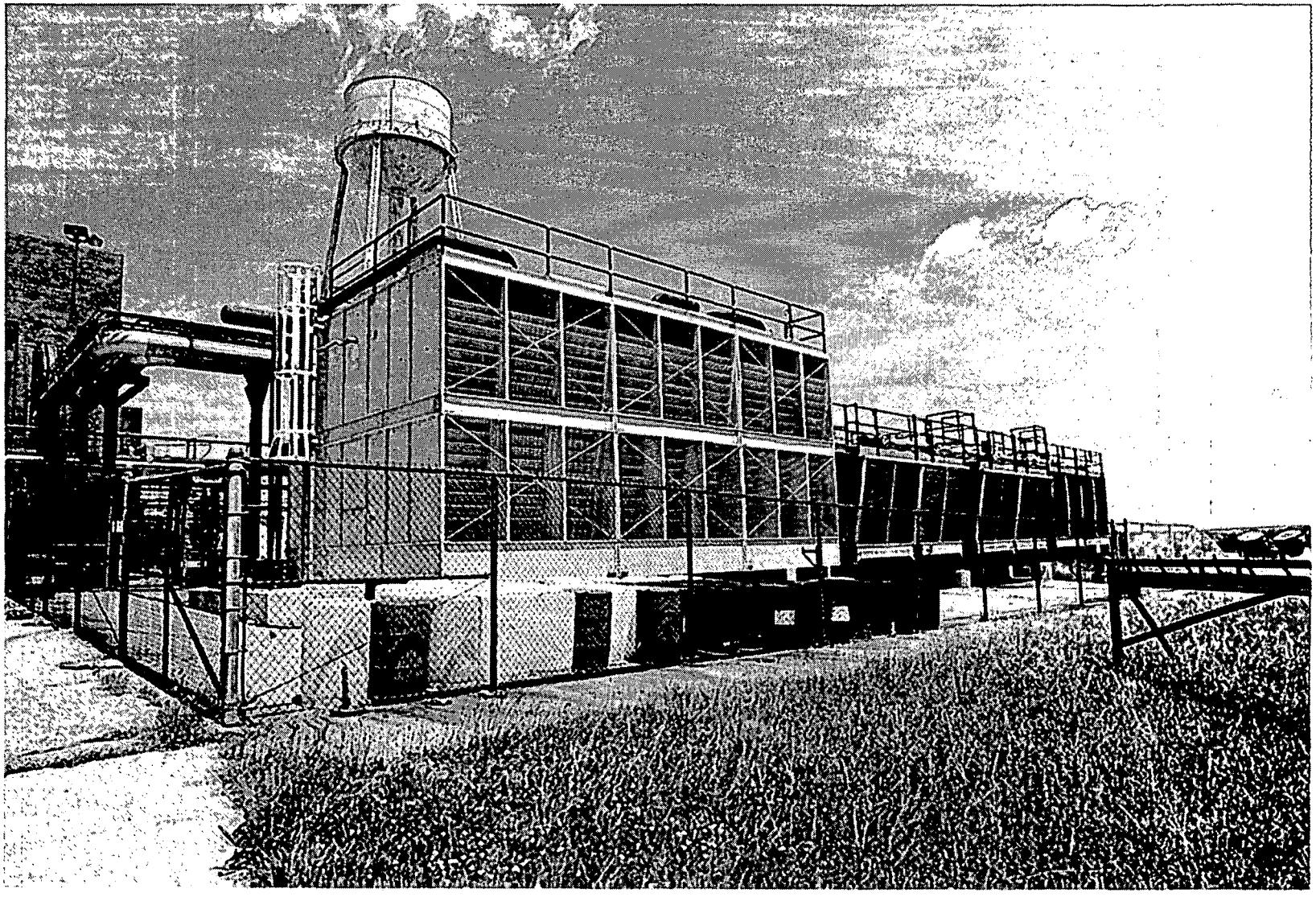
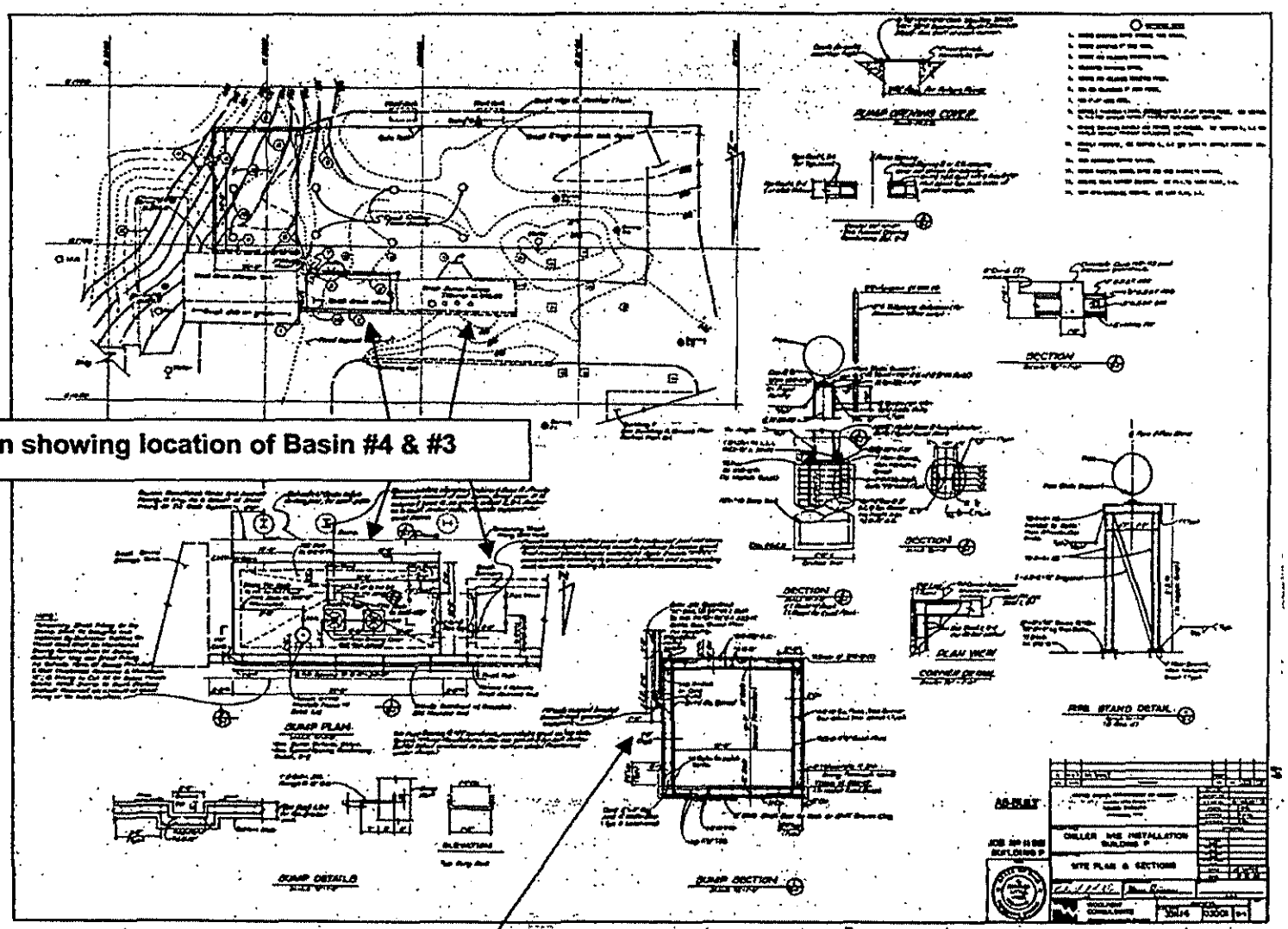


**FIGURE 6: Drawing S-1, Job 11881, 1987 (as built), Basin #4 Site Plan provides details on sump construction (looking south)**



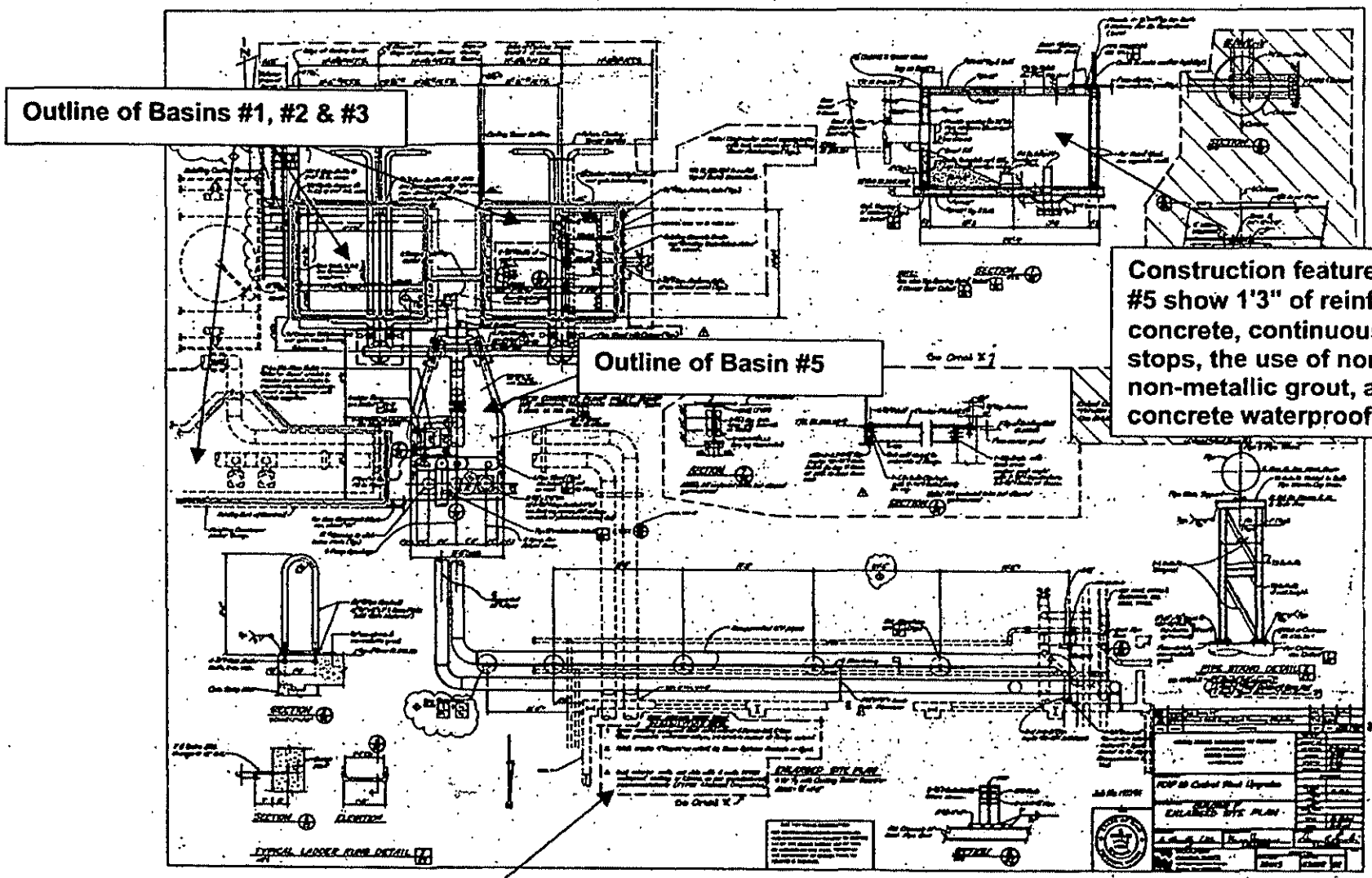

Site plan showing location of Basin #4 & #3

Construction features of Basin #4 shows 1'0" of reinforced concrete, continuous water stops, the use of non-shrink and non-metallic grout, as well as waterproofing the concrete.

DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION

Reviewing Official: J. A. NESHEIM
Name
Date: 09-02-08

**FIGURE 7: drawing S2, Job 12091, 1991 (as built), Basin #5 Site Plan provides details on basin construction (looking south)**

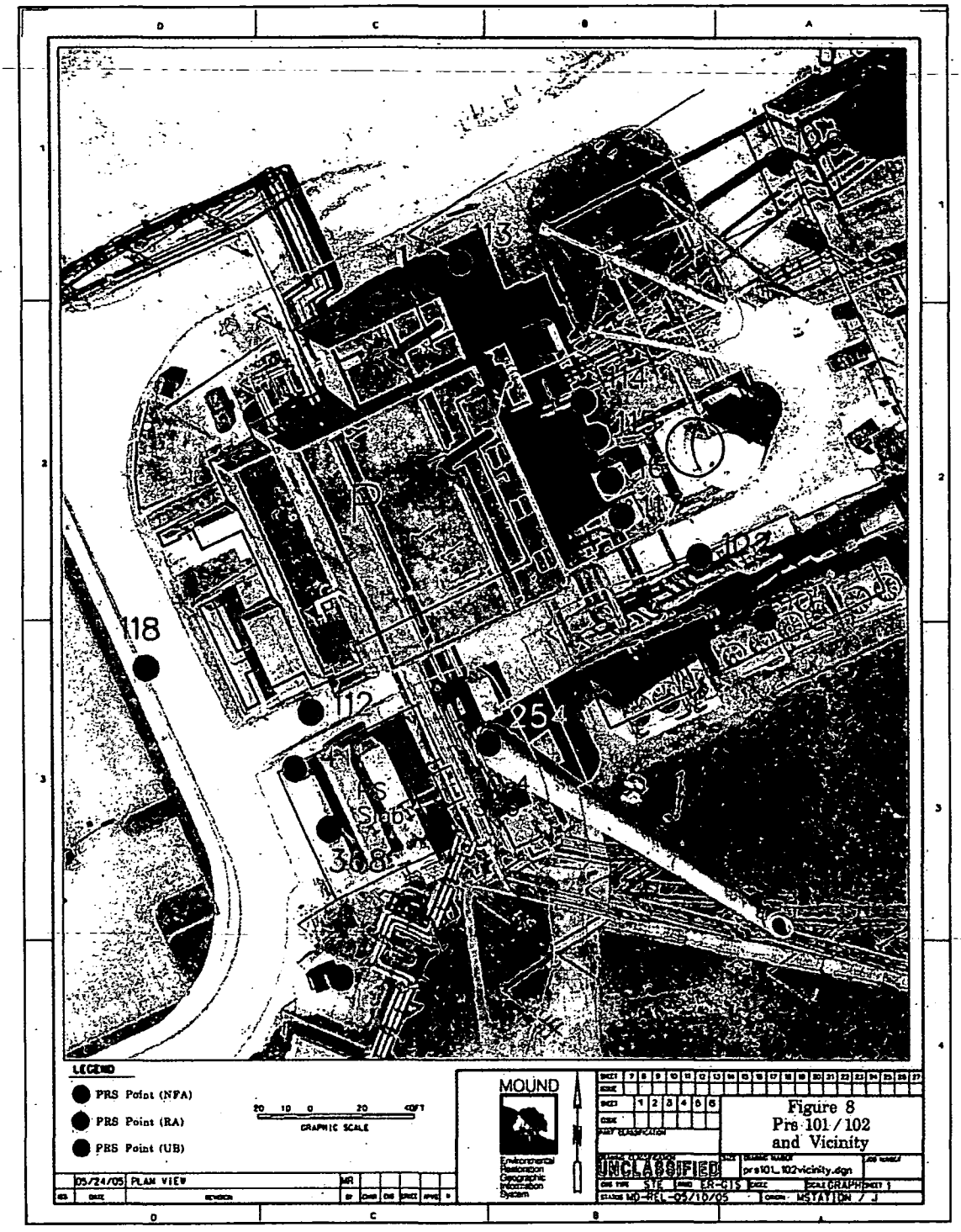



DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION

Reviewing Official: J. A. NESHEIM
Name
Date: 05-26-08

This page intentionally left blank

# FIGURE 8: PRS 101/102 & Vicinity



# . ATTACHMENT 1

## SUMMARY TABLES: OU9 SITE SCOPING REPORT

*(Tables relevant to PRS 101/102)*

## Taken from the OU 9 Site Scoping Report: Volume 12-Site Summary Report, APPENDIX A

| Table A.1. Comprehensive Tabulation of Potential Release Sites | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Description of History and Nature of Waste Handling | | | | | | Hazardous Conditions and Incidents | | | Environmental Data | | |
| No. | Site Name | Location | Status | Potential Hazardous Substances | Ref | Releases | Media | Ref | Analytes[a] | Results | Ref |
| 101 | Cooling Tower Basins | E-7<br>E-8 | In service | Sulfuric acid<br>Chromates | 4, 5, 18 | Blowdown water is released to storm sewer and drainage ditch. | | 4 | No Data | | |
| | | | | NALCO 2575 (phosphonate base, tolytriazole, polyacrylate, sodium chromate) | | | | | | | |
| | | | | NALCO 2532 (bistributyltin) oxide, n-alkyldimethylbenzyl ammonium chloride, potassium hydroxide) | | | | | | | |
| | | | | NALCO 2590 (calcium hypochlorite) | | | | | | | |
| | | | | ANCO CSA (phosphonate base, tolytriazole, polyacrylate) | | | | | | | |
| | | | | MICROBICIDE 77 (5-chloro-2 methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazolin-3-one) | | | | | | | |
| | | | | ANCO ALGAECIDE No. 1 (2-benzyl-4-chlorophenol, sodium hydroxide) | | | | | | | |
| | | | | SILTEX (sodium polyacrylate) | | | | | | | |
| | | | | ANCOCIDE 4020 (glutaraldehyde) | | | | | | | |
| | | | | ANCOSPERSE 3830 (polyalkylene glycol, n-alkyldimethylbenzylammonium chloride) | | | | | | | |
| | | | | ANCOOL 3310 (phosphonate, triazole, sodium molybdate, sodium hydroxide) | | | | | | | |

## Taken from the OU 9 Site Scoping Report: Volume 12-Site Summary Report, APPENDIX A

| Table A.1. Comprehensive Tabulation of Potential Release Sites | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Description of History and Nature of Waste Handling | | | | | | Hazardous Conditions and Incidents | | | Environmental Data | | |
| No. | Site Name | Location | Status | Potential Hazardous Substances | Ref | Releases | Media | Ref | Analytes* | Results | Ref |
| 102 | Cooling Tower Drum Storage Area | E-7 | In service | Contaminants listed under Cooling Tower Basins | 4, 5 | | | | No Data | | |
| | | E-8 | | Ethylene glycol | | | | | | | |
| References | | | | | | | | | | | |
| 4. DOE 1993a - "Site Scoping Report: Volume 7 - Waste Management (Final)." | | | | | | | | | | | |
| 5. EPA 1988a - "Preliminary Review/Visual Site Inspection for RCRA Facility Assessment of Mound Plant" | | | | | | | | | | | |
| 18. DOE 1992a - "Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan (Final)." | | | | | | | | | | | |

| Table A.2. Assignment of Regulatory Authorities to Potential Release Sites and Recommendations for Further Action | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Operational Jurisdiction | | | SWMU | Historic Activities | | Further Action Recommended | FFA OU |
| No. | Site Name | Location | Status | Regulated Units | Regulatory Authority | Spill Response | | Evidence Of Release | Response Authority | | |
| 101 | Cooling Tower Basins | E-7<br>E-8 | In Service | Discharge to plant drainage ditch | RCRA | RCRA | SWMU | Yes* | CERCLA | Yes | 2 |
| 102 | Cooling Tower Drum Storage Area | E-7<br>E-8 | In Service | PBR | RCRA | RCRA | SWMU | No | NA | OM | |
| Acronyms | | | | | | | | | | | |
| OM - Action to be taken by Mound Plant operations and maintainence | | | | | CERCLA - Comprehensive Environmental Response, Compensation & Liability Act. | | | | | | |
| PBR - permit by rule | | | | | | | | | | | |
| SWMU - Solid waste Management unit | | | | | * Refers to release of blowdown water documented on previous page. | | | | | | |
| RCRA - Resourse Conservation and Recovery Act | | | | | | | | | | | |

# ATTACHMENT 2

## HISTORIC CHEMICAL INFORMATION

*OU9, Site Scoping Report (dated February 1993, pages 99-100)*
*Building Data Package, P Building (dated January 2005, page K4)*

Taken from OU9, Site Scoping Report: Volume 7
Waste Management, February 1993, pages 99-101

materials of the same type. Failed vehicle parts are returned for redemption of the core charge. Parts that have no core charge, such as used filters, hoses, and spark plugs, are discarded as non-hazardous trash, which is transported off-plant for disposal.

Brake repair is now performed in confined conditions to prevent worker exposure to asbestos. A containment system with glove ports is placed around the wheel and maintained at a negative pressure. The containment system is connected to two HEPA filters. Asbestos or other dusts generated by the maintenance process are removed from the air by HEPA filters prior to discharge. Loaded HEPA filters are removed and packaged as asbestos waste.

A ventilation system contains the vehicle exhaust emissions inside the building. A hose is placed around the vehicle's tail pipe and when the vehicle is running, fans pull the exhaust fumes from the tailpipe and discharge them outside the building (Deel 1991).

Historically, the waste oils and antifreeze were disposed of in the historic landfill. A few tires and batteries were also dumped in the landfill, but most were sent off-plant for recycling. In the late 1960s, on-plant dumping was stopped, materials were collected for pickup by Industrial Waste Disposal, Inc., and shipped to an approved off-plant waste disposal facility (Vaughters 1991). Briefly, in 1972, waste oil was staged in a 1,000-gallon tank and burned in the incinerator in Building 51. Currently, the waste oil, used antifreeze, old batteries, worn out tires, and filters containing asbestos are placed outside the south side of the building. Mound waste management personnel collect these wastes weekly for proper off-plant disposal or recycling (Deel 1991).

Building G is also used to store janitorial supplies such as floor strippers, floor finishes, cleansers, deodorizers, hand soaps, sponges, and mops that are used throughout Mound. These materials are stored in locked cabinets and caged areas, because they do not generate any hazardous waste streams.

### 3.4. COOLING TOWER BASINS

Substantial volumes of water were used at Mound for the single-pass cooling of process equipment in Buildings E, SW, T, DS, HH, 38, and others. In the past, this cooling water was routed directly to the storm sewer system, which discharged to the Miami-Erie Canal via NPDES Outfall 002. The NPDES suspended solids limit set for this stream was frequently exceeded during heavy rainfall due to the additional storm water runoff containing high concentrations of silt. To remove the cooling water discharges from the storm sewer, closed loop systems

using cooling towers were installed at the powerhouse for the major water users (Figure 3.1).

Specific information on the chemicals used in the recirculating cooling tower water prior to 1980 is not available. Typical cooling water treatment chemicals used in industry until the mid-1970s consisted of sulfuric acid and chromates. This type of water treatment was probably used at Mound. In 1980, Mound began using Nalco treatment chemicals to condition the cooling water. Nalco 2575, an organic treatment, was used as a corrosion inhibitor. Nalco 2575 contained a phosphorate base (scale inhibitor), tolytriazole (a copper corrosion inhibitor), polyacrylate, and a sodium chromate tracer. Sodium chromate was present in minor concentrations, totalling approximately 0.5 percent of the total constituents. Nalco 2532 and Nalco 2590 were the biocides used. Nalco 2532 contained bis(tributyltin) oxide, n-alkylidimethylbenzyl ammonium chloride, and potassium hydroxide; Nalco 2590 consisted of calcium hypochlorite.

In 1983, Mound changed from Nalco chemicals to Anco water treatment chemicals manufactured by Anderson Chemical Company. Anco CSA was used as the corrosion inhibitor and replaced Nalco 2575. Anco CSA basically consists of the same compounds as Nalco 2575; however, no chromates are present in Anco CSA. Microbicide 77 was used as the microbicide. Microbicide 77 consists of 5-chloro-2 methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one. Anco Algaecide No. 1 was used as an algicide. This product contains 2-benzyl-4-chlorophenol and sodium hydroxide. Siltex was used as a micro-biodispersent and contained sodium polyacrylate.

Over the past few years, minor changes have been made in the compounds used in the cooling tower water. Presently, Ancocide 4020 (formerly called Microbicide 77) is used as the microbicide. Ancocide 4020 is added to the water as a biocide and contains aqueous glutaraldehyde. Ancosperse 3830 is added as a surfactant and contains polyalkylene glycol and n-alkyldimethylbenzylammonium chloride. Ancool 3310 is added as an organic treatment corrosion inhibitor and contains phosphorate, triazole, sodium molybdate, and sodium hydroxide (Mitchell 1991; Raker 1991).

Three cooling tower basins are installed to collect the cooled water from the 10 cooling towers and recycle it back into the plant cooling system. The cooling tower basins are below-ground concrete sumps and are provided with circulating pumps. The basins are covered with a concrete top and are on the north side of the cooling towers. Periodically, blowdown of the cooling water system is performed. The blowdown water is routed to the Mound drainage ditch. The area

around the cooling towers and the basins is covered with asphalt to keep dirt and debris from entering the tower via the air draft. The start-up dates for the cooling tower basins vary. They are all currently in operation.

A cooling tower drum storage area is located near the cooling towers. The storage area consists of an asphalt pad on the south and west sides of the cooling tower. The pad is used as a chemical staging area. No containment system is present to control drum leakage or runoff. The pad is used to stage biocides, anticorrosion chemicals, boiler treatment chemicals, ethylene glycol, and other powerhouse water treatment chemicals contained in 55-gallon drums. The pad was built in the early 1970s and is still operational.

### *3.5. PHOTOPROCESSING*

Photoprocessing activities are conducted at approximately 20 locations at Mound. The functional groupings of these activities are listed below:

Product Development and Environmental Testing

Manuals and Procedures

Drawing Control

General Analytical

Advanced Devices Plastics (ADP) Operations

Photography

Instrumental Analysis

Radiography (Industrial)

Radiography (Medical)

Classified Explosives Work

Specific wastes generated from the above activities include approximately 2,850 L (750 gallons) of spent fixer solution that are collected and stored on-plant for future recovery of silver using a recently acquired electrolytic unit, and approximately 2,850 L (750 gallons) of other photoprocessing waste consisting of developers, stop baths, bleaches, rinses, etc., that are collected for on-plant storage prior to transfer to an EPA-permitted vendor for transport and treatment/disposal.

In addition, very small amounts of photoprocessing waste are generated by X-ray film development. The X-ray film development is performed in Building DS, using a Hope processor, which uses Kodak

Taken from Building Data Package, P Building dated January 2005, page K-4

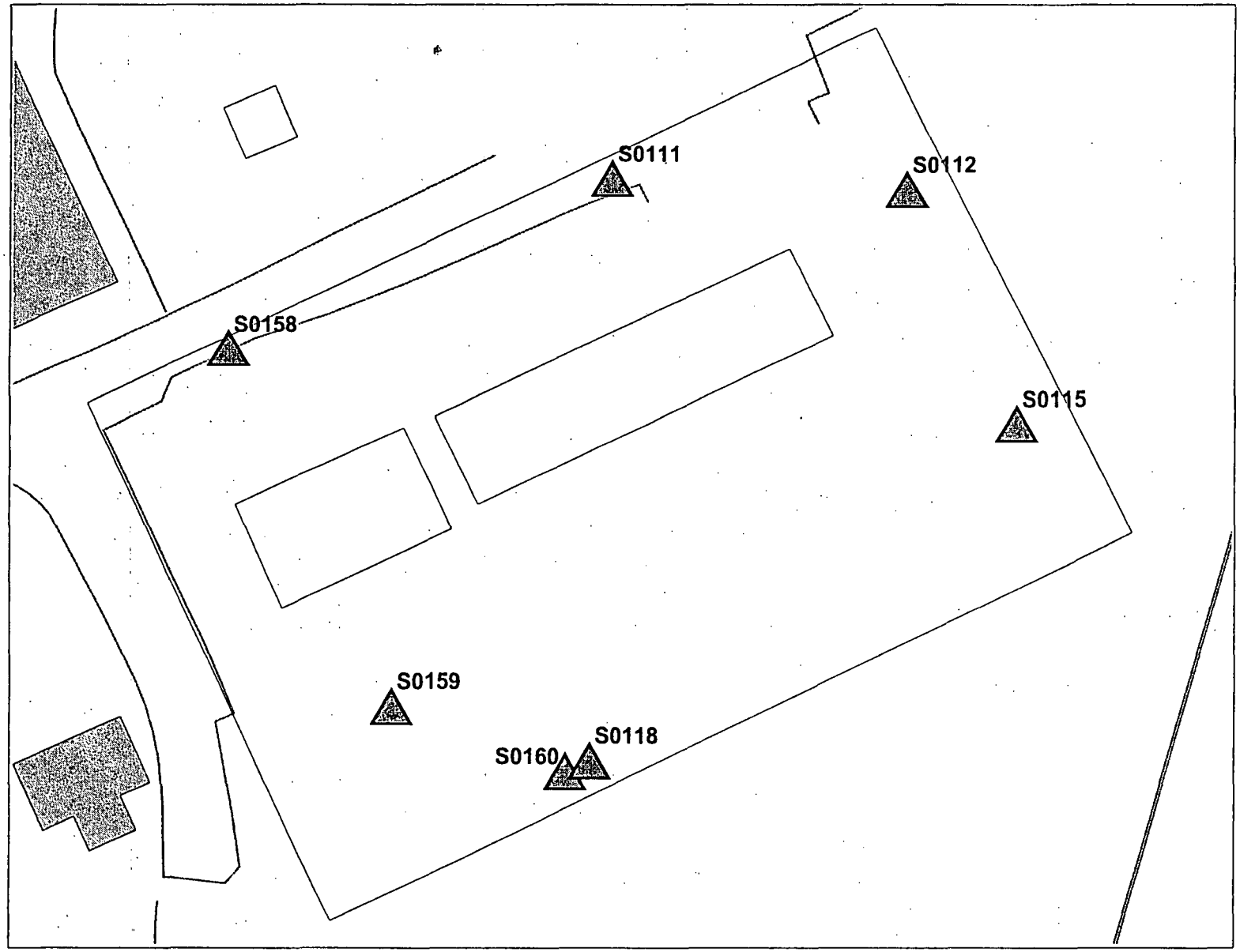
**Chemicals and Products Previously Used or Stored in P Building**

Anco 3310
Anco 8007
Anco 8510
Ancocide 4020
Ancocide 4070
Ancool 3710
Ancosteam 2010 (condensate)
Ancotreat 1310
Antifoam BW
Braxon #2 (Phosphate)
Bromthymol Blue Indicator
Buffer Ph 10.0
Buffer Ph 7.0
Buffer Reagent
C.A.N. Solution
C.O.D. Solution
Calcium Chloride Standard Solution
chlorodifluoromethane
Conductivity Standard
Cresol Red
D.P.D. Free-Chlorine Reagent
D.P.D. Total-Chlorine Reagent
dichlorodifluoromethane
dichlorodifluoromethane/difluoromethane
diesel
Dowtherm SR1 (Glycol)
ethylene glycol
Ferrozine Iron
fuel oil
Fuel Oil #2
Gemclor 12.5 Hypochlorite (Chlorine)
Hardness Titrating Solution
Hydrogen-Peroxide
Indicator Reagent
iodide iodate
Liquid Neutralizer
lubricating oil
Methyl Orange
Molybdate
Molybdenum Buffer Reagent
Molybdenum Indicator Powder
Molybdenum Oxidizing Reagent
Neutralizing Solution
Ox-Gem (Sulfife)
Phenolphthalein
Potassium Chromate Indicator
Reagent Solution Pillows
Reducite
Silver Nitrate
Sodium Carbonate N/10
Sodium Hypochlorite
Sodium Silicate (Ancool 3400)
Standard Zero
Stannous-Chloride Powder
Sulfife Indicator Powder
Sulfuric Acid N/50
Total Hardness Buffer
Total Hardness Indicator
trichlorofluoroethane
Zeolite (Aluminosilicate)
zinc chromate

# ATTACHMENT 3

## HISTORIC SOIL SAMPLING INFORMATION

# Historic Samples around PRS 101 & 102




Sample Detect
Boring
Surface Sample

N
W
E
S

MOUND
Environmental Restoration Geographic Information System

25 0 25 50 75 100 Feet

01/31/05

e:\cad_proj\prs101_102\esri\prs101_102_013105.apr

Attachment 3: 1 of 2

## Previous Sampling Results-All detections

| Location Name | Sample id | Location type | Collection date | Value name | Measured value | Value units | Detection limit | Chem class | Start depth | End depth | CAS number | Lab qualifier | Data qualifier | Project code | Media | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S0112 | 6200 | Surface Location | 19840801 | Plutonium-238 | 0.120000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 0 |
| S0111 | 6198 | Surface Location | 19840801 | Plutonium-238 | 0.720000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 2 |
| S0115 | 6199 | Surface Location | 19840801 | Plutonium-238 | 0.410000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 2 |
| S0118 | 3060 | Surface Location | 19831001 | Plutonium-238 | 0.620000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 2 |
| S0118 | 3060 | Surface Location | 19831001 | Tritium | 2.130000 | PCI/ML | | RAD | 0 | 0 | 10028-17-8 | | | RSS | Soil | 0 |
| S0160 | 6209 | Surface Location | 19840801 | Plutonium-238 | 0.170000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 2 |
| S0159 | 6210 | Surface Location | 19840801 | Plutonium-238 | 0.170000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 2 |
| S0158 | 3094 | Surface Location | 19831001 | Plutonium-238 | 0.730000 | PCI/G | 0.01 | RAD | 0 | 0 | 13981-16-3 | | | RSS | Soil | 2 |

| | |
|---|---|
| (Blank) | No criteria checked |
| 0 | Value is less than criteria checked in file "Final RBGVs Constr Worker-Site Employee Rev8.xls" |
| 1 | Value is greater than 10-6 Risk-Based Guideline Value |
| 2 | Value is greater than the OU9 Soil Background Value |
| 3 | Value is greater than the Screening Value (10-6 RBGV + background or as agreed) |
| 4 | Value is greater than the Cleanup Objective (10-5 RBGV + background or as agreed) |
| 5 | Value is greater than the MCL |
| 6 | Value is greater than the Guide Value based on the Hazard Index = 1 |
| 7 | Value is greater than the Hot Spot Criteria (3x10-5 + background or as agreed) |
| 8 | Value is greater than the Guide Value based on the Hazard Index = 1 + background |
| 9 | Value is greater than the Guide Value based on the Hazard Index = .1 + background |

Duplicate entries in the Comment column indicate values for RAD daughters and long lived decay.

## Previous Sampling Results-All non-detects

| Location Name | Sample id | Location type | Collection date | Value name | Measured value | Value units | Detection limit | Chem class | Start depth | End depth | CAS number | Lab qualifier | Data qualifier | Project code | Media | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S0112 | 6200 | Surface Location | 19840801 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |
| S0111 | 6198 | Surface Location | 19840801 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |
| S0115 | 6199 | Surface Location | 19840801 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |
| S0118 | 3060 | Surface Location | 19831001 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |
| S0160 | 6209 | Surface Location | 19840801 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |
| S0159 | 6210 | Surface Location | 19840801 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |
| S0158 | 3094 | Surface Location | 19831001 | Thorium-232 | 2.0 | PCI/G | 2.0 | RAD | 0 | 0 | 7440-29-1 | U | | RSS | Soil | |

U = Indicates the analyte was analyzed for, but not detected.

# ATTACHMENT 4

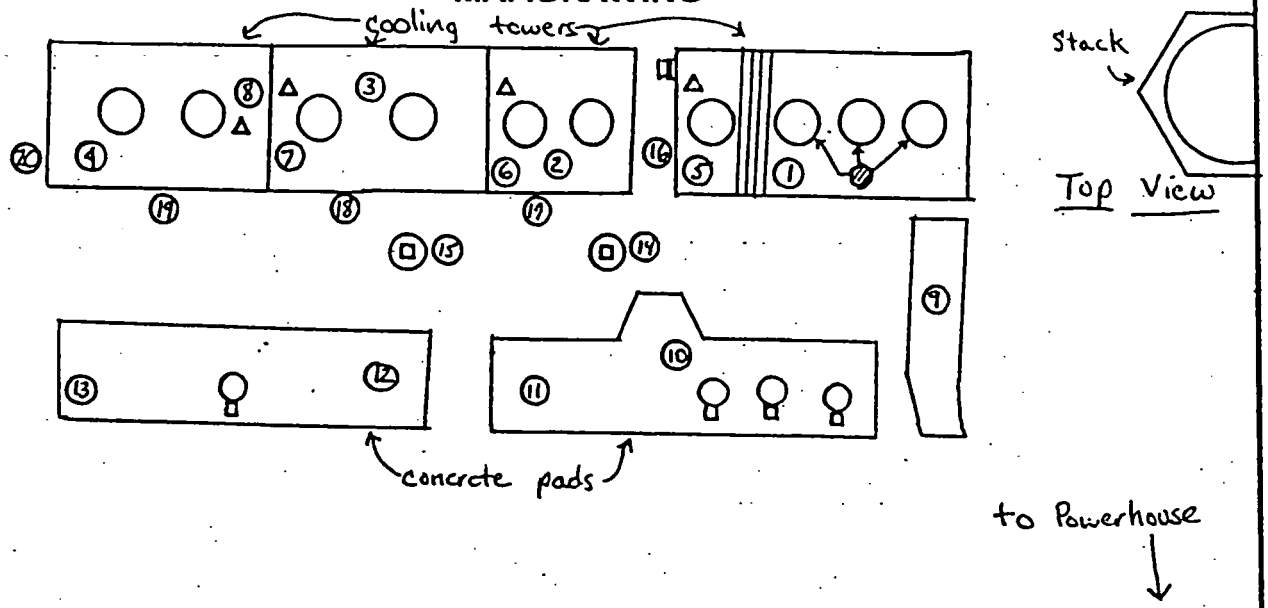
## RADIOLOGICAL SURVEY DATA SHEET
## #04-TF-0434

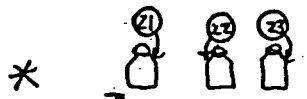
# RADIOLOGICAL SURVEY DATA SHEET



| | |
|---|---|
| LOCATION: (BLDG.AREA/ROOM) Powerhouse Cooling Towers | SURVEY NO. 04-TF-0434 |
| PURPOSE: MARSSIM Final Status Survey, SU#11 | RWP NO. N/A |
| | DATE: 12-~~20~~ 16-04 ~~12/20/04~~ |
| | TIME: 1500 |

## MAP/DRAWING



sediment sample containers. sediment samples collected from 4 cooling towers and combined as one sample. Sample sent to count room, see attached results.

Δ - sample collection point

⊘ - composite water sample taken in cooling tower wells. See attached results.

* Note composite sample from basins #1 and #2. SP 2/3/05

bkgd = 2cpm α
283cpm β⁻

LEGEND:
# = mrem/hr (γ) whole body
# E = mrem/hr (β+n+γ) extremity on contact
K = factor of 1000
- - - - - - = radiological boundary
# = mrem/hr neutron
# = air sample number
# = swipe number
# α or β = direct contamination measurement in dpm/100cm2

### INSTRUMENTS USED

| Instrument | Serial Number | Cal. Due Date |
|---|---|---|
| Lud 2360 4389 | 5691 / 5811 | 8/4/05 |
| | | |
| | | |
| | | |
| | | |

ML-0620

| | | |
|---|---|---|
| [redacted] | HPS 7836 7572 | Date: 12-23-04 |
| Counted by: (Signature) See Attached | HPS | Date: |
| Counted by: (Print) See Attached | | |
| Reviewed: [redacted] | HPS 7707 | Date: 01/03/05 |
| Reviewed/Approved by: (Print) [redacted] | | |

~~G1650 of 270~~

# RADIOLOGICAL SURVEY DATA SHEET (cont.)

| Removable Contamination | | | | |
|---|---|---|---|---|
| Swipes (dpm/100cm2) | | | | |
| Sample# | β/γ | Alpha | Tritium | Comments |
| 1 | | | | top of tower |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | inside tower |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | concrete pad |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | pillar |
| 15 | | | | |
| 16 | | | | tower base |
| 17 | | | | side of tower |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
| 21 | | | | o/s of bottles |
| 22 | | | | |
| 23 | | | | |
| 24 | | | | |
| 25 | | | | |
| 26 | | | | |
| 27 | | | | |
| 28 | | | | |
| 29 | | | | |
| 30 | | | | |
| 31 | | | | |
| 32 | | | | |
| 33 | | | | |
| 34 | | | | |
| 35 | | | | |

See attached results

N A

| Removable Contamination | | | | |
|---|---|---|---|---|
| Swipes (dpm/100cm2) | | | | |
| Sample# | β/γ | Alpha | Tritium | Commen |
| 36 | | | | |
| 37 | | | | |
| 38 | | | | |
| 39 | | | | |
| 40 | | | | |
| 41 | | | | |
| 42 | | | | |
| 43 | | | | |
| 44 | | | | |
| 45 | | | | |
| 46 | | | | |
| 47 | | | | |
| 48 | | | | |
| 49 | | | | |
| 50 | | | | |
| 51 | | | | |
| 22 | | | | |
| 53 | | | | |
| 54 | | | | |
| 55 | | | | |
| 56 | | | | |
| 57 | | | | |
| 58 | | | | |
| 59 | | | | |
| 60 | | | | |
| 61 | | | | |
| 62 | | | | |
| 63 | | | | |
| 64 | | | | |
| 65 | | | | |
| 66 | | | | |
| 67 | | | | |
| 68 | | | | |
| 99 | | | | |
| 70 | | | | |

See attached results

N A

COMMENTS: Smears field counted prior to submitting to count lab. All <1K dpm 100 cm² α, β⁻. o/s = outside

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

ML-0620

# Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR007
Batch Ended: 12/16/04 15:12
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: 04-TF-0434 OFFNER [23] GWD

| Detector ID | Sample ID | Alpha Activity DPM | Alpha Activity σ | Alpha Activity flags | Beta Activity DPM | Beta Activity σ | Beta Activity flags |
|---|---|---|---|---|---|---|---|
| A1 | 1 | 1.74 | 2.22 | | 0.81 | 2.27 | |
| A2 | 2 | 0.00 | 2.08 | | 5.07 | 2.86 | |
| A3 | 3 | 0.00 | 2.33 | | 4.49 | 2.82 | |
| A4 | 4 | 1.71 | 2.16 | | 3.77 | 2.70 | |
| B1 | 5 | 0.00 | 1.90 | | 0.54 | 1.69 | |
| B2 | 6 | 0.00 | 1.87 | | 0.00 | 1.59 | |
| B3 | 7 | 0.00 | 2.29 | | 5.60 | 3.26 | |
| B4 | 8 | 0.00 | 1.96 | | 0.00 | 1.21 | |
| C1 | 9 | 0.00 | 2.13 | | 0.40 | 1.76 | |
| C2 | 10 | 0.00 | 1.97 | | 0.49 | 1.64 | |
| C3 | 11 | 0.00 | 2.18 | | 0.00 | 1.27 | |
| C4 | 12 | 0.00 | 2.04 | | 0.00 | 1.21 | |
| D1 | 13 | 0.00 | 2.28 | | 0.00 | 2.94 | |
| D2 | 14 | 0.00 | 2.27 | | 0.00 | 1.24 | |
| D3 | 15 | 0.00 | 2.33 | | 3.95 | 2.90 | |
| D4 | 16 | 1.88 | 2.21 | | 2.93 | 2.55 | |
| A1 | 17 | 1.74 | 2.23 | | 2.12 | 2.62 | |
| A2 | 18 | 0.00 | 2.02 | | 0.42 | 1.65 | |
| A3 | 19 | 0.00 | 2.27 | | 0.00 | 1.27 | |
| A4 | 20 | 1.71 | 2.13 | | 1.37 | 2.10 | |
| B1 | 21 | 0.76 | 1.92 | | 1.51 | 2.07 | |
| B2 | 22 | 8.64 | 4.19 | | 5.58 | 3.17 | |
| B3 | 23 | 0.00 | 2.18 | | 0.00 | 1.34 | |

NAO NAO

~~Page 1 of 1~~ NAO 12/20/04

Attachment 4, 3 of 11

~~G16784210~~

30 of 11 12/23/04

GMT

16 Dec 2004 18:08 ALPHA/BETA - 1.09 Page #12
Protocol #: 6 PW H3 #403728 User : 213

Time: 2.00
Data Mode: DPM Nuclide: SMGL02 Quench Set: SMGL02
Background Subtract: 1st Vial

| | LL | UL | LCR | 2S% | BKG |
|---|---|---|---|---|---|
| Region A: | 0.5 - | 18.6 | 0 | 0.0 | 10.05 |
| Region B: | 2.0 - | 18.6 | 0 | 0.0 | 9.36 |
| Region C: | 40.0 - | 2000 | 0 | 0.0 | 11.30 |

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
04-TF-0434 L. OEFFNER (23) AG
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: c:\data\prot1.dat
Count Data Filename: c:\data\SDATA6.DAT
Spectrum Data Drive & Path: c:\data

| S# | TIME | CPMA | LUM | FLAG | tSIE | DPM1 | 2Sigma | CPMC | CPMB |
|---|---|---|---|---|---|---|---|---|---|
| -1 | 10.00 | 10.05 | 11 | B | 643.16 | | 0.00 | 11.30 | 9.36 |
| 0 | 2.00 | 686.83 | 1 | | 612.66 | 1260.11 | 102.09 | 0.00 | 652.34 |
| 1 | 2.00 | 0.00 | 6 | | 428.82 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 2.00 | 0.00 | 6 | | 584.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 2.00 | 0.00 | 6 | | 577.62 | 0.00 | 0.00 | 0.70 | 0.00 |
| 4 | 2.00 | 1.45 | 4 | | 594.82 | 2.70 | 9.68 | 0.00 | 1.34 |
| 5 | 2.00 | 0.00 | 7 | | 612.92 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2.00 | 0.00 | 0 | | 614.83 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | 2.00 | 0.00 | 0 | | 533.57 | 0.00 | 0.00 | 3.70 | 0.00 |
| 8 | 2.00 | 0.00 | 7 | | 341.93 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9 | 2.00 | 0.00 | 6 | | 553.23 | 0.00 | 0.00 | 0.20 | 0.00 |
| 10 | 2.00 | 0.00 | 7 | | 574.98 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11 | 2.00 | 0.00 | 7 | | 593.59 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12 | 2.00 | 0.00 | 0 | | 592.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13 | 2.00 | 0.00 | 9 | | 427.15 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14 | 2.00 | 0.00 | 6 | | 550.28 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 2.00 | 0.00 | 0 | | 642.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16 | 2.00 | 0.00 | 8 | | 499.05 | 0.00 | 0.00 | 0.20 | 0.00 |
| 17 | 2.00 | 0.00 | 8 | | 547.87 | 0.00 | 0.00 | 0.00 | 0.00 |
| 18 | 2.00 | 0.00 | 0 | | 609.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| 19 | 2.00 | 1.45 | 0 | | 641.52 | 2.60 | 9.32 | 0.00 | 1.44 |
| 20 | 2.00 | 2.95 | 0 | | 635.80 | 5.31 | 9.87 | 0.00 | 1.78 |
| 21 | 2.00 | 0.00 | 0 | | 616.97 | 0.00 | 0.00 | 1.70 | 0.00 |
| 22 | 2.00 | 0.00 | 8 | | 644.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 23 | 2.00 | 0.00 | 8 | | 608.38 | 0.00 | 0.00 | 0.00 | 0.00 |

NO

# P BLDG COOLING TOWERS AREA: SURVEY UNIT-11

RSDS#: 04-TF-0434 JQ LO

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 43-89 ALPHA BKG: | 0 | Factor | 8 | PROBE AREA: | 100 | cm2 | Surface Eff: | 1 | ALPHA | 1 |
| 43-89 BETA BKG: | 0 | Factor | 4 | PROBE AREA: | 100 | cm2 | Surface Eff: | 1 | BETA | 2 |

| LOCATION | 2360# | RCT ID | PROBE | TYPE: 1 or 2 | ITEM # | DATE | TIME | CNTS | CT TIME (sec) | dpm/100cm2 |
|---|---|---|---|---|---|---|---|---|---|---|
| top of tower | 5691 | 7572 | 5811 | 1 | 1 | 12/16/04 | 13:00 | 40 | 120 | 160 |
| top of tower | 5691 | 7572 | 5811 | 1 | 2 | 12/16/04 | 13:03 | 54 | 120 | 216 |
| top of tower | 5691 | 7572 | 5811 | 1 | 3 | 12/16/04 | 13:06 | 61 | 120 | 244 |
| top of tower | 5691 | 7572 | 5811 | 1 | 4 | 12/16/04 | 13:09 | 85 | 120 | 340 |
| inside tower | 5691 | 7572 | 5811 | 1 | 5 | 12/16/04 | 13:12 | 18 | 120 | 72 |
| inside tower | 5691 | 7572 | 5811 | 1 | 6 | 12/16/04 | 13:15 | 11 | 120 | 44 |
| inside tower | 5691 | 7572 | 5811 | 1 | 7 | 12/16/04 | 13:18 | 35 | 120 | 140 |
| inside tower | 5691 | 7572 | 5811 | 1 | 8 | 12/16/04 | 13:21 | 11 | 120 | 44 |
| concrete pad | 5691 | 7572 | 5811 | 1 | 9 | 12/16/04 | 13:24 | 97 | 120 | 388 |
| concrete pad | 5691 | 7572 | 5811 | 1 | 10 | 12/16/04 | 13:27 | 69 | 120 | 276 |
| concrete pad | 5691 | 7572 | 5811 | 1 | 11 | 12/16/04 | 13:30 | 114 | 120 | 456 |
| concrete pad | 5691 | 7572 | 5811 | 1 | 12 | 12/16/04 | 13:33 | 56 | 120 | 224 |
| concrete pad | 5691 | 7572 | 5811 | 1 | 13 | 12/16/04 | 13:36 | 194 | 120 | 776 |
| pillar | 5691 | 7572 | 5811 | 1 | 14 | 12/16/04 | 13:39 | 110 | 120 | 440 |
| pillar | 5691 | 7572 | 5811 | 1 | 15 | 12/16/04 | 13:42 | 82 | 120 | 328 |
| tower base | 5691 | 7572 | 5811 | 1 | 16 | 12/16/04 | 13:45 | 71 | 120 | 284 |
| side of tower | 5691 | 7572 | 5811 | 1 | 17 | 12/16/04 | 13:48 | 10 | 120 | 40 |
| side of tower | 5691 | 7572 | 5811 | 1 | 18 | 12/16/04 | 13:51 | 11 | 120 | 44 |
| side of tower | 5691 | 7572 | 5811 | 1 | 19 | 12/16/04 | 13:55 | 30 | 120 | 120 |
| side of tower | 5691 | 7572 | 5811 | 1 | 20 | 12/16/04 | 13:58 | 26 | 120 | 104 |
| | ~~5691~~ 10 12/16/04 | | | | | | | | | |
| top of tower | 5691 | 7572 | 5811 | 2 | 1 | 12/16/04 | 13:00 | 358 | 120 | 716 |
| top of tower | 5691 | 7572 | 5811 | 2 | 2 | 12/16/04 | 13:03 | 311 | 120 | 622 |
| top of tower | 5691 | 7572 | 5811 | 2 | 3 | 12/16/04 | 13:06 | 520 | 120 | 1040 |
| top of tower | 5691 | 7572 | 5811 | 2 | 4 | 12/16/04 | 13:09 | 491 | 120 | 982 |
| inside tower | 5691 | 7572 | 5811 | 2 | 5 | 12/16/04 | 13:12 | 278 | 120 | 556 |
| inside tower | 5691 | 7572 | 5811 | 2 | 6 | 12/16/04 | 13:15 | 293 | 120 | 586 |
| inside tower | 5691 | 7572 | 5811 | 2 | 7 | 12/16/04 | 13:18 | 393 | 120 | 786 |
| inside tower | 5691 | 7572 | 5811 | 2 | 8 | 12/16/04 | 13:21 | 260 | 120 | 520 |
| concrete pad | 5691 | 7572 | 5811 | 2 | 9 | 12/16/04 | 13:24 | 513 | 120 | 1026 |
| concrete pad | 5691 | 7572 | 5811 | 2 | 10 | 12/16/04 | 13:27 | 567 | 120 | 1134 |
| concrete pad | 5691 | 7572 | 5811 | 2 | 11 | 12/16/04 | 13:30 | 612 | 120 | 1224 |

| LOCATION | 2360# | RCT ID | PROBE | TYPE: 1 or 2 | ITEM # | DATE | TIME | CNTS | CT TIME (sec) | dpm/100cm2 |
|---|---|---|---|---|---|---|---|---|---|---|
| concrete pad | 5691 | 7572 | 5811 | 2 | 12 | 12/16/04 | 13:33 | 683 | 120 | 1366 |
| concrete pad | 5691 | 7572 | 5811 | 2 | 13 | 12/16/04 | 13:36 | 740 | 120 | 1480 |
| pillar | 5691 | 7572 | 5811 | 2 | 14 | 12/16/04 | 13:39 | 471 | 120 | 942 |
| pillar | 5691 | 7572 | 5811 | 2 | 15 | 12/16/04 | 13:42 | 538 | 120 | 1076 |
| tower base | 5691 | 7572 | 5811 | 2 | 16 | 12/16/04 | 13:45 | 401 | 120 | 802 |
| side of tower | 5691 | 7572 | 5811 | 2 | 17 | 12/16/04 | 13:48 | 256 | 120 | 512 |
| side of tower | 5691 | 7572 | 5811 | 2 | 18 | 12/16/04 | 13:51 | 302 | 120 | 604 |
| side of tower | 5691 | 7572 | 5811 | 2 | 19 | 12/16/04 | 13:55 | 323 | 120 | 646 |
| side of tower | 5691 | 7572 | 5811 | 2 | 20 | 12/16/04 | 13:58 | 248 | 120 | 496 |

7of-9 11
12/23/0

BWXT of Ohio, Inc.

# ANALYTICAL SERVICES REQUEST FOR ANALYSIS

| DATE SUBMITTED: | SAMPLE TYPE: | COLLECTED BY: | NUMBER OF SAMPLES |
|---|---|---|---|
| 12-20-04 | $H_2O$ | Oeffner | 1 |

| PROJECT/FUNCTION: | PRIMARY CONTACT/PHONE NO.: | MAIL STOP: |
|---|---|---|
| Boss | Bob Coblentz | Tr 19B |

| CHARGE NUMBER: | DATE(S) COLLECTED: | RSDS# (if applicable): | ATTACHMENTS (list): |
|---|---|---|---|
| EE00PF | 12-20-04 | 04-TF-0434 12/20/04 | N/A |

ANALYSES REQUESTED (check):

- [x] $^3H$
- [ ] Characterize/Approve for Sanitary or Storm Discharge. Estimate of Total Volume for Release_____ Approved_____
- [x] Gross Alpha
- [ ] Air Filter – Isotopic Analysis
- [ ] Characterization per MD-80036, Operation #10015
- [ ] Isotopic Analysis: Pu____ U____ Th____ Am____ Other____
- [ ] Other_____

ADDITIONAL INFORMATION:

NOTE: Attach additional information (e.g. RSDS, screening results, collection data, and gamma spec. results) if applicable

| LAB IDENTIFICATION | SAMPLE LOCATION | SAMPLE NUMBER | RESULTS $^3H$ neat | RESULTS Gros Alpha DPM/ml |
|---|---|---|---|---|
| 0407402 | Powerhouse cooling Tower | 1 | 1.48 | <0.60 * |

*(= <0.3 pCi/ml) DPM to pCi divide by 2 SP 2/4/05

COMMENTS:

ANALYZED BY: Laurel McWhorter

DATE: 12-20-04

UL-5222 (1-01)

~~G1710/210~~

Attachment 4: 7 of 11

BWXT of Ohio, Inc.

# ANALYTICAL SERVICES REQUEST FOR ANALYSIS

| DATE SUBMITTED: | SAMPLE TYPE: | COLLECTED BY: | NUMBER OF SAMPLES |
|---|---|---|---|
| 12/16/04 | Sediment | J. Quick | 1 |
| PROJECT/FUNCTION: | PRIMARY CONTACT/PHONE NO.: | | MAIL STOP: |
| BRSS | B. Coblentz | | Tr-19B |
| CHARGE NUMBER: | DATE(S) COLLECTED: | RSDS# (if applicable): | ATTACHMENTS (list): |
| | 12/16/04 | 04-TF-0434 | |

ANALYSES REQUESTED (check):

- ☐ $^3H$
- ☐ Characterize/Approve for Sanitary or Storm Discharge. Estimate of Total Volume for Release_____ Approved_____
- ☐ Gross Alpha
- ☐ Air Filter – Isotopic Analysis
- ☒ Characterization per MD-80036, Operation #10015
- ☐ Isotopic Analysis: Pu____ U____ Th____ Am____ Other____
- ☐ Other_____

ADDITIONAL INFORMATION:

NOTE: Attach additional information (e.g. RSDS, screening results, collection data, and gamma spec. results) if applicable

| LAB IDENTIFICATION | SAMPLE LOCATION | SAMPLE NUMBER | RESULTS |
|---|---|---|---|
| 0407320 | cooling towers T-Bldg | 1 | See Page 9 |

COMMENTS:

ANALYZED BY: [signature] DATE: 12-20-04

KL-5222 (1-01)

1 of 11
12/2

| | |
|---|---|
| Laboratory ID#: | 0407320 |
| Project/function: | BOSS |
| Submitted: | Dec 16, 2004 |
| Submitted by: | J. Quick |
| Point of Contact: | B. Coblentz |
| RSDS#: | 04-TF-0434 |
| Date: | Dec 20, 2004 |

| Lab ID | 0407320 | | |
|---|---|---|---|
| Sample Location | P-Bldg Chiller #1 | | |
| Isotope | pCi/g | Uncertainty +/- | LDL |
| Pu-238 | 0.52 | 0.08 | 0.09 |
| Pu-239/240 | <LDL | <LDL | 0.06 |
| Th-227 | <LDL | <LDL | 0.07 |
| Th-228 | 0.39 | 0.07 | 0.07 |
| Th-230 | 0.30 | 0.06 | 0.03 |
| Th-232 | 0.16 | 0.04 | 0.03 |
| U-233/234 | <LDL | <LDL | 0.03 |
| U-235 | <LDL | <LDL | 0.03 |
| U-238 | 0.04 | 0.02 | 0.03 |

[redacted]

1585 — HP #
12-20-04 — Date

1585 — HP #
12-20-04 — Date

~~G1730~~ 210

Attachment 4: 9 of 11

BWXT of Ohio, Inc.

# ANALYTICAL SERVICES REQUEST FOR ANALYSIS

| DATE SUBMITTED: | SAMPLE TYPE: | COLLECTED BY: | NUMBER OF SAMPLES |
|---|---|---|---|
| 12-17-04 | Acid Etch | Hopkins | 3 |
| **PROJECT/FUNCTION:** | **PRIMARY CONTACT/PHONE NO.:** | | **MAIL STOP:** |
| BOSS | B. Cobleutz | | |
| **CHARGE NUMBER:** | **DATE(S) COLLECTED:** | **RSDS# (if applicable):** | **ATTACHMENTS (list):** |
| EE05WJ | 12-17-04 | | |

ANALYSES REQUESTED (check):

- ☐ $^3H$
- ☐ Characterize/Approve for Sanitary or Storm Discharge. Estimate of Total Volume for Release_____ Approved_____
- ☐ Gross Alpha
- ☐ Air Filter – Isotopic Analysis
- ☑ Characterization per MD-80036, Operation #10015
- ☐ Isotopic Analysis: Pu____ U____ Th____ Am____ Other____
- ☐ Other_____

ADDITIONAL INFORMATION:

NOTE: Attach additional information (e.g. RSDS, screening results, collection data, and gamma spec. results) if applicable

| LAB IDENTIFICATION | SAMPLE LOCATION | SAMPLE NUMBER | RESULTS |
|---|---|---|---|
| 0407387 | P-Bldg-Manhole | 1 | RSDS 04-TF-0425 |
| 0407388 | Fuel Tank | 2 | RSDS 04-TF-0433 |
| 0407389 | Cooling Tower | 3 | See Page 11 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

COMMENTS:

| ANALYZED BY: | DATE: |
|---|---|
| Ronald Cilgubner | 12-18-04 |

NIL-5222 (1-01)

~~G1940~~ 210

Attachment 4: 10 of 11

| | |
|---|---|
| Laboratory ID#: | 0407387 - 0407389 |
| Project/function: | BOSS |
| Submitted: | Dec 17, 2004 |
| Submitted by: | L. Hopkins |
| Point of Contact: | B. Coblentz |
| RSDS#: | N/A |
| Date: | Dec 20, 2004 |

Lab ID 0407387
Sample Location P-House Etch #1

| Isotope | pCi/g | Uncertainty +/- | LDL |
|---|---|---|---|
| Pu-238 | 1.03 | 0.25 | 0.48 |
| Pu-239/240 | <LDL | <LDL | 0.33 |
| Th-227 | <LDL | <LDL | 0.13 |
| Th-228 | <LDL | <LDL | 0.45 |
| Th-230 | 0.68 | 0.19 | 0.13 |
| Th-232 | <LDL | <LDL | 0.13 |
| U-233/234 | <LDL | <LDL | 0.56 |
| U-235 | <LDL | <LDL | 0.45 |
| U-238 | 0.49 | 0.20 | 0.45 |
| Po-210 | 0.88 | 0.29 | 0.59 |

RSDS 04-TF-0425

Not For this RSDS

Lab ID 0407388
Sample Location P-House Etch #2

| Isotope | pCi/g | Uncertainty +/- | LDL |
|---|---|---|---|
| Pu-238 | <LDL | <LDL | 0.34 |
| Pu-239/240 | <LDL | <LDL | 0.34 |
| Th-227 | <LDL | <LDL | 0.14 |
| Th-228 | 0.35 | 0.13 | 0.14 |
| Th-230 | 1.15 | 0.26 | 0.14 |
| Th-232 | <LDL | <LDL | 0.14 |
| U-233/234 | 0.30 | 0.17 | 0.27 |
| U-235 | <LDL | <LDL | 0.91 |
| U-238 | <LDL | <LDL | 0.27 |
| Po-210 | <LDL | <LDL | 0.56 |

RSDS 04-TF-0433

12/23/04

Lab ID 0407389
Sample Location P-House Etch #3

| Isotope | pCi/g | Uncertainty +/- | LDL |
|---|---|---|---|
| Pu-238 | 0.68 | 0.19 | 0.13 |
| Pu-239/240 | <LDL | <LDL | 0.13 |
| Th-227 | <LDL | <LDL | 0.15 |
| Th-228 | <LDL | <LDL | 0.15 |
| Th-230 | 1.14 | 0.26 | 0.15 |
| Th-232 | 0.16 | 0.10 | 0.15 |
| U-233/234 | <LDL | <LDL | 2.29 |
| U-235 | <LDL | <LDL | 7.86 |
| U-238 | <LDL | <LDL | 2.29 |
| Po-210 | <LDL | <LDL | 0.20 |

[redacted]

1585 12-20-04
HP # Date

~~G1750~~ 1210

1585 12-20-04

# ATTACHMENT 5

RADIOLOGICAL SURVEY DATA SHEET
#04-TF-0443

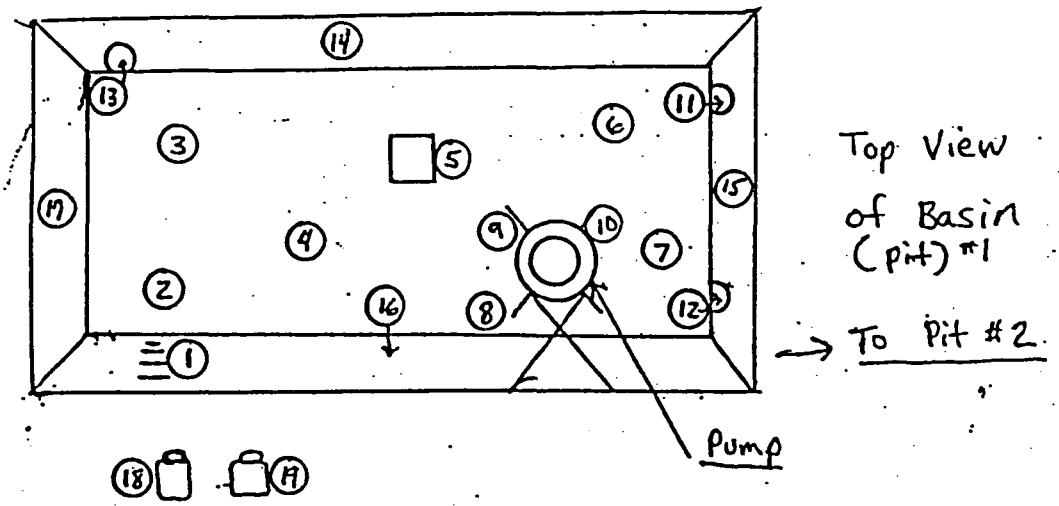
# RADIOLOGICAL SURVEY DATA SHEET



| | |
|---|---|
| LOCATION: (BLDG./AREA/ROOM) Powerhouse ~~Basin~~ BASINS (PIT) | SURVEY NO. 04-TF-0443 |
| PURPOSE: Characterize Pit #1, sample water in Pit #2 | RWP NO. N/A |
| | DATE: 12-21-04 |
| | TIME: 1400 |

## MAP/DRAWING

COOLING TOWER PIT (BASIN)




bkgd = 3 cpm α
175 cpm β⁻

- Direct scan and pause survey conducted
- No audible clicks in required time
- Integrated not required

Note: Pit #2 referenced on this RSDS is called Basin #3 for purposes of the PRS Pkg - SP 2/3/05

LEGEND:
- # = mrem/hr (γ) whole body
- # E = mrem/hr (β+n+γ) extremity on contact
- K = factor of 1000
- - - - - - = radiological boundary
- # = mrem/hr neutron
- # = air sample number
- # = swipe number
- #α or /β = direct contamination measurement in dpm/100cm2

### INSTRUMENTS USED

| Instrument | Serial Number | Cal. Due Date |
|---|---|---|
| Ludlum 2360-4389 | 5755 / 5773 | 5-7-05 |
| | | |
| | | |
| | A | |
| | N | |

[redacted] Date: 12-23-04

Counted by: (Signature) | HPI | Date:

Counted by: (Print) See Attached

Reviewed by: [redacted] HPI 7707 Date: 01/03/05

Reviewed/Approved by: (Print) [redacted]

MIL-0820

~~6 of 210~~

Attachment 5: 1 of 5

RSDS# 04-TF-0443



# RADIOLOGICAL SURVEY DATA SHEET (cont.)

| Removable Contamination | | | | |
|---|---|---|---|---|
| Swipes (dpm/100cm2) | | | | |
| Sample# | β/γ | Alpha | Tritium | Comments |
| 1 | | | | ladder |
| 2 | | | | floor |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | pump |
| 10 | | | | |
| 11 | | | | inlet |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | wall |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | o/s bottle |
| 19 | | | | |
| 20 | | | | [illegible] |
| 21 | | | | |
| 22 | | | | |
| 23 | | | | |
| 24 | | | | |
| 25 | | | | |
| 26 | | | | |
| 27 | | | | |
| 28 | | N | | A |
| 29 | | | | |
| 30 | | | | |
| 31 | | | | |
| 32 | | | | |
| 33 | | | | |
| 34 | | | | |
| 35 | | | | |

See attached results

| Removable Contamination | | | | |
|---|---|---|---|---|
| Swipes (dpm/100cm2) | | | | |
| Sample# | β/γ | Alpha | Tritium | Comm |
| 36 | | | | |
| 37 | | | | |
| 38 | | | | |
| 39 | | | | |
| 40 | | | | |
| 41 | | | | |
| 42 | | | | |
| 43 | | | | |
| 44 | | | | |
| 45 | | | | |
| 46 | | | | |
| 47 | | | | |
| 48 | | | | |
| 49 | | | | |
| 50 | | | | |
| 51 | | | | |
| 22 | | N | A | |
| 53 | | | | |
| 54 | | | | |
| 55 | | | | |
| 56 | | | | |
| 57 | | | | |
| 58 | | | | |
| 59 | | | | |
| 60 | | | | |
| 61 | | | | |
| 62 | | | | |
| 63 | | | | |
| 64 | | | | |
| 65 | | | | |
| 66 | | | | |
| 67 | | | | |
| 68 | | | | |
| 69 | | | | |
| 70 | | | | |

See attached results

COMMENTS: Smears field counted prior to submitting to count lab - all dpm/100cm² α,β⁻. Sediment sample taken in pit #1/ $H_2O$ sample taken in pit #2

NOTES:

1. See MD-60036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of resul are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

ML-0620

~~6 of 10~~

Attachment 5: 2 of 5

# Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR012
Batch Ended: 12/21/04 14:04
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: 04-TF-0443 OFFNER [19] GWD

| Detector ID | Sample ID | Alpha Activity DPM | Alpha Activity σ | Alpha Activity flags | Beta Activity DPM | Beta Activity σ | Beta Activity flags |
|---|---|---|---|---|---|---|---|
| A1 | 1 | 0.00 | 2.25 | | 3.60 | 2.93 | |
| A2 | 2 | 0.00 | 2.02 | | 0.42 | 1.65 | |
| A3 | 3 | 0.00 | 2.27 | | 0.00 | 1.27 | |
| A4 | 4 | 1.71 | 2.10 | | 0.00 | 1.22 | |
| B1 | 5 | 0.00 | 2.02 | | 7.66 | 3.39 | |
| B2 | 6 | 0.00 | 1.85 | | 0.00 | 1.13 | |
| B3 | 7 | 0.00 | 2.20 | | 0.31 | 1.88 | |
| B4 | 8 | 0.00 | 1.99 | | 0.16 | 1.70 | |
| C1 | 9 | 0.00 | 2.13 | | 0.40 | 1.76 | |
| C2 | 10 | 0.00 | 1.97 | | 0.49 | 1.64 | |
| C3 | 11 | 0.00 | 2.25 | | 4.29 | 2.83 | |
| C4 | 12 | 0.00 | 2.11 | | 4.47 | 2.70 | |
| D1 | 13 | 0.00 | 2.23 | | 0.00 | 1.92 | |
| D2 | 14 | 1.91 | 2.28 | | 0.00 | 1.24 | |
| D3 | 15 | 0.00 | 2.27 | | 0.08 | 1.84 | |
| D4 | 16 | 0.00 | 2.16 | | 0.00 | 1.28 | |
| A1 | 17 | 0.00 | 2.20 | | 0.00 | 1.86 | |
| A2 | 18 | 1.56 | 2.09 | | 6.07 | 3.09 | |
| A3 | 19 | 0.00 | 2.28 | | 0.72 | 1.78 | |

MO MO

~~0005 of 210~~

Attachment 5.3 3 of 5



GWP

21 Dec 2004 18:23 ALPHA/BETA - 1.09 Page #1-1
Protocol #: 4 PW H3 #410462 User : 580

Time: 2.00
Data Mode: DPM Nuclide: SMSLS02 Quench Set: SMSLS02
Background Subtract: 1st Vial

| | LL | UL | LCR | 2SI | BKG |
|---|---|---|---|---|---|
| Region A: | 0.5 - | 18.6 | 0 | 0.0 | 16.66 |
| Region B: | 2.0 - | 18.6 | 0 | 0.0 | 14.12 |
| Region C: | 40.0 - | 2000 | 0 | 0.0 | 10.70 |

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
04-TF-0443 [19] GWD OFFNER
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT4.DAT
Count Data Filename: C:\DATA\SDATA4.DAT
Spectrum Data Drive & Path: C:\DATA

| S# | TIME | CPMA | CPMB | LUM | FLAG | tSIE | DPM1 | 2Sigma | CPMC |
|---|---|---|---|---|---|---|---|---|---|
| -1 | 10.00 | 16.66 | 14.12 | 0 | B | 641.52 | | 0.00 | 10.70 |
| 0 | 2.00 | 712.95 | 666.40 | 0 | | 618.17 | 1312.10 | 99.93 | 3.30 |
| 1 | 2.00 | 0.00 | 0.00 | 0 | | 539.77 | 0.00 | 0.00 | 4.49 |
| 2 | 2.00 | 0.00 | 0.00 | 0 | | 489.05 | 0.00 | 0.00 | 0.00 |
| 3 | 2.00 | 0.00 | 0.00 | 0 | | 462.62 | 0.00 | 0.00 | 0.30 |
| 4 | 2.00 | 0.00 | 0.00 | 0 | | 567.80 | 0.00 | 0.00 | 0.00 |
| 5 | 2.00 | 0.00 | 0.00 | 10 | | 365.39 | 0.00 | 0.00 | 1.32 |
| 6 | 2.00 | 0.00 | 0.00 | 0 | | 562.29 | 0.00 | 0.00 | 0.00 |
| 7 | 2.00 | 0.00 | 0.00 | 0 | | 411.19 | 0.00 | 0.00 | 0.00 |
| 8 | 2.00 | 0.00 | 0.00 | 0 | | 410.24 | 0.00 | 0.00 | 0.00 |
| 9 | 2.00 | 0.00 | 0.00 | 0 | | 464.89 | 0.00 | 0.00 | 0.00 |
| 10 | 2.00 | 0.00 | 0.00 | 0 | | 493.87 | 0.00 | 0.00 | 0.00 |
| 11 | 2.00 | 0.00 | 0.00 | 0 | | 381.80 | 0.00 | 0.00 | 0.00 |
| 12 | 2.00 | 0.00 | 0.00 | 0 | | 568.06 | 0.00 | 0.00 | 0.00 |
| 13 | 2.00 | 0.00 | 0.00 | 0 | | 475.22 | 0.00 | 0.00 | 1.30 |
| 14 | 2.00 | 0.00 | 0.00 | 0 | | 599.29 | 0.00 | 0.00 | 3.85 |
| 15 | 2.00 | 0.00 | 0.00 | 0 | | 615.85 | 0.00 | 0.00 | 0.00 |
| 16 | 2.00 | 0.00 | 0.00 | 0 | | 606.09 | 0.00 | 0.00 | 4.80 |
| 17 | 2.00 | 0.00 | 0.00 | 0 | | 602.80 | 0.00 | 0.00 | 0.00 |
| 18 | 2.00 | 0.00 | 0.00 | 0 | | 551.74 | 0.00 | 0.00 | 0.00 |
| 19 | 2.00 | 0.00 | 0.00 | 0 | | 594.02 | 0.00 | 0.00 | 0.30 |

NA

GW

~~G2060/210~~

Attachment 5: 4 of 5

# BWXT of Ohio, Inc.

## ANALYTICAL SERVICES REQUEST FOR ANALYSIS

| DATE SUBMITTED: | SAMPLE TYPE: | COLLECTED BY: | NUMBER OF SAMPLES |
|---|---|---|---|
| 12/21/04 | $H_2O$ | L. Oeffner | 1 |
| **PROJECT/FUNCTION:** | **PRIMARY CONTACT/PHONE NO.:** | | **MAIL STOP:** |
| Boss | Bob Collentz | | Tr 19 |
| **CHARGE NUMBER:** | **DATE(S) COLLECTED:** | **RSDS# (if applicable):** | **ATTACHMENTS (list):** |
| EE00 PF | 12/21/04 | 04-TF-0443 | N/A |

ANALYSES REQUESTED (check):

- [x] $^3H$
- [ ] Characterize/Approve for Sanitary or Storm Discharge. Estimate of Total Volume for Release _____ Approved _____
- [x] Gross Alpha
- [ ] Air Filter – Isotopic Analysis
- [ ] Characterization per MD-80036, Operation #10015
- [ ] Isotopic Analysis: Pu____ U____ Th____ Am____ Other____
- [ ] Other _____

ADDITIONAL INFORMATION:

NOTE: Attach additional information (e.g. RSDS, screening results, collection data, and gamma spec. results) if applicable

| LAB IDENTIFICATION | SAMPLE LOCATION | SAMPLE NUMBER | RESULTS $^3H$ mci/l | RESULTS Gross Alpha DPM/ml |
|---|---|---|---|---|
| 0407420 | Powerhouse Pit (Truck cooling) | 1 | 6.79 | <0.60 * |
| | | | | (* = 0.3 pCi/ml) |
| | | | | DPM to pCi divide by 2 SP 1/2/05 |

COMMENTS:

ANALYZED BY: [signature] DATE: 12-21-04

NC-5222 (1-01)

~~8807 of 210~~

Attachment 5: 5 of 5

# ATTACHMENT 6

## P BUILDING FINAL STATUS SURVEY ADDENDUM 1

# P-Building Final Status Survey Addendum 1

This addendum is intended to expand upon acid etch sampling data obtained on surfaces exterior to P-Building. As a part of the Final Status Survey, four surfaces were chosen to represent four individual areas in which initial direct alpha measurements were above 100 dpm/100cm$^2$. These areas were: 1) roof, 2) electrical switchgear area, 3) cooling towers, and 4) fuel oil tank. The analysis results of the roof acid etch sample indicated the predominant presence of Polonium-210, while the analysis results from the remaining three locations showed little or no Po-210. Follow-up alpha readings were obtained at the three latter acid etch locations to determine the amount of activity which had been removed by the acid etch sampling. The Group 1 radionuclides detected in the samples were then compared to the amount of activity removed by the sampling, as a calculated fraction of the total activity removed. This fraction was then applied to the highest direct alpha measurement in the respective survey units, to determine the surface contamination attributed to Group 1 radionuclides. The maximum surface contamination attributable to Group 1 radionuclides, in the three areas studied is 15.84 dpm/100cm$^2$. These follow-up measurements showed that the amount of activities removed were as follows:

| Location | Original Direct Alpha | Follow-up Direct Alpha | dpm removed |
|---|---|---|---|
| Manhole Cover (switchgear area) | 456 | 232 | 224 |
| Cooling Tower (top of tower) | 216 | 0 | 216 |
| Fuel Oil Tank (side of tank) | 628 | 96 | 532 |

**Acid Etch Samples**

Switchgear Area - RSDS 04-TF-0425

| Isotope | dpm/sample | Uncert. | LDL |
|---|---|---|---|
| Pu-238 | 2.28 | 0.56 | 1.07 |
| Pu-239/240 | <LDL | <LDL | 0.73 |
| Th-227 | <LDL | <LDL | 0.29 |
| Th-228 | <LDL | <LDL | 1 |
| Th-230 | 1.51 | 0.42 | 0.29 |
| Th-232 | <LDL | <LDL | 0.29 |
| U-233/234 | <LDL | <LDL | 1.25 |
| U-235 | <LDL | <LDL | 0.99 |
| U-238 | 1.08 | 0.43 | 0.99 |
| Po-210 | 1.95 | 0.65 | 1.3 |
| Total Group 1 | 3.79 | | |
| Fraction of removed activity | 0.02 | | |
| Highest direct | 456 | | |
| Group 1 surface contam. | 7.72 | | |

Cooling Tower - RSDS 04-TF-0434

| Isotope | dpm/sample | Uncert. | LDL |
|---|---|---|---|
| Pu-238 | 1.51 | 0.42 | 0.29 |
| Pu-239/240 | <LDL | <LDL | 0.29 |
| Th-227 | <LDL | <LDL | 0.33 |
| Th-228 | <LDL | <LDL | 0.33 |
| Th-230 | 2.54 | 0.59 | 0.33 |
| Th-232 | 0.36 | 0.21 | 0.33 |
| U-233/234 | <LDL | <LDL | 5.09 |
| U-235 | <LDL | <LDL | 17.49 |
| U-238 | <LDL | <LDL | 5.09 |
| Po-210 | <LDL | <LDL | 0.45 |
| Total Group 1 | 4.41 | | |
| Fraction of removed activity | 0.02 | | |
| Highest direct | 776 | | |
| Group 1 surface contam. | 15.84 | | |

Fuel Tank - RSDS 04-TF-0433

| Isotope | dpm/sample | Uncert. | LDL |
|---|---|---|---|
| Pu-238 | <LDL | <LDL | 0.75 |
| Pu-239/240 | <LDL | <LDL | 0.75 |
| Th-227 | <LDL | <LDL | 0.3 |
| Th-228 | 0.78 | 0.3 | 0.3 |
| Th-230 | 2.55 | 0.57 | 0.3 |
| Th-232 | <LDL | <LDL | 0.3 |
| U-233/234 | 0.66 | 0.38 | 0.59 |
| U-235 | <LDL | <LDL | 2.03 |
| U-238 | <LDL | <LDL | 0.59 |
| Po-210 | <LDL | <LDL | 1.24 |

| | |
|---|---|
| Total Group 1: | 3.33 |
| Fraction of removed activity: | 0.01 |
| Highest direct: | 628 |
| Group 1 surface contam. | 3.93 |

Count lab personnel explained that the difference between the removed activity, and the reported activity, was most likely due to the heat used to process samples collected in the field, via paper towel absorption of the acid solution. This process had not been necessary for the roof sample, in that a physical sample of the roof material was taken directly to the laboratory. To confirm this conclusion, additional samples were collected, including the following: 1) paint scrapings from the fuel oil tank (Survey Unit 10, immediately adjacent to data point #3), and 2) sheet metal coupon sample from the cooling tower (Survey Unit 11, at data point #4). These physical samples were taken directly to the lab for analysis. The results of the analyses are as follows.

Fuel Oil Tank Paint Scrapings – RSDS 05-TF-0047

| Isotope | dpm/sample | Uncert. | LDL |
|---|---|---|---|
| Pu-238 | <LDL | <LDL | 0.98 |
| Pu-239/240 | <LDL | <LDL | 0.98 |
| Th-227 | <LDL | <LDL | 0.37 |
| Th-228 | <LDL | <LDL | 0.37 |
| Th-230 | <LDL | <LDL | 0.37 |
| Th-232 | <LDL | <LDL | 0.37 |
| U-233/234 | <LDL | <LDL | 0.89 |
| U-235 | <LDL | <LDL | 0.71 |
| U-238 | <LDL | <LDL | 0.71 |
| Po-210 | 201.29 | 23.18 | 6.92 |

Cooling Tower Coupon- RSDS 05-TF-0047

| Isotope | dpm/sample | Uncert. | LDL |
|---|---|---|---|
| Pu-238 | <LDL | <LDL | 1.00 |
| Pu-239/240 | <LDL | <LDL | 0.79 |
| Th-227 | <LDL | <LDL | 1.08 |
| Th-228 | <LDL | <LDL | 0.40 |
| Th-230 | <LDL | <LDL | 0.40 |
| Th-232 | <LDL | <LDL | 0.40 |
| U-233/234 | <LDL | <LDL | 6.64 |
| U-235 | <LDL | <LDL | 18.05 |
| U-238 | <LDL | <LDL | 6.64 |
| Po-210 | 569.46 | 39.80 | 1.69 |

Note: Isotopic analyses were performed via alpha spectroscopy. The parent radionuclides do not emit alpha particles, and therefore are not listed on the alpha spectroscopy report. Any Polonium-210 detected is assumed to be a result of environmental factors, and parent radionuclides are assumed to also be present.