3001-0008080066

BWX Technologies, Inc.
a McDermott company

BWXT of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-117/00
August 7, 2000

00-TC/08-07

Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P.O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Dewain Eckman

SUBJECT: Contract No. DE-AC24-97OH20044
POTENTIAL RELEASE SITE (PRS) 416 DATA PACKAGE - FINAL

REFERENCE: Statement of Work Requirement C 7.1e -- Regulator Reports

Dear Mr. Provencher:

Attached is the Final Potential Release site (PRS) 416 Data Package. The release of this document to USEPA, OEPA, ODH, and the public reading room has been authorized by Art Kleinrath of MEMP.

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

Sincerely,

JSStapleton

Jeffrey S. Stapleton
Manager, Environmental Safeguards & Compliance

JSS/nmg

Enclosures as stated

cc: Tim Fischer, USEPA, (1) w/attachment
Brian Nickel, OEPA, (1) w/attachment
Ruth Vandegrift, ODH, (1) w/attachment
Art Kleinrath, MEMP, (2) w/attachment
Terrence Tracy, DOE/HQ, (1) w/attachment
Dann Bird, MMCIC, (2) w/attachment
John Price, BWXT of Ohio, (2) w/attachment
Public Reading Room, (5) w/attachment
Administrative Record, (2) w/attachment
DCC

3001 – 0008080006

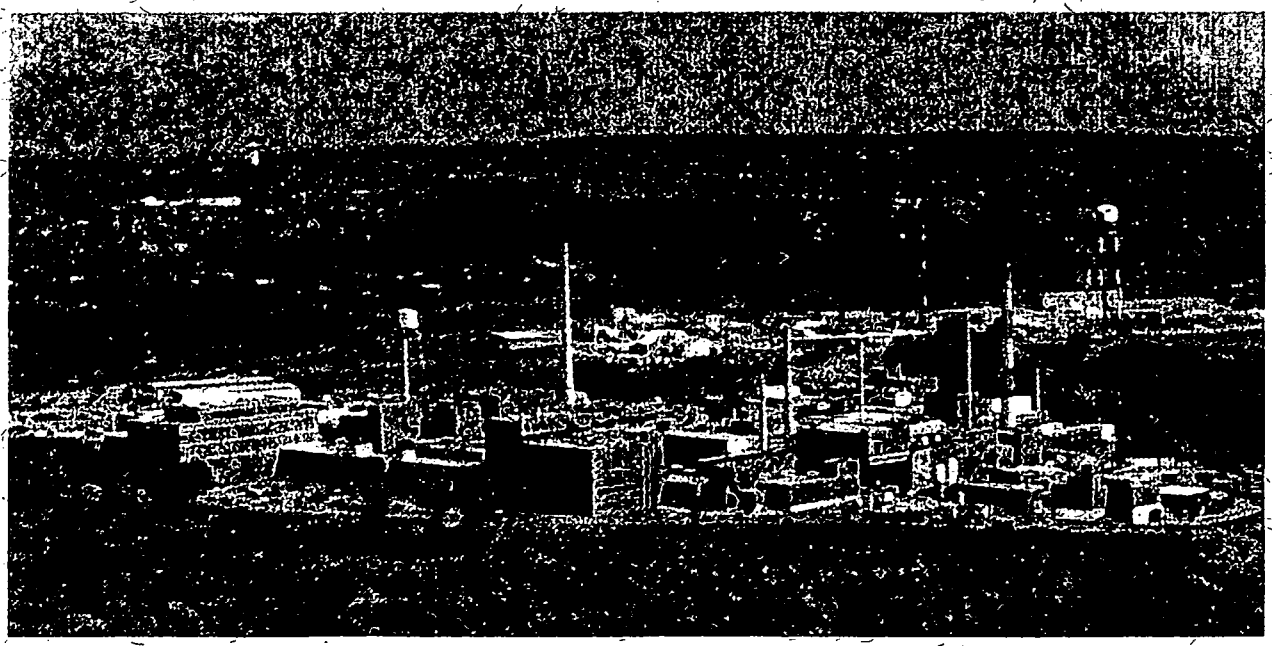
MOUND

Environmental
Restoration
Program

MOUND PLANT

Potential Release Site Package

PRS #416



REV	DESCRIPTION	DATE
WORKING DRAFT		June 23, 1999
DRAFT	Binned FA: 15 September 1999	August 25, 1999
DRAFT PROPOSED FINAL	Binned NFA: 17 February 2000	March 9, 2000
PUBLIC REVIEW DRAFT	OEPA comments incorporated. Cover adjusted.	March 21, 2000
FINAL	MMCIC comments received. Comments and Core Team responses inserted. Addendum 1 inserted.	July 3, 2000

The Mound Core Team
P.O. Box 66
Miamisburg, Ohio 45343-0066

Mr. Daniel Bird, AICP
Planning Manager
Miamisburg Mound Community Improvement Corporation
720 Mound Road
COS Bldg. 4221
Miamisburg, Ohio 45342-6714

Dear Mr. Bird:

The Core Team, consisting of the U.S. Department of Energy Miamisburg Environmental Management Project (DOE-MEMP), U.S. Environmental Protection Agency (USEPA), and the Ohio Environmental Protection Agency (OEPA), appreciates your comments on PRS 416 Data Package, Public Review Draft, March 21, 2000. Attached are our responses.

Should the responses to comments require additional detail, please contact Art Kleinrath at (937) 865-3597 and we will gladly arrange a meeting or telephone conference.

Sincerely,

DOE/MEMP: Arthur Kleinrath
Art Kleinrath, Remedial Project Manager

USEPA: Timothy J. Fischer
Timothy J. Fischer, Remedial Project Manager

OEPA: Brian K. Nickel
Brian K. Nickel, Project Manager

PRS 416 Data Package
Public Review Draft
March 21, 2000

Substantive Comments

1. The third sentence of the second paragraph following "**PRS HISTORY**" states that "The Runnoff Hollow was evaluated (In what way was it evaluated?) and found to be less than..." Neither this sentence nor the following table indicates from what medium the samples were collected. From the units provided in the table (pCi/g) and the Guideline Values listed (i.e., 55 pCi/g for the 10^{-5} risk level for Pu-238), we assume that the samples were collected from soil. Is this correct?

Response:

The Runoff Hollow is Potential Release Site (PRS) 4. It was evaluated by the Mound Core Team as part of a PRS Data Package addressing the Miami-Erie Canal: PRSs 1, 2, 3, 4, 5, & 6. PRS 4, along with the other Miami-Erie Canal PRSs, was binned as requiring No Further Assessment (NFA) on March 20, 1996. The PRS recommendation (for 1, 2, 3, 4, 5, & 6) was signed on May 8, 1996 and states, in part, that "PRSs 2, 3, 4, 5, 6 are being addressed under the OU4, Miami-Erie Canal Removal Action which includes the removal of contaminated soil and complete verification for radiological and chemical contaminants to the stakeholder agreed upon clean-up standard;..." Specifically, with respect to the Runoff Hollow (PRS 4), an NFA determination was made based on no sample results exceeding the canal's stakeholder approved 75 pCi/g clean up level for plutonium-238 in soil. MMCIC will best find answers to this comment in the applicable On Scene Coordinator Report and related canal clean-up literature. It is noted that the Runoff Hollow is PRS 4 and the PRS being addressed is PRS 416. The Runoff Hollow is referenced because water that falls within the small watershed drains into PRS 416.

2. Under "**PRS HISTORY**," a rationale is provided as to why no further action will be taken regarding the Runoff Hollow maximum sample result exceeding the Pu-238 Guideline Criteria (i.e., the result is less than the Canal clean-up standard for Pu-238 of 75 pCi/g). What is the rationale for no further action regarding the sample result exceeding the Radium-226 Guideline Criteria, and, perhaps also the J-qualified sample results exceeding the Cesium-137 and Stontium-90 Guideline Criteria? It is because of a limited number of sample points or because the Runoff Hollow is outside of the Mound property? Please explain.

Response:

The Runoff Hollow is Potential Release Site (PRS) 4. It was evaluated by the Mound Core Team as part of a PRS Data Package addressing the Miami-Erie Canal: PRSs 1, 2, 3, 4, 5, & 6. PRS 4, along with the other Miami-Erie Canal PRSs, was binned as requiring No Further Assessment (NFA) on March 20, 1996. The PRS recommendation (for 1, 2, 3, 4, 5, & 6) was signed on May 8, 1996 and states, in part, that "PRSs 2, 3, 4, 5, 6 are being addressed under the OU4, Miami-Erie Canal Removal Action which includes the removal of contaminated soil and complete verification for radiological and chemical contaminants to the stakeholder agreed upon clean-up standard; ..." Although sample results for radium-226, strontium-90, and cesium-137 exceed the 10^{-6} guideline value, the incremental risk associated with all three of these contaminants is at or below the 10^{-5} risk level.

3. In the paragraph titled "**Surface/Fixed.**" Under the heading "**CONTAMINATION**," the sampling effort and results of direct readings for alpha identification are discussed. However, the first sentence of that paragraph states that the "Concrete surfaces of the box culvert were investigated for the presence of alpha (α) and beta (β)/gamma (γ) emissions." Are direct reading data available for beta/gamma emissions from the 1997 and 1998 sampling effort? Were beta/gamma data not discussed because the alpha emissions have the more stringent screening surface release criteria? Please explain.

Response:

Additional text will be inserted into the "surface/fixed" paragraph as follows. "The average and maximum allowable residual surface contamination for beta/gamma emitters is 5,000 dpm/100 cm^2 and 15,000 dpm/100 cm^2, respectively. Results of direct beta/gamma readings collected in 1998 indicate no detections at or above 5,000 dpm/100 cm^2."

4. Please provide a more detailed description of what is meant by "a risk-based evaluation of the current scenario was made and the resultant determination was acceptable risk." This phase appears as the second sentence under the heading "FURTHER ASSESSMENT ACTIVITY." Was this evaluation a simple comparison of sampling results with risk-based screening criteria, or were there more complicated assumptions and calculations involved.

Response:

The most likely exposure scenario involves a heavy equipment operator demolishing the entire concrete structure and breathing airborne

contamination from ground-up residual surface contamination. The calculated dose that the person would receive was compared to NRC criteria and the resultant risk deemed acceptable by the Core Team. However, as a best management practice to address the concerns associated with the exceedances of the screening criteria, monolithic encapsulation via placement of concrete was approved by the Core Team and performed in early February 2000.

MOUND

Environmental Restoration Program

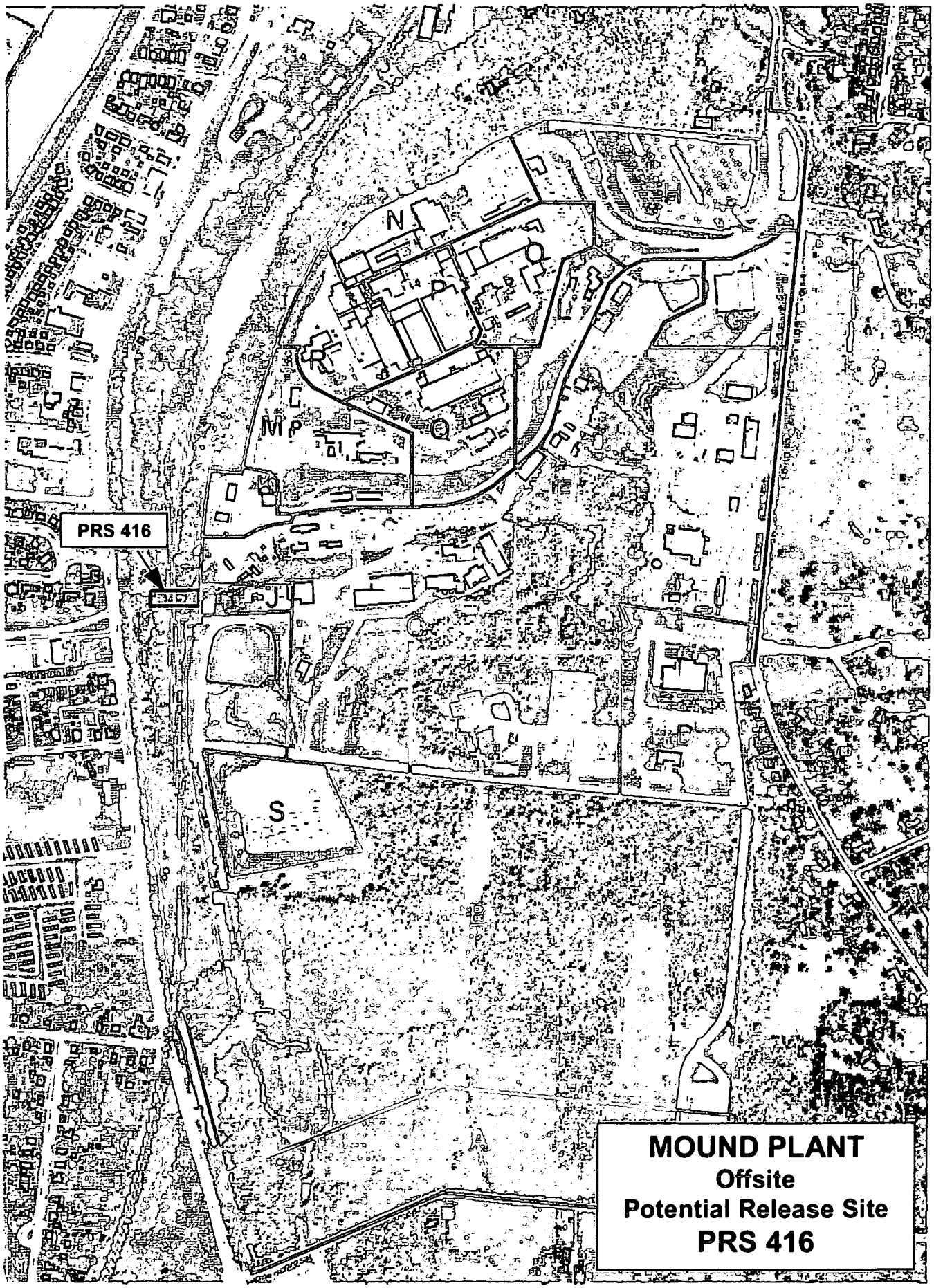
MOUND PLANT POTENTIAL RELEASE SITE PACKAGE

Notice of Public Review Period

The following Potential Release Site (PRS) 416 Data Package is available for public review in the CERCLA Public Reading Room, 305 E. Central Ave., Miamisburg, Ohio. Public comment on this document will be accepted March 22, 2000 through April 22, 2000.

Potential Release Site 416: Twin 60s

Questions can be referred to Paul Lucas at (937) 865-4578.


PRS 416
N
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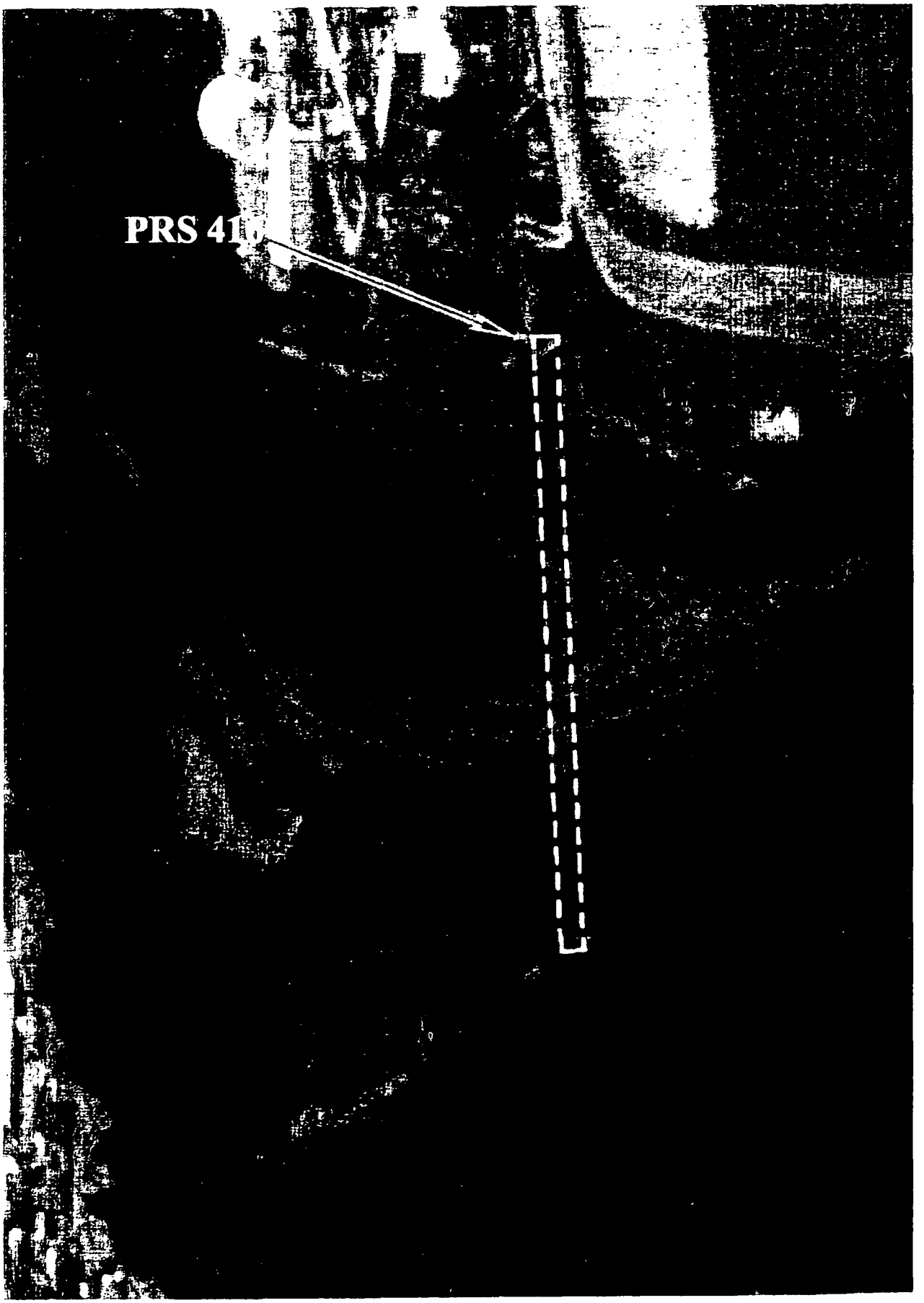
MOUND PLANT
Offsite
Potential Release Site
PRS 416


PRS 41

PRS 416

PRS HISTORY:

Potential Release Site (PRS) 416, also known as the "Twin 60s," is a set of 60-inch diameter concrete stormwater discharge pipes that are connected and drain into a five foot wide, seven foot tall concrete box culvert. As shown in Figure 1, the pipes originate at the Mound Plant property line, drain into the box culvert, and discharge into the Miami-Erie Canal. The Twin 60s are located entirely offsite and under the Conrail railroad embankment near the southwest corner of the Mound Plant original property line.

A small watershed known as "Runoff Hollow" is located between the Mound Plant fence line and the Conrail embankment. Stormwater from Runoff Hollow is directed to a pipe that traverses the Conrail embankment and enters the Twin 60s at the box culvert. (The Runoff Hollow was evaluated and found to be less than the Canal clean-up standard for plutonium-238 of 75 pCi/g.) The highest result of each contaminant found to be above its guideline criteria is presented in Table 1[1].

Table 1: Runoff Hollow Sample Results Exceeding Guideline Criteria

Analyte	Result & Data Qualifier	Guideline Value[2] (GV)	Background[3] (Bkgd)	GV + Bkgd
Cesium^{137} (pCi/g)	0.777 J	10^{-6}=0.42	0.42	0.84
Strontium^{90} (pCi/g)	8.29 J	10^{-6}=3.0	0.72	3.72
Radium^{226} (pCi/g)	3.3	10^{-6}=0.13	2.0	2.13
Benzo(a)pyrene (mg/kg)	0.42 U	10^{-6}=0.41	NA	0.41
Dibenz(a,h)anthracene (mg/kg)	0.42 U	10^{-6}=0.41	NA	0.41
Plutonium^{238} (pCi/g)	68.3	10^{-5}=55	0.13	55.13

U = not detected at the level indicated
J = estimated

Prior to the construction of the drainage reroute (PRS 419), the Twin 60s conveyed all of the Mound Plant stormwater offsite. The entrance to the Twin 60s was concreted shut as part of the drainage reroute project (see Figure 2) and the only stormwater conveyed via the Twin 60s is from Runoff Hollow. The Twin 60s was made a PRS because of the presence of Pu^{238} contamination in sediment (estimated depth ranged from one to a maximum of 12 inches) and on concrete surfaces related to the Twin 60s.

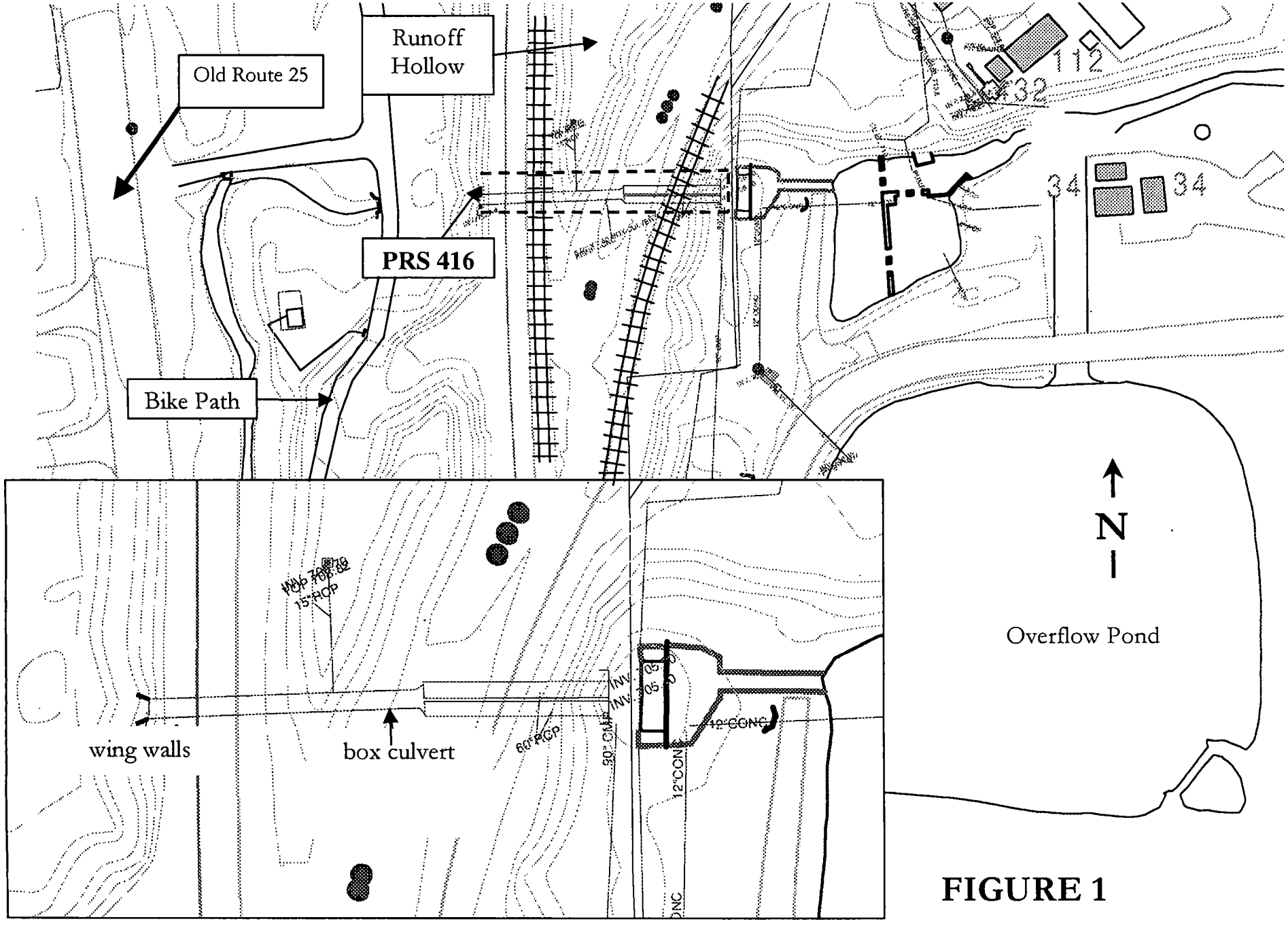

Old Route 25
Runoff Hollow
PRS 416
Bike Path
112
32
34
34
N
Overflow Pond
wing walls
box culvert
15"PCP
60"PCP
30" CMP
12"CONC
12"CONC

FIGURE 1

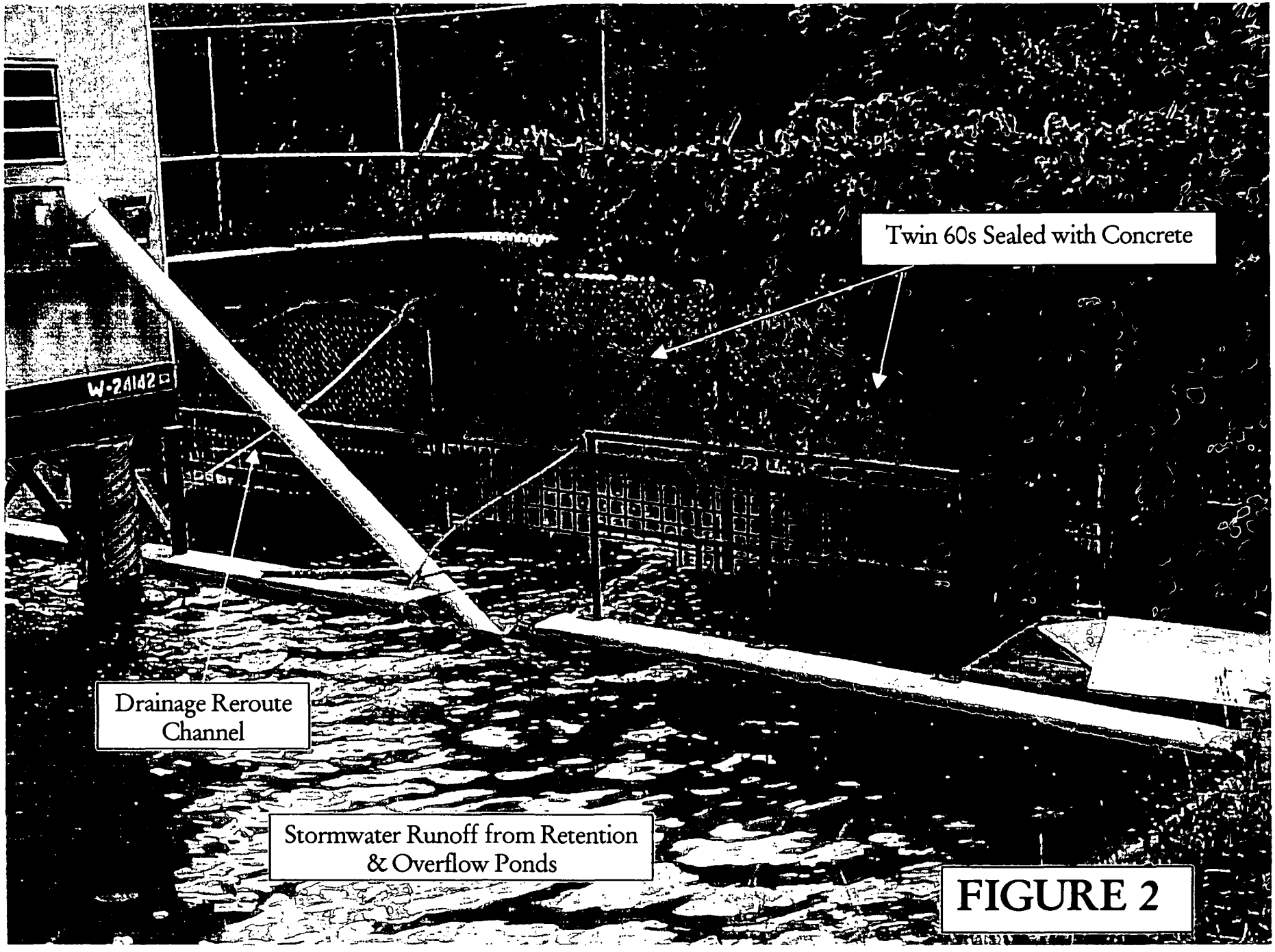

Twin 60s Sealed with Concrete
Drainage Reroute Channel
Stormwater Runoff from Retention & Overflow Ponds

FIGURE 2

CONTAMINATION:

Sediment. Sampling of the Twin 60s was conducted in 1997 and 1998. A total of 14 sediment samples was collected from the floor of the box culvert, distributed over its entire length. One of the sample results, at a level of 69.5 pCi/g, exceeded the Pu^{238} guideline criterion of 55 pCi/g (10^{-5} risk)[2]. All other sediment results[4] were below the Pu^{238} guideline criterion. Ten of the 14 samples had no detection of Pu^{238} at the minimum detectable activity (MDA). Using the MDA for averaging purposes, the average result of all 14 samples is 24.3 pCi/g. Assuming that all MDA results indicate no contamination, the average result of all 14 samples drops to 11.5 pCi/g. The actual average lies somewhere between 11.5 pCi/g and 24.3 pCi/g.

Even though the entrance to the box culvert is restricted via a fence, coarse aggregate was placed along the length of the interior of the box culvert to further reduce the chance for the public to come in contact with the sediment.

Surface/Fixed. Concrete surfaces of the box culvert were investigated for the presence of alpha (α) and beta (β)/gamma (γ) emissions.[5] A total of 24 direct readings for alpha identification were collected on the wing walls and interior surfaces of the box culvert (Figure 3). The average[6] allowable residual surface contamination for transuranic α emitters is 100 dpm/100 cm^2. The maximum[6] allowable residual surface contamination for transuranic α emitters is 300 dpm/100 cm^2. Six of the 24 readings were collected above the former water line, none of which resulted in a detection above 100 dpm/100cm^2. The maximum of the remaining 18 readings was 990 dpm/100 cm^2, with an average reading of 476 dpm/100 cm^2. Fixed elevated Pu^{238} was only detected below the former water line, which has been blocked by the addition of the stone.

Surface/Removable. A total of 24 swipes were collected from the same concrete surfaces to determine if removable contamination was present.[5] Results of all β/γ and α swipe analyses indicated no removable detections at 1,000 dpm/100cm^2 and 20 dpm/100cm^2, respectively.[2] Allowable residual surface contamination guidelines for removable β/γ and α are 1,000 dpm/100cm^2 and 20 dpm/100cm^2, respectively.

Survey data for surface and sediment sampling are included in Reference 4 to this PRS Package.

REFERENCES:

1) Excerpts from Vista Map Sampling Data Query for Runoff Hollow
2) *Risk-Based Guideline Values, Mound Plant, Miamisburg, Ohio,* March 1997, Final (Revision 4), Appendix B, Tables 4A and 4B.
3) Excerpt from Mound 2000 Residual Risk Evaluation, January 6, 1997, Revision 0, Final
4) 1997 and 1998 sediment sampling forms related to the Twin 60s.
5) 1997 and 1998 radiological survey forms related to the Twin 60s.
6) Excerpts from Work Plan for Environmental Restoration of the DOE Mound Site, the Mound 2000 Approach, February 1999.

PREPARED BY:

Karen M. Arthur, Babcock & Wilcox of Ohio Soils Project Engineer
Joseph C. Geneczko, Babcock & Wilcox of Ohio Technical Staff

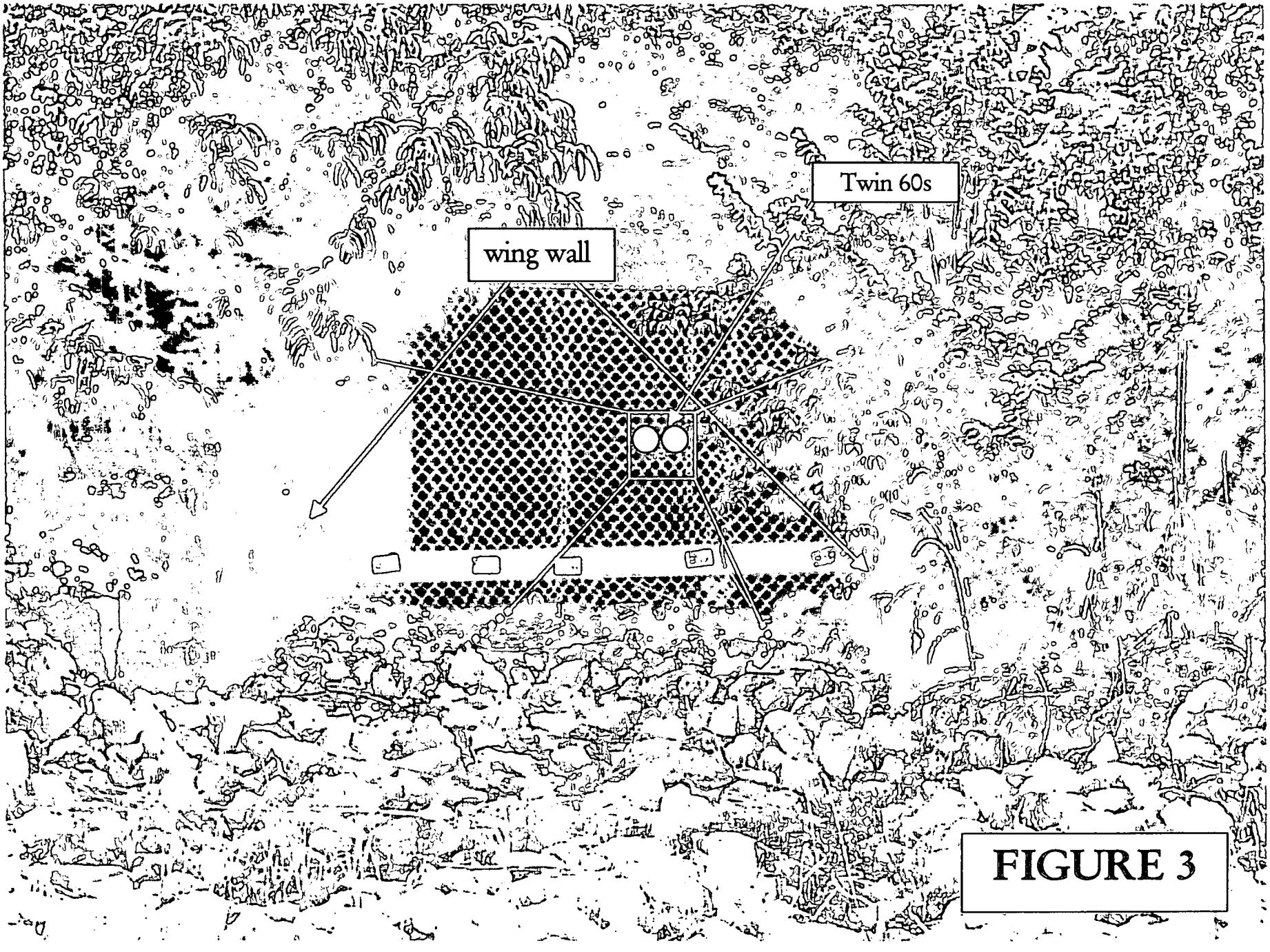


FIGURE 3

MOUND

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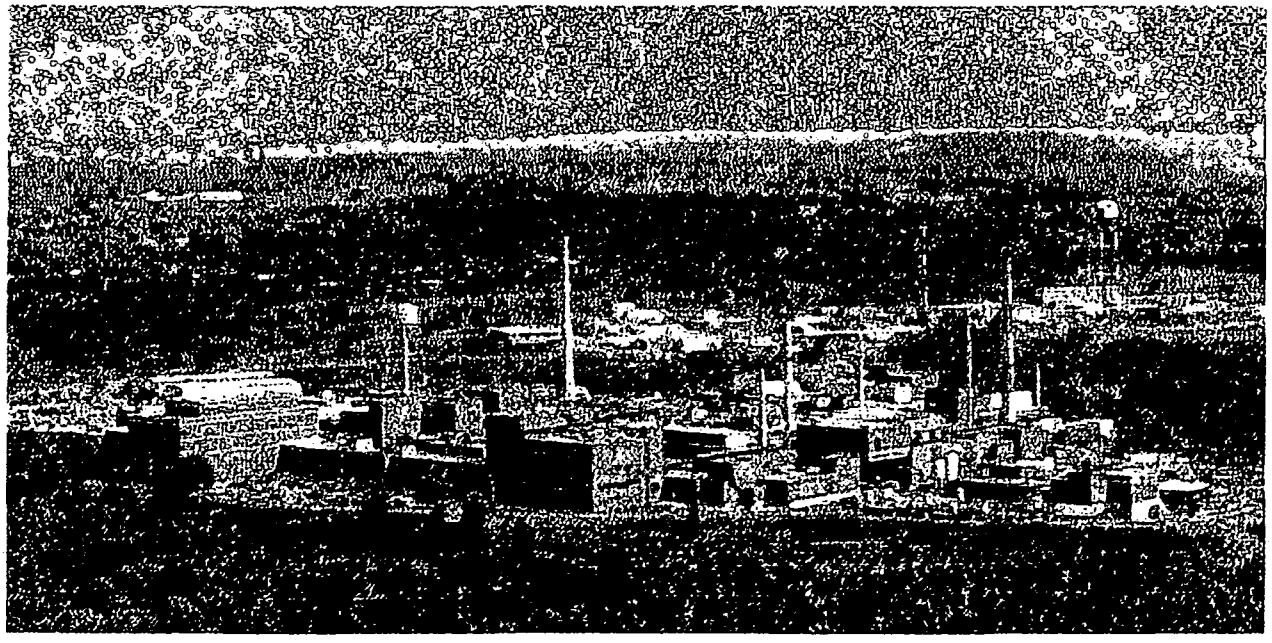
Program

MOUND PLANT
Potential Release Site Package
PRS #416
Addendum 1



This addendum was prepared to describe further assessment activities performed as a result of the Core Team binning of PRS 416 Package as Further Assessment.

FURTHER ASSESSMENT ACTIVITY:

Potential Release Site (PRS) 416 was identified because the surfaces along the bottom of the sidewalls of the Twin 60s box culvert failed screening surface release criteria. A risk-based evaluation of the current scenario was made and the resultant determination was "acceptable risk". As a best management practice to address the concerns associated with the exceedances of the screening criteria, monolithic encapsulation via placement of concrete was approved by the Core Team and performed in early February 2000. The attached photograph shows the completed project.

Box Culvert & Wingwalls. A 100% surface scan was performed for both alpha (α) and beta (β) contamination. Concrete was poured and surfaces not meeting the building release criteria were encapsulated. The highest activity encapsulated in the box culvert and wingwall area was 1,500dpm/100cm^2 α. Ten 1-meter (3.3-foot) grid surfaces above the poured concrete contained detectable activity but met the building release criteria as shown on the three calculation pages attached to this addendum. All other surfaces surveyed were found to be <100dpm/100cm^2 α and therefore meet the building release criteria (average reading <100dpm/100cm^2 α with a maximum single value not >300dpm/100cm^2 α, and not >5,000dpm/100cm^2 β.

Twin 60 Pipes. A representative scan performed in both of the Twin 60s (north pipe and south pipe) identified a "bathtub ring" approximately six inches off the bottom center of both pipes below which showed activity greater than the building release criteria. All other surfaces surveyed were found to be <100dpm/100cm^2 α and therefore meet the building release criteria.

South Pipe. The highest activity found within the bathtub ring in the south pipe was 300dpm/100cm^2 α. Concrete was poured in the south pipe and surfaces displaying detectable activity were encapsulated.

North Pipe. Eight locations in the north pipe within the bathtub ring had activity greater than 1,000dpm/100cm^2 α, the highest being 5,000dpm/100cm^2 α. Following destructive sampling, four locations remained greater than 1,000dpm/100cm^2 α (1,426dpm/100cm^2 α, 1,610dpm/100cm^2 α, 1,805dpm/100cm^2 α, and 2,413dpm/100cm^2 α). Concrete was poured and surfaces not meeting the building release criteria were encapsulated.

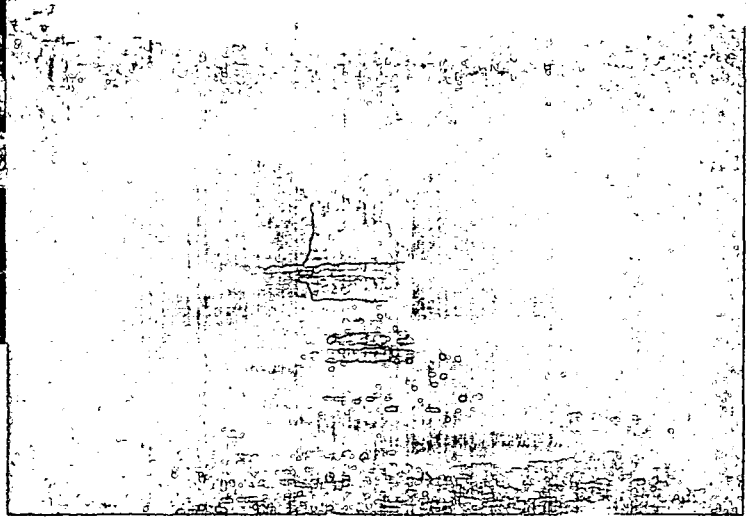
FURTHER ASSESSMENT RESULTS:

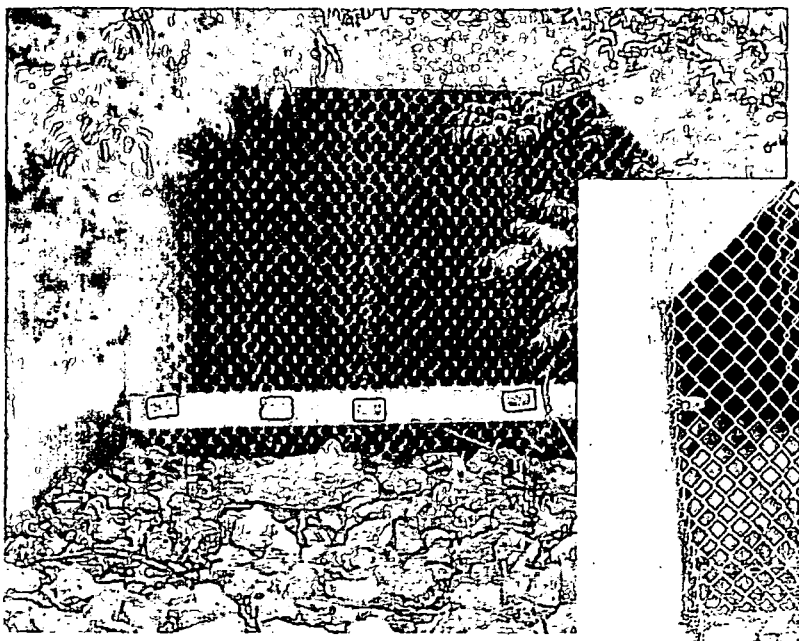
✓The attached post-pour radiological survey shows that remaining exposed surfaces on the wingwalls, box culvert, and Twin 60s contain **less than the allowable average and maximum residual surface contamination** for transuranic α emitters. All areas surveyed as part of this project were also less than the building release criteria for β contamination.

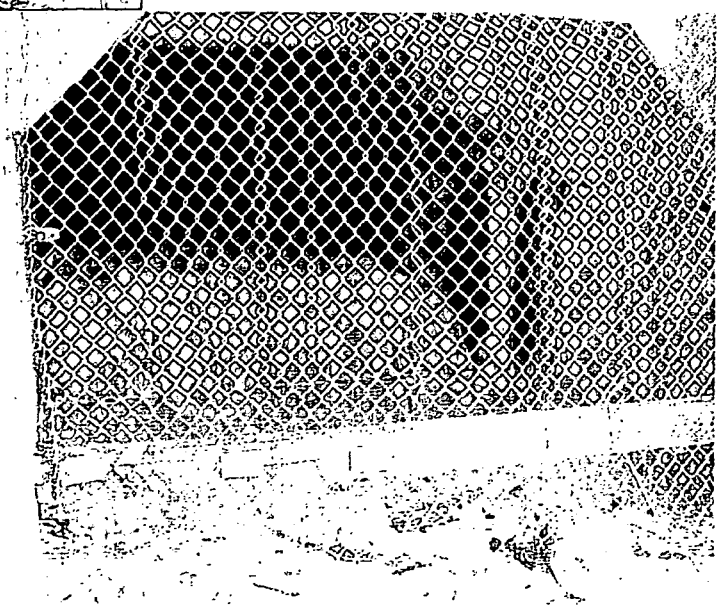
PREPARED BY:

Karen M. Arthur, BWXT of Ohio Soils Project Engineer
Joseph C. Geneczko, BWXT of Ohio Technical Staff

Before & After Photos of Twin 60s & Box Culvert Entrance







MOUND PLANT
PRS 416
Twin 60s

RECOMMENDATION:

Potential Release Site (PRS) 416 was identified because the surfaces along the bottom of the sidewalls of the Twin 60s box culvert failed screening surface release criteria. A risk-based evaluation of the current scenario was made and the resultant determination was "acceptable risk." As a best management practice to address the concerns associated with the exceedances of the screening criteria, monolithic encapsulation via placement of concrete was approved by the Core Team and performed in early February 2000.

The post-pour radiological survey documents show that remaining exposed surfaces on the wingwalls, box culvert, and Twin 60s contain less than the allowable average and maximum residual surface contamination for transuranic alpha (α) emitters. All areas surveyed as part of this project were also less than the building release criteria for beta (β) contamination.

Therefore, PRS 416 requires NO FURTHER ASSESSMENT.

CONCURRENCE:

DOE/MEMP:	Arthur W. Kleinrath, Remedial Project Manager	Feb 17 2000 (date)
USEPA:	Timothy J. Fischer, Remedial Project Manager	2/22/2000 (date)
OEPA:	Brian K. Nickel, Project Manager	2/17/2000 (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from 3/22/2000 to 4/22/2000

☐ No comments were received during the comment period.

☒ Comment responses can be found on ~~page~~ at beginning of this package.

R

RECEIVED
FEB 22 2000
REMEDIAL RESPONSE BR. 2
FEDERAL FACILITIES

REFERENCE MATERIAL

PRS 416

Runoff Hollow Data from Vista Map

Location name	Sample Id	Collection date	Chem class	Value name	Measured value	Value units	Detection limit	Data qualifier	Lab qualifier	Comment
AN	RAN303	19940420	RAD	Uranium-238	0.719	PCI/G				
AN	RAN305	19940420	ORSVO	4-Nitroaniline	990	UG/KG	990	U	U	
AN	RAN305	19940420	ORVOA	Acrylonitrile	119	UG/KG	119	U	U	
AN	RAN305	19940420	ORVOA	Vinyl Acetate	12	UG/KG	12	U	U	
AN	RAN305	19940420	ORVOA	4-Methyl-2-pentanone	12	UG/KG	12	UJ	U	
AN	RAN305	19940420	ORSVO	2,2'-oxybis(1-chloropropane)	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	Toluene	6	UG/KG		J		
AN	RAN305	19940420	ORVOA	Chlorobenzene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORSVO	Phenol	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	Hexane	12	UG/KG	12	U	U	
AN	RAN305	19940420	ORPPB	Aroclor-1260	**7.8**	UG/KG	7.8	U	U	Exceeds background value.
AN	RAN305	19940420	ORPPB	Aroclor-1254	7.8	UG/KG	7.8	U	U	
AN	RAN305	19940420	ORSVO	Bis(2-chloroethyl)ether	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	Bis(2-chloroethoxy)methane	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORPPB	Aroclor-1221	16	UG/KG	16	U	U	
AN	RAN305	19940420	ORPPB	Aroclor-1232	7.8	UG/KG	7.8	U	U	
AN	RAN305	19940420	ORSVO	Bis(2-ethylhexyl)phthalate	400	UG/KG	400	U	U	
AN	RAN305	19940420	RAD	Cesium-137 6v+bkgd = 0.84	**0.777**	PCI/G		J		Exceeds soil 10-6 QV. Exceeds background value.
AN	RAN305	19940420	ORSVO	4-Nitrophenol	990	UG/KG	990	U	U	
AN	RAN305	19940420	ORVOA	1,2-Dichloroethene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORSVO	1,3-Dichlorobenzene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	Carbon Tetrachloride	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORSVO	Benzo(a)anthracene	82	UG/KG		J	J	
AN	RAN305	19940420	INORG	Cyanide	**0.59**	MG/KG	0.59	U	U	Exceeds background value.
AN	RAN305	19940420	ORPPB	Gamma-BHC (Lindane)	**0.4**	UG/KG	0.4	U	U	Exceeds background value.
AN	RAN305	19940420	ORSVO	4-Chloro-3-methylphenol	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	2-Hexanone	12	UG/KG	12	UJ	U	
AN	RAN305	19940420	ORPPB	Dieldrin	**0.78**	UG/KG	0.78	U	U	Exceeds background value.
AN	RAN305	19940420	ORSVO	2,6-Dinitrotoluene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	N-Nitroso-di-n-propylamine	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	Benzoic Acid	54	UG/KG		J	J	
AN	RAN305	19940420	ORVOA	Acetone	12	UG/KG	12	U	U	
AN	RAN305	19940420	ORVOA	Chloroform	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORSVO	Hexachloroethane	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	4-Chlorophenyl-phenylether	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	Benzene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORVOA	1,1,1-Trichloroethane	6	UG/KG	6	UJ	U	

BKgd = 0.42
10^{-6} = 0.42 pCi/g

Runoff Hollow Data from Vista Map

Location name	Sample Id	Collection date	Chem class	Value name	Measured value	Value units	Detection limit	Data qualifier	Lab qualifier	Comment
AN	RAN305	19940420	ORPPB	4,4'-DDT	0.78	UG/KG	0.78	U	U	
AN	RAN305	19940420	ORSVO	Benzo(a)pyrene	94	UG/KG		J	J	
AN	RAN305	19940420	ORSVO	2,4-Dinitrophenol	990	UG/KG	990	U	U	
AN	RAN305	19940420	ORPPB	Alpha Chlordane	**0.4**	UG/KG	0.4	U	U	Exceeds background value.
AN	RAN305	19940420	ORPPB	Gamma Chlordane	**0.4**	UG/KG	0.4	U	U	Exceeds background value.
AN	RAN305	19940420	ORSVO	Dibenz(a,h)anthracene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	4,6-Dinitro-o-Cresol	990	UG/KG	990	U	U	
AN	RAN305	19940420	ORPPB	Aroclor-1242	7.8	UG/KG	7.8	U	U	
AN	RAN305	19940420	ORPPB	Endrin Ketone	**0.78**	UG/KG	0.78	U	U	Exceeds background value.
AN	RAN305	19940420	ORSVO	4-Bromophenyl-phenyl Ether	400	UG/KG	400	U	U	
AN	RAN305	19940420	RAD	Cobalt-60	0.024	PCI/G	0.024	U	ND	
AN	RAN305	19940420	ORPPB	Heptachlor Epoxide	**0.4**	UG/KG	0.4	U	U	Exceeds background value.
AN	RAN305	19940420	ORPPB	Endosulfan Sulfate	**0.78**	UG/KG	0.78	U	U	Exceeds background value.
AN	RAN305	19940420	ORSVO	2,4-Dimethylphenol	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	4-Methylphenol	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	1,4-Dichlorobenzene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	4-Chloroaniline	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	1,2-Dichloroethane	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORVOA	Ethylbenzene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORVOA	Styrene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORVOA	1,3-cis-Dichloropropene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORVOA	1,3-trans-Dichloropropene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	RAD	Strontium-90 BKgd+GV = 3.72	**4.57**	PCI/G		J	CJ	10^{-6} GV = 3.0, BKgd = 0.72 pCi/g Exceeds soil 10-6 GV. Exceeds background value.
AN	RAN305	19940420	ORSVO	Di-n-octyl Phthalate	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	Hexachlorobenzene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	Anthracene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	2-Benzyl-4-Chlorophenol	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	1,2,4-Trichlorobenzene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	2,4-Dichlorophenol	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	2,4-Dinitrotoluene	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORVOA	Dibromochloromethane	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORPPB	Aroclor-1248	**7.8**	UG/KG	7.8	U	U	Exceeds background value.
AN	RAN305	19940420	ORPPB	Aroclor-1016	7.8	UG/KG	7.8	U	U	
AN	RAN305	19940420	ORVOA	Tetrachloroethene	6	UG/KG	6	UJ	U	
AN	RAN305	19940420	ORSVO	Pyrene	240	UG/KG		J	J	
AN	RAN305	19940420	ORSVO	Dimethyl Phthalate	400	UG/KG	400	U	U	
AN	RAN305	19940420	ORSVO	Dibenzofuran	400	UG/KG	400	U	U	

Runoff Hollow Data from Vista Map

Location name	Sample id	Collection date	Chem class	Value name	Measured value	Value units	Detection limit	Data qualifier	Lab qualifier	Comment
AN	RAN316	19940420	ORSVO	4,6-Dinitro-o-Cresol	990	UG/KG	990	U	U	
AN	RAN316	19940420	ORPPB	Aroclor-1242	7.8	UG/KG	7.8	U	U	
AN	RAN316	19940420	ORPPB	Endrin Ketone	**0.78**	UG/KG	0.78	U	U	Exceeds background value.
AN	RAN316	19940420	ORSVO	4-Bromophenyl-phenyl Ether	400	UG/KG	400	U	U	
AN	RAN316	19940420	RAD	Cobalt-60	0.0362	PCI/G	0.0362	U	ND	
AN	RAN316	19940420	ORPPB	Heptachlor Epoxide	**0.4**	UG/KG	0.4	U	U	Exceeds background value.
AN	RAN316	19940420	ORPPB	Endosulfan Sulfate	**0.78**	UG/KG	0.78	U	U	Exceeds background value.
AN	RAN316	19940420	ORSVO	2,4-Dimethylphenol	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	4-Methylphenol	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	1,4-Dichlorobenzene	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	4-Chloroaniline	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORVOA	1,2-Dichloroethane	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORVOA	Ethylbenzene	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORVOA	Styrene	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORVOA	1,3-cis-Dichloropropene	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORVOA	1,3-trans-Dichloropropene	6	UG/KG	6	UJ	U	10^{-6} = 3.0 pCi/g, BKgd = 0.72 pCi/g
AN	RAN316	19940420	RAD	Strontium-90 BKgd+GV = 3.72	**8.29**	PCI/G		J	CJ	Exceeds soil 10-6 GV. Exceeds background value.
AN	RAN316	19940420	ORSVO	Di-n-octyl Phthalate	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	Hexachlorobenzene	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	Anthracene	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	2-Benzyl-4-Chlorophenol	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	1,2,4-Trichlorobenzene	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	2,4-Dichlorophenol	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	2,4-Dinitrotoluene	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORVOA	Dibromochloromethane	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORPPB	Aroclor-1248	**7.8**	UG/KG	7.8	U	U	Exceeds background value.
AN	RAN316	19940420	ORPPB	Aroclor-1016	7.8	UG/KG	7.8	U	U	
AN	RAN316	19940420	ORVOA	Tetrachloroethene	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORSVO	Pyrene	130	UG/KG		J	J	
AN	RAN316	19940420	ORSVO	Dimethyl Phthalate	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORSVO	Dibenzofuran	400	UG/KG	400	U	U	
AN	RAN316	19940420	ORVOA	Xylenes, Total	6	UG/KG	6	UJ	U	
AN	RAN316	19940420	ORVOA	1,2-Diethylbenzene	24	UG/KG	24	U	U	
AN	RAN316	19940420	RAD	Potassium-40	29.5	PCI/G				current std = 10^{-5} GV = 55 pCi/g
AN	RAN316	19940420	RAD	Plutonium-238	**33**	PCI/G				Exceeds soil 10-6 GV. Exceeds background value. Exceeds other criteria.
AN	RAN316	19940420	INORG	Antimony	0.73	MG/KG	0.73	UJ	U N	

Runoff Hollow Data from Vista Map

Location name	Sample Id	Collection date	Chem class	Value name	Measured value	Value units	Detection limit	Data qualifier	Lab qualifier	Comment
N04	N04301	19940608	INORG	Nickel	25.3	MG/KG				
N04	N04301	19940608	INORG	Potassium	1060	MG/KG			B	
N04	N04301	19940608	INORG	Silver	1.2	MG/KG	1.2	U	U	
N04	N04301	19940608	INORG	Sodium	**471**	MG/KG	471	U	U	Exceeds background value.
N04	N04301	19940608	INORG	Thallium	**0.9**	MG/KG	0.9	U	U	Exceeds background value.
N04	N04301	19940608	ORSVO	Benzyl Alcohol	420	UG/KG	420	U	U	
N04	N04301	19940608	RAD	Plutonium-238	**18**	PCI/G			U	Exceeds soil 10-6 GV. Exceeds background value.
N04	N04301	19940608	RAD	Plutonium-238	**6**	PCI/G			U	Exceeds soil 10-6 GV. Exceeds background value.
N04	N04301	19940608	RAD	Plutonium-238	**7**	PCI/G			U	Exceeds soil 10-6 GV. Exceeds background value.
N04	N04301	19940608	RAD	Plutonium-238	**9**	PCI/G			U	Exceeds soil 10-6 GV. Exceeds background value.
N04	N04301	19940608	RAD	Plutonium-238	**0.3**	PCI/G		UJ	B	Exceeds background value.
N04	N04301	19940608	RAD	Plutonium-238	**7**	PCI/G			U	Exceeds soil 10-6 GV. Exceeds background value.
N04	N04301	19940608	RAD	Radium-226 BKgd+GV= 2.13	**3.3**	PCI/G	BKgd= 2.0 pCi/g. 10-6= 0.13 pCi/g			Exceeds soil 10-6 GV. Exceeds background value.
N04	N04301	19940608	RAD	Thorium-230	**1.52**	PCI/G				Exceeds soil 10-6 GV. 10-6 = 44 pCi/g
N04	N04301	19940608	RAD	Thorium-228	**0.902**	PCI/G				Exceeds soil 10-6 GV. Current std = 3.0 pCi/g
N04	N04301	19940608	RAD	Americium-241	0.159	PCI/G	0.159	U	ND	
N04	N04301	19940608	ANION	Nitrate/Nitrite	0.62	MG/KG	0.62	U	U	
N04	N04301	19940608	RAD	Uranium-235	0.0556	PCI/G				
N04	N04301	19940608	ORSVO	Benzo(g,h,i)perylene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Indeno(1,2,3-cd)pyrene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Benzo(b)fluoranthene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Fluoranthene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Benzo(k)fluoranthene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Acenaphthylene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Chrysene	420	UG/KG	420	U	U	
N04	N04301	19940608	OREXP	HMX	2.7	MG/KG	2.7	U	U	
N04	N04301	19940608	ORPPB	Aldrin	**0.42**	UG/KG	0.42	U	U	Exceeds background value.
N04	N04301	19940608	ORPPB	Alpha-BHC	**0.42**	UG/KG	0.42	U	U	Exceeds background value.
N04	N04301	19940608	ORPPB	Beta-BHC	**0.42**	UG/KG	0.42	U	U	Exceeds background value.
N04	N04301	19940608	ORPPB	Delta-BHC	0.42	UG/KG	0.42	U	U	
N04	N04301	19940608	ORPPB	Endosulfan II	0.82	UG/KG	0.82	U	U	
N04	N04301	19940608	OREXP	2-Amino-4,6-dinitrotoluene	0.31	MG/KG	0.31	U	U	
N04	N04301	19940608	OREXP	Tetryl	0.81	MG/KG	0.81	U	U	

Current std = 10-5 GV = 55 pCi/g

Runoff Hollow Data from Vista Map

Location name	Sample Id	Collection date	Chem class	Value name	Measured value	Value units	Detection limit	Data qualifier	Lab qualifier	Comment
N04	N04301	19940608	ORPPB	4,4'-DDT	0.82	UG/KG	0.82	UJ	U	
N04	N04301	19940608	ORSVO	Benzo(a)pyrene 10-6 = 410	**420**	UG/KG	420	U	U	Exceeds soil 10-6 GV. = 0.41 mg/kg = 410 ug/kg
N04	N04301	19940608	ORSVO	2,4-Dinitrophenol	1000	UG/KG	1000	U	U	
N04	N04301	19940608	ORPPB	Alpha Chlordane	**0.42**	UG/KG	0.42	U	U	Exceeds background value.
N04	N04301	19940608	ORPPB	Gamma Chlordane	**0.42**	UG/KG	0.42	U	U	Exceeds background value.
N04	N04301	19940608	ORSVO	Dibenz(a,h)anthracene 10-6 = 410	**420**	UG/KG	420	U	U	Exceeds soil 10-6 GV. = 0.41 mg/kg = 410 ug/kg
N04	N04301	19940608	ORSVO	4,6-Dinitro-o-Cresol	1000	UG/KG	1000	U	U	
N04	N04301	19940608	ORPPB	Aroclor-1242	8.2	UG/KG	8.2	U	U	
N04	N04301	19940608	ORPPB	Endrin Ketone	**0.82**	UG/KG	0.82	U	U	Exceeds background value.
N04	N04301	19940608	RAD	Cobalt-60	0.0364	PCI/G	0.0364	U	ND	
N04	N04301	19940608	ORPPB	Heptachlor Epoxide	**0.42**	UG/KG	0.42	U	U	Exceeds background value.
N04	N04301	19940608	ORPPB	Endosulfan Sulfate	**0.82**	UG/KG	0.82	U	U	Exceeds background value.
N04	N04301	19940608	ORSVO	2,4-Dimethylphenol	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	4-Methylphenol	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	1,4-Dichlorobenzene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	4-Chloroaniline	420	UG/KG	420	U	U	
N04	N04301	19940608	ORVOA	1,2-Dichloroethane	6	UG/KG	6	UJ	U	
N04	N04301	19940608	ORVOA	Ethylbenzene	6	UG/KG	6	UJ	U	
N04	N04301	19940608	ORVOA	Styrene	6	UG/KG	6	UJ	U	
N04	N04301	19940608	RAD	Cesium-137	0.0293	PCI/G	0.0293	U	ND	
N04	N04301	19940608	ORVOA	1,3-cis-Dichloropropene	6	UG/KG	6	UJ	U	
N04	N04301	19940608	ORVOA	1,3-trans-Dichloropropene	6	UG/KG	6	UJ	U	
N04	N04301	19940608	RAD	Strontium-90	**0.728**	PCI/G	0.728	U	NDM	Exceeds background value.
N04	N04301	19940608	ORSVO	4-Bromophenyl-phenyl Ether	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Di-n-octyl Phthalate	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	Hexachlorobenzene	420	UG/KG	420	U	U	
N04	N04301	19940608	OREXP	2,4,6-Trinitrotoluene	0.31	MG/KG	0.31	U	U	
N04	N04301	19940608	ORSVO	Anthracene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	2-Benzyl-4-Chlorophenol	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	1,2,4-Trichlorobenzene	420	UG/KG	420	U	U	
N04	N04301	19940608	ORSVO	2,4-Dichlorophenol	420	UG/KG	420	U	U	
N04	N04301	19940608	OREXP	2,4-Dinitrotoluene	0.31	MG/KG	0.31	U	U	
N04	N04301	19940608	ORSVO	2,4-Dinitrotoluene	420	UG/KG	420	U	U	
N04	N04301	19940608	OREXP	RDX	1.2	MG/KG	1.2	U	U	
N04	N04301	19940608	ORVOA	Dibromochloromethane	6	UG/KG	6	UJ	U	
N04	N04301	19940608	ORPPB	Aroclor-1248	**8.2**	UG/KG	8.2	U	U	Exceeds background value.
N04	N04301	19940608	ORPPB	Aroclor-1016	8.2	UG/KG	8.2	U	U	

Runoff Hollow Data from Vista Map

Location name	Sample Id	Collection date	Chem class	Value name	Measured value	Value units	Detection limit	Data qualifier	Lab qualifier	Comment
97VRHN1	750011	19961028	ORSVO	2-Chloronaphthalene	430	UG/KG	430		U	
97VRHN1	750011	19961028	ORSVO	3,3'-Dichlorobenzidine	430	UG/KG	430		U	
97VRHN1	750011	19961028	ORSVO	2-Methylphenol	430	UG/KG	430		U	
97VRHN1	750011	19961028	ORSVO	1,2-Dichlorobenzene	430	UG/KG	430		U	
97VRHN1	750011	19961028	ORSVO	2-Chlorophenol	430	UG/KG	430		U	
97VRHN1	750011	19961028	ORSVO	2,4,5-Trichlorophenol	1100	UG/KG	1100		U	
97VRHN1	750011	19961028	ORSVO	Nitrobenzene	430	UG/KG	430		U	
97VRHN1	750011	19961028	ORSVO	3-Nitroaniline	1100	UG/KG	1100		U	
97VRHN1	750011	19961028	RAD	Plutonium-239/240	0.0528	PCI/G	0.00161			
97VRHN1	750011	19961028	RAD	Uranium-238	0.979	PCI/G	0.0134			
97VRHN1	750011	19961028	ANION	Chloride	70.4	MG/KG	3.2			
97VRHN1	750011	19961028	ANION	Fluoride	1.3	MG/KG	1.3		U	
97VRHN1	750011	19961028	ANION	Sulfate	320	MG/KG	320		U	
97VRHN2	750021	19961028	RAD	Plutonium-238	**3.31**	PCI/G	0.00789			Exceeds background value.
97VRHN2	750021	19961028	RAD	Plutonium-239/240	0.0379	PCI/G	0.00789			current std = 10^{-5} = 55pCi/g
97VRHN3	750031	19961028	RAD	Plutonium-238	**21.9**	PCI/G	0.00921			Exceeds soil 10-6 GV. Exceeds background value.
97VRHN3	750031	19961028	RAD	Plutonium-239/240	0.214	PCI/G	0.0109			
97VRHN4	750041	19961028	RAD	Plutonium-238	**61.5**	PCI/G	0.00975			Exceeds soil 10-6 GV. Exceeds background value. Exceeds other criteria.
97VRHN4	750041	19961028	RAD	Plutonium-239/240	0.498	PCI/G	0.00974			
97VRHN5	750051	19961028	RAD	Plutonium-238	**68.3**	PCI/G	0.0142			Exceeds soil 10-6 GV. Exceeds background value. Exceeds other criteria.
97VRHN5	750051	19961028	RAD	Plutonium-239/240	0.541	PCI/G	0.0155			

current std = 10^{-5} GV = 55pCi/g

RISK-BASED GUIDELINE VALUES

MOUND PLANT
MIAMISBURG, OHIO

March 1997

Submitted to the
Miamisburg Environmental Management Project
U.S. DEPARTMENT OF ENERGY

Prepared by
HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM
Environmental Management and Enrichment Facilities
Managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

Revised by EG&G Mound Applied Technologies, Inc.

FINAL
(REVISION 4)

TABLE 4A

Construction/Mound Employee - Soil/Sediment Guideline Values: Chemicals (Units = mg/kg)

CHEMICAL	Ingestion				Inhalation				Ingestion + Inhalation			
	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1
High Explosives												
HMX				1.10e+04								
PETN												
RDX	2.70e+03	2.70e+02	2.70e+01	6.40e+04								
Inorganics												
Aluminum												
Antimony				8.50e+01								
Arsenic				6.40e+01	6.00e+05	6.00e+04	6.00e+03					
Barium				1.50e+04				3.10e+06				1.50e+04
Beryllium	7.00e+01	7.00e+00	7.00e-01	1.10e+03	3.65e+06	3.65e+05	3.65e+04		7.00e+01	7.00e+00	7.00e-01	
Cadmium (Diet)				2.10e+02	5.00e+06	5.00e+05	5.00e+04					
Chromium III				2.10e+05								
Chromium VI				1.10e+03	7.50e+05	7.50e+04	7.50e+03					
Cobalt												
Copper												

TABLE 4A

Construction/Mound Employee - Soil/Sediment Guideline Values: Chemicals (Units = mg/kg)

CHEMICAL	Ingestion				Inhalation				Ingestion + Inhalation			
	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1
Cyanide				4.30e+03								
Iron												
Lead												
Lithium												
Manganese (Diet)				3.00e+04				3.10e+05				2.70e+04
Mercury				6.40e+01				1.90e+06				6.40e+01
Nickel				4.30e+03								
Silver				1.10e+03								
Thallium												
Vanadium				1.50e+03								
Zinc				6.40e+04								
Organics												
1,1,1-Trichloroethane												
1,1-Dichloroethane				2.10e+04				7.80e+00				7.80e+00
1,2-Dichloroethane	3.30e+03	3.30e+02	3.30e+01		1.70e+03	1.70e+02	1.70e+01		1.10e+03	1.10e+02	1.10e+01	

TABLE 4A

Construction/Mound Employee - Soil/Sediment Guideline Values: Chemicals (Units = mg/kg)

CHEMICAL	Ingestion				Inhalation				Ingestion + Inhalation			
	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1
1,2-trans-Dichloroethylene				4.30e+03								
2-Butanone				1.30e+05				9.30e+03				9.30e+03
2-Hexanone												
2-Methylnaphthalene												
4-Methyl-2-Pentanone				1.70e+04				7.00e+02				7.00e+02
4-Methylphenol				1.10e+03								
Acetone				2.10e+04								
Benzene	1.05e+04	1.05e+03	1.05e+02		2.45e+03	4.65e+02	4.65e+01		2.45e+03	3.20e+02	3.20e+01	
Benzoic Acid				8.50e+05								
Bromodichloromethane	4.80e+03	4.80e+02	4.80e+01	4.30e+03								
Butyl benzyl phthalate				4.30e+04								
Carbon Disulfide				2.10e+04				2.90e+02				2.80e+02
Carbon Tetrachloride	2.30e+03	2.30e+02	2.30e+01	1.50e+02	2.55e+03	2.55e+02	2.55e+01		1.20e+0[illegible]	1.20e+02	1.20e+01	
Chloroethane								1.60e+02				
Chrysene	4.10e+04	4.10e+03	4.10e+02									

TABLE 4A

Construction/Mound Employee - Soil/Sediment Guideline Values: Chemicals (Units = mg/kg)

CHEMICAL	Ingestion				Inhalation				Ingestion + Inhalation			
	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-4}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1
Cresols												
Di-n-butylphthalate				2.10e+04								
Di-n-octylphthalate				4.30e+03								
Dibromochloromethane	3.55e+03	3.55e+02	3.55e+01	4.30e+03								
Dichloromethane	3.95e+04	3.95e+03	3.95e+02	1.30e+04				1.00e+03				1.00e+03
Diethyl benzene, 1,4-												
Ethyl benzene				2.10e+04				4.80e-01				4.80e-01
Hexane				1.30e+04				9.10e+01				9.10e+01
Isophorone	3.15e+05	3.15e+04	3.15e+03	4.30e+04								
Methyl iodide												
N-nitroso-diphenylamine	6.00e+04	6.00e+03	6.00e+02									
Pentachlorophenol	2.50e+03	2.50e+02	2.50e+01	6.40e+03								
Phenol				1.30e+05								
Tetrachloroethene				2.10e+03								
Toluene				4.30e+04				2.50e+02				2.50e+02

TABLE 4A

Construction/Mound Employee - Soil/Sediment Guideline Values: Chemicals (Units = mg/kg)

CHEMICAL	Ingestion				Inhalation				Ingestion + Inhalation			
	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1
Tribromomethane	3.75e+04	3.75e+03	3.75e+02	4.30e+03	8.00e+09	8.00e+08	8.00e+07		3.75e+04	3.75e+03	3.75e+02	
Trichloroethylene	2.70e+04	2.70e+03	2.70e+02		2.20e+03	2.20e+03	2.25e+02		2.20e+03	1.25e+03	1.25e+02	
Trichlorofluoromethane				6.40e+04				7.30e+02				7.30e+02
Trichloromethane	4.90e+04	4.90e+03	4.90e+02	2.10e+03	1.55e+03	1.55e+02	1.55e+01		1.55e+03	1.55e+02	1.55e+01	
Xylene				4.30e+05								
bis(2-Ethylhexyl)phthalate	2.15e+04	2.15e+03	2.15e+02	4.30e+03								
PAHs												
Acenaphthylene												
Anthracene				6.40e+04								
Benzo(a)anthracene	4.10e+02	4.10e+01	4.10e+00									
Benzo(a)pyrene	4.10e+01	4.10e+00	4.10e-01									
Benzo(b)fluoranthene	4.10e+02	4.10e+01	4.10e+00									
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene	4.10e+03	4.10e+02	4.10e+01									
Dibenz(a,h)anthracene	4.10e+01	4.10e+00	4.10e-01									

TABLE 4A

Construction/Mound Employee - Soil/Sediment Guideline Values: Chemicals (Units = mg/kg)

CHEMICAL	Ingestion				Inhalation				Ingestion + Inhalation			
	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1	GV for TR=10^{-4}	GV for TR=10^{-5}	GV for TR=10^{-6}	GV for HI=1
Fluoranthene				8.50e+03								
Indeno(1,2,3-cd)pyrene	4.10e+02	4.10e+01	4.10e+00									
Phenanthrene												
Pyrene				6.40e+03								
Pesticides/PCBs												
4,4'-DDE	9.00e+02	9.00e+01	9.00e+00									
4,4'-DDT	9.00e+02	9.00e+01	9.00e+00	1.10e+02	9.00e+07	9.00e+06	9.00e+05		9.00e+02	9.00e+01	9.00e+00	
Aroclor 1248	3.85e+01	3.85e+00	3.85e-01									
Aroclor 1254				4.30e+00								
Aroclor 1260	3.85e+01	3.85e+00	3.85e-01									
Beta-BHC	1.65e+02	1.65e+01	1.65e+00		1.70e+07	1.70e+06	1.70e+05		1.65e+02	1.65e+01	1.65e+00	
Dieldrin	1.85e+01	1.85e+00	1.85e-01	1.10e+01	1.90e+06	1.90e+05	1.90e+04		1.85e+01	1.85e+00	1.85e-01	
Endrin Ketone												

TABLE 4B **Construction/Mound Employee - Soil/Sediment Guideline Values: Radionuclides (Units =pCi/g)**

RADIONUCLIDE	Ingestion			External			Inhalation			Ingestion + External + Inhalation		
	GV for TR =			GV for TR =			GV for TR =			GV for TR =		
	10^{-4}	10^{-5}	10^{-6}	10^{-4}	10^{-5}	10^{-6}	10^{-4}	10^{-5}	10^{-6}	10^{-4}	10^{-5}	10^{-6}
Actinium-227+D	2.65E+02	2.65E+01	2.65E+00	1.65E+02	1.65E+01	1.65E+00	2.20E+05	2.20E+04	2.20E+03	1.00E+02	1.00E+01	1.00E+00
Americium-241	5.00E+02	5.00E+01	5.00E+00	2.10E+04	2.10E+03	2.10E+02	4.45E+05	4.45E+04	4.45E+03	4.95E+02	4.95E+01	4.95E+00
Bismuth-207	3.30E+04	3.30E+03	3.30E+02	1.75E+01	1.75E+00	1.75E-01	1.80E+09	1.80E+08	1.80E+07	1.75E+01	1.75E+00	1.75E-01
Cesium-137+D	5.50E+03	5.50E+02	5.50E+01	4.65E+01	4.65E+00	4.65E-01	9.00E+08	9.00E+07	9.00E+06	4.60E+01	4.60E+00	4.60E-01
Cobalt-60	9.00E+03	9.00E+02	9.00E+01	1.00E+01	1.00E+00	1.00E-01	2.50E+08	2.50E+07	2.50E+06	1.00E+01	1.00E+00	1.00E-01
Plutonium-238	5.50E+02	5.50E+01	5.50E+00	5.00E+06	5.00E+05	5.00E+04	6.50E+05	6.50E+04	6.50E+03	5.50E+02	5.50E+01	5.50E+00
Plutonium-239	5.50E+02	5.50E+01	5.50E+00	7.50E+06	7.50E+05	7.50E+04	6.00E+05	6.00E+04	6.00E+03	5.50E+02	5.50E+01	5.50E+00
Plutonium-240	5.50E+02	5.50E+01	5.50E+00	5.00E+06	5.00E+05	5.00E+04	6.00E+05	6.00E+04	6.00E+03	5.50E+02	5.50E+01	5.50E+00
Radium-226+D	5.50E+02	5.50E+01	5.50E+00	1.45E+01	1.45E+00	1.45E-01	6.00E+06	6.00E+05	6.00E+04	1.40E+01	1.40E+00	1.40E-01
Strontium-90+D	3.00E+03	3.00E+02	3.00E+01				2.45E+08	2.45E+07	2.45E+06	3.00E+02	3.00E+01	3.00E+00
Thorium-228+D	7.00E+02	7.00E+01	7.00E+00	1.00E+02	1.00E+01	1.00E+00	1.75E+05	1.75E+04	1.75E+03	8.50E+01	8.50E+00	8.50E-01
Thorium-230	4.45E+03	4.45E+02	4.45E+01	2.20E+06	2.20E+05	2.20E+04	1.00E+06	1.00E+05	1.00E+04	4.40E+03	4.40E+02	4.40E+01
Thorium-232	5.00E+03	5.00E+02	5.00E+01	4.95E+06	4.95E+05	4.95E+04	9.00E+05	9.00E+04	9.00E+03	5.00E+03	5.00E+02	5.00E+01
Tritium	2.35E+06	2.35E+05	2.35E+04				1.80E+11	1.80E+10	1.80E+09	2.35E+06	2.35E+05	2.35E+04
Uranium-233	3.70E+03	3.70E+02	3.70E+01	2.75E+06	2.75E+05	2.75E+04	1.20E+06	1.20E+05	1.20E+04	3.70E+03	3.70E+02	3.70E+01
Uranium-234	3.75E+03	3.75E+02	3.75E+01	4.55E+06	4.55E+05	4.55E+04	1.20E+06	1.20E+05	1.20E+04	3.75E+03	3.75E+02	3.75E+01
Uranium-235+D	3.55E+03	3.55E+02	3.55E+01	3.65E+02	3.65E+01	3.65E+00	1.30E+06	1.30E+05	1.30E+04	3.35E+02	3.35E+01	3.35E+00
Uranium-238+D	2.70E+03	2.70E+02	2.70E+01	1.85E+03	1.85E+02	1.85E+01	1.40E+06	1.40E+05	1.40E+04	1.10E+03	1.10E+02	1.10E+01

MOUND

Environmental
Restoration
Program

MOUND 2000

Residual Risk Evaluation Methodology
MOUND PLANT

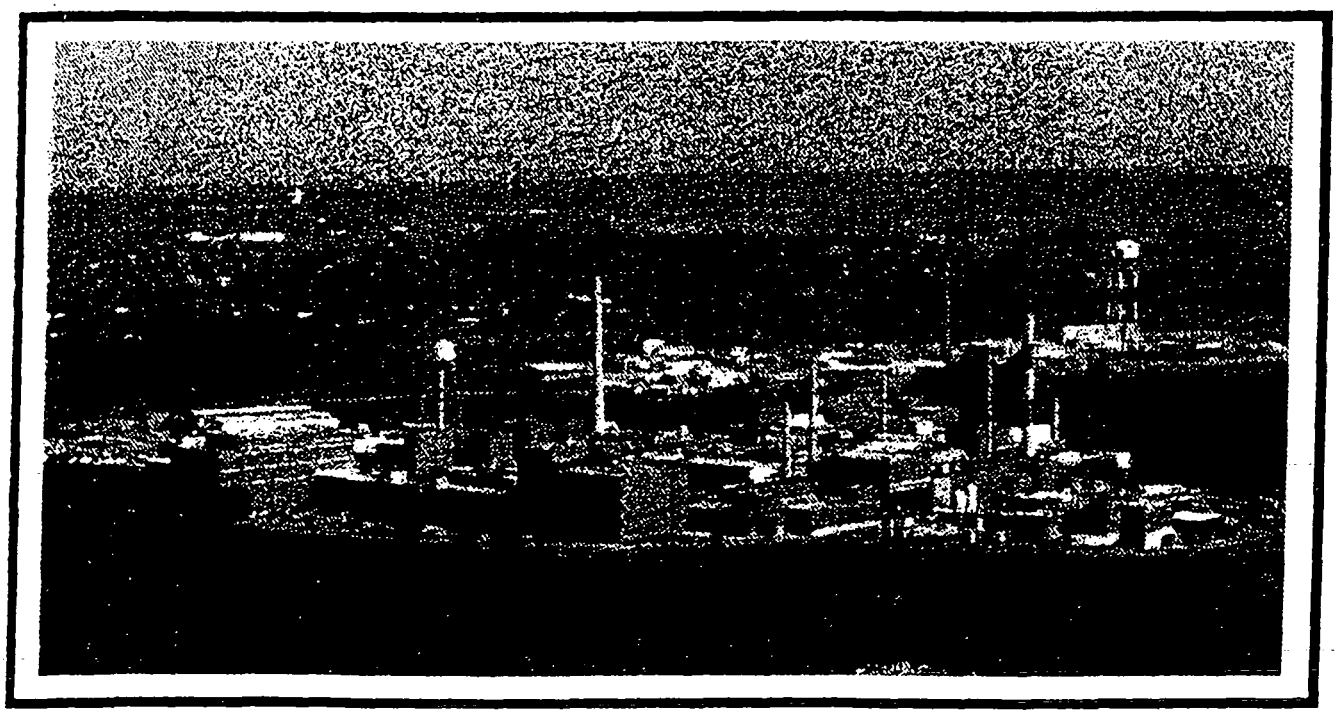


Table A-1: Radionuclide Background Values for Comparison to Mound Plant Soils
Operable Unit 9 Background Soils Investigation Soil Chemistry Report. September 1994.

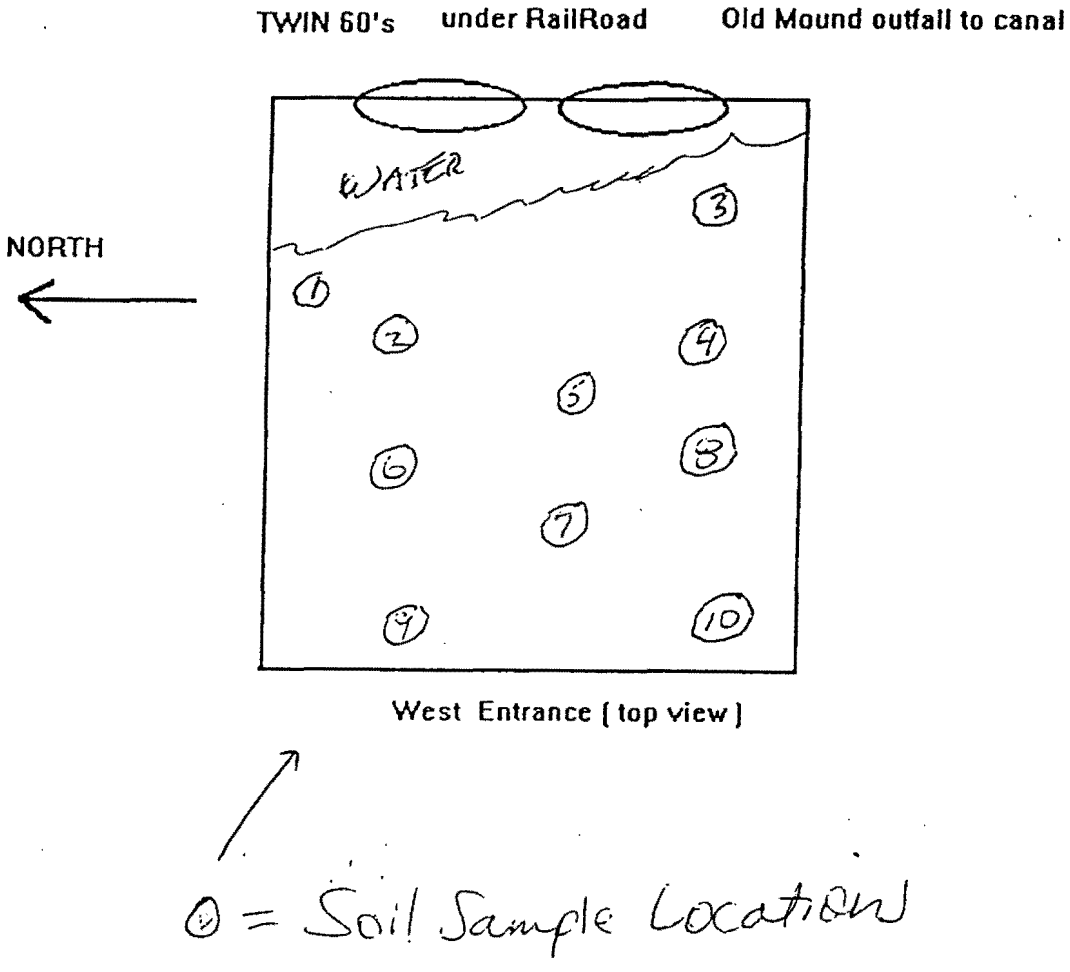
	Maximum Value (pCi/g)	Background Value (pCi/g)[1]
Americium-241	Not detected in any sample	Not detected in any sample
Bismuth-207	Not detected in any sample	Not detected in any sample
Bismuth-210	Not detected in any sample	Not detected in any sample
Cesium-137	0.73	0.42
Cobalt	1.01	[2]
Plutonium-238	0.25	0.13
Plutonium-239/240	0.32	0.18
Potassium-40	37.9	37.0
Radium-226	2.95	2.0
Strontium-90	21.9	0.72
Thorium-228	2.13	1.5
Thorium-230[3]	2.44	1.9
Thorium-232	1.69	1.4
Tritium	8.28	1.6
Uranium-234	1.16	1.1
Uranium-235/236	0.12	0.11
Uranium-238	1.29	1.2

[1] Upper 95th% Tolerance Limit
[2] The background value could not be computed due to the large number of non-detects in the sample set.
[3] From Regional Soils Investigation (DOE, 1995a)

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) CANAL AREA	SURVEY NO. 97-044-905 ~~88-056-97~~ LD 12/8/97
PURPOSE: Soil Survey Twin 60's	RWP NO. 88-056-97
	DATE: 12/02/97
	TIME: AM

MAP/DRAWING



LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
NE ELECTRA	5435/5436	03/10/97
BICRON MICROR	3294/3825	12/13/97
	NFE	

[redacted] 2442	Date: 12/02/97
Counted by: (Signature/HP#) N/A – See attached	Date:
Re[redacted]ture/HP#) 5996	Date: 12-2-97

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Charge Authorization No. _____

☐ Removable Contamination ☐ Airborne Activity (check one)				
Swipes (dpm/100cm^2) or Airborne (µCi/cc)				
Sample #	β/γ	Alpha	Tritium	Comments

NO FURTHER ENTRIES THIS PAGE

☐ Removable Contamination ☐ Airborne Activity (check one)				
Swipes (dpm/100cm^2) or Airborne (µCi/cc)				
Sample #	β/γ	Alpha	Tritium	Comments

NO FURTHER ENTRIES THIS PAGE

COMMENTS:

N/A

Max. Activity on Large Area Wipe (dpm)	Tritium Airborne Activity (µCi/m^3)
N/A	N/A

NOTES:
1. LSC results #3 corresponds to Sample #1 on this RSDS.
2. See MD-80036 10002 for calculations of WB, extremity and skin dose rates
3. 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.
4. Annotate special sample type (e.g. soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

CA704964 , 0.000000 , 15.8206 , 1:10:49PM Dec/2/1997 ,
CF-3 , 5801 , 781.000 , CA704964 Twin 60's (inside) #1Rec.12/2/97

97-0ce4-705
Page 3 of 12

Sample Filename: C3_01695.S0
Sample Identification: CA704964
Title: CA704964 Twin 60's (inside) #1Rec.12/2/97
Begin Collection Time & Date: 1:10:49PM Dec/2/1997
Detector Identification: CF-3
User Identification: 5801
Sample Quantity: 781.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	15.8206	Use MDA value

15.8 pCi/g U

DWA 24AUG99

Density: 1.64421
Efficiency: 0.00355000
Concentration: 0.000000

CA704965 , 0.192059 , 11.7006 , 1:14:32PM Dec/2/1997 ,
CF-4 , 5801 , 822.000 , CA704965 Twin 60's (inside)#2 Rec.12/2/9

97-out-705
Page 4 of 12

Sample Filename: C4_01631.S0
Sample Identification: CA704965
Title: CA704965 Twin 60's (inside)#2 Rec.12/2/97
Begin Collection Time & Date: 1:14:32PM Dec/2/1997
Detector Identification: CF-4
User Identification: 5801
Sample Quantity: 822.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.192059	11.7006	Use MDA value

11.7 pCi/g U

24 Aug 99

Density: 1.73053
Efficiency: 0.00370700
Concentration: 0.192059

CA704966 , 0.000000 , 17.1519 , 1:17:30PM Dec/2/1997 ,
CF-5 , 5801 , 798.000 , CA704966 Twin 60's (inside)#3 Rec.12/2/97

97-0ccf-705

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Sample Filename: C5_01532.S0
Sample Identification: CA704966
Title: CA704966 Twin 60's (inside)#3 Rec.12/2/97
Begin Collection Time & Date: 1:17:30PM Dec/2/1997
Detector Identification: CF-5
User Identification: 5801
Sample Quantity: 798.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	17.1519	Use MDA value

17.2 pCi/g U

24AU899

Density: 1.68000
Efficiency: 0.00358000
Concentration: 0.000000

CA704967 , 0.000000 , 17.9006 , 1:39:29PM Dec/2/1997 ,
CF-3 , 5801 , 730.000 , CA704967 Twin 60's (inside)#4 Rec.12/2/9

97-644-705

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Sample Filename:	C3_01696.S0
Sample Identification:	CA704967
Title:	CA704967 Twin 60's (inside)#4 Rec.12/2/97
Begin Collection Time & Date:	1:39:29PM Dec/2/1997
Detector Identification:	CF-3
User Identification:	5801
Sample Quantity:	730.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	17.9006	Use MDA value

17.9 pCi/g U

24 AUG 99

Density: 1.53684
Efficiency: 0.00355000
Concentration: 0.000000

CA704968 , 69.5429 , 14.4045 , 1:40:31PM Dec/2/1997 ,
CF-4 , 5801 , 653.000 , CA704968 Twin 60's (inside)#5 Rec.12/2/97

97-004-70
Page 7 of 12
RH

Sample Filename: C4_01632.S0
Sample Identification: CA704968
Title: CA704968 Twin 60's (inside)#5 Rec.12/2/97
Begin Collection Time & Date: 1:40:31PM Dec/2/1997
Detector Identification: CF-4
User Identification: 5801
Sample Quantity: 653.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	69.5429	14.4045	

69.5 pCi/g

AMA 2/18/99

Density: 1.37474
Efficiency: 0.00370700
Concentration: 69.5429

CA704969 , 44.9997 , 16.7688 , 1:41:41PM Dec/2/1997 ,
CF-5 , 5801 , 648.000 , CA704969 Twin 60's (inside)#6 Rec.12/2/97

97-OWI-405
Page 8 of 12

Sample Filename: C5_01533.S0
Sample Identification: CA704969
Title: CA704969 Twin 60's (inside)#6 Rec.12/2/97
Begin Collection Time & Date: 1:41:41PM Dec/2/1997
Detector Identification: CF-5
User Identification: 5801
Sample Quantity: 648.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	44.9997	16.7688	

45.0 pCi/g

Density: 1.36421
Efficiency: 0.00358000
Concentration: 44.9997

CA704970 , 18.7682 , 14.3090 , 2:02:37PM Dec/2/1997 ,
CF-3 , 5613 , 665.000 , CA704970 twin60'S (INSIDE)7 Rec.12/2/97

97-0W4-705
Page-9 of 12
QD

Sample Filename: C3_01697.S0
Sample Identification: CA704970
Title: CA704970 twin60'S (INSIDE) Rec.12/2/97
Begin Collection Time & Date: 2:02:37PM Dec/2/1997
Detector Identification: CF-3
User Identification: 5613
Sample Quantity: 665.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	18.7682	14.3090	

18.8 pCi/g

MWA 2/4/99

Density: 1.40000
Efficiency: 0.00355000
Concentration: 18.7682

CA704971 , 0.275902 , 14.1163 , 2:04:31PM Dec/2/1997 ,
CF-4 , 5613 , 603.000 , CA704971 TWIN 60'S (INSIDE)8Rec.12/2/97

97-0u of-705
Page 10 of 12

Sample Filename:	C4_01633.S0
Sample Identification:	CA704971
Title:	CA704971 TWIN 60'S (INSIDE) Rec.12/2/97
Begin Collection Time & Date:	2:04:31PM Dec/2/1997
Detector Identification:	CF-4
User Identification:	5613
Sample Quantity:	603.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.275902	14.1163	Use MDA value

14.1 pCi/g U

[illegible] 29 Aug 99

Density: 1.26947
Efficiency: 0.00370700
Concentration: 0.275902

CA704972 , 0.000000 , 22.4395 , 2:05:58PM Dec/2/1997 ,
CF-5 , 5613 , 534.000 , CA704972 TWIN 60'S (INSIDE) 9 Rec.12/2/97

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97-0604-705

Sample Filename:	C5_01534.S0
Sample Identification:	CA704972
Title:	CA704972 TWIN 60'S (INSIDE) 9 Rec.12/2/97
Begin Collection Time & Date:	2:05:58PM Dec/2/1997
Detector Identification:	CF-5
User Identification:	5613
Sample Quantity:	534.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	22.4395	Use MDA value

22.4 pCi/g U

24 Aug 99

Density: 1.12421
Efficiency: 0.00358000
Concentration: 0.000000

CA704973 , 0.000000 , 21.2272 , 2:21:24PM Dec/2/1997 ,
CF-3 , 5613 , 480.000 , CA704973 TWIN 60'S (INSIDE)#10Rec.12/2/97

97-WCH-705
Page 12 of 20

Sample Filename: C3_01698.S0
Sample Identification: CA704973
Title: CA704973 TWIN 60'S (INSIDE)#10Rec.12/2/97
Begin Collection Time & Date: 2:21:24PM Dec/2/1997
Detector Identification: CF-3
User Identification: 5613
Sample Quantity: 480.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	21.2272	Use MDA value

21.2 pCi/g U

DMA 24 Aug 99

Density: 1.01053
Efficiency: 0.00355000
Concentration: 0.000000

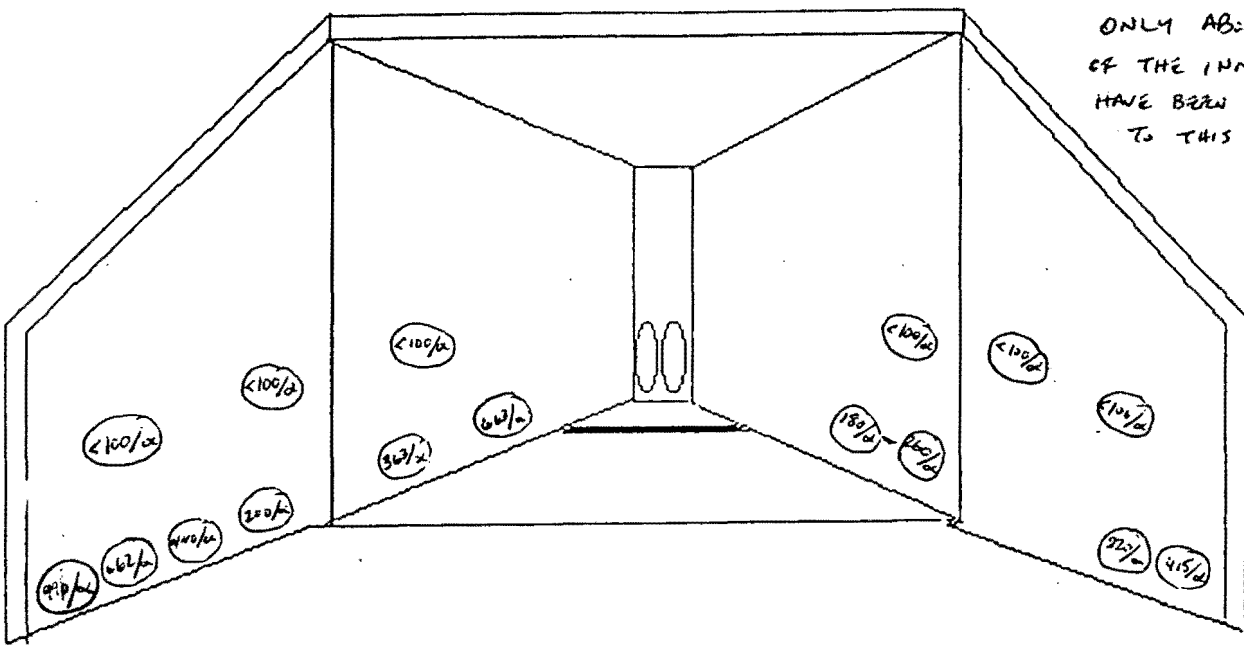
RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) OUY CANAL	SURVEY NO. 98-004-222
PURPOSE: CHARACTERIZE TWIN 60'S WALLS.	RWP NO. LS-001-98
	DATE: 5/7/98
	TIME: 1300

MAP/DRAWING

North

Viewing Twin 60's from West looking East



ONLY ABOUT 1/3 OF THE INNER WALLS HAVE BEEN SURVEYED TO THIS POINT.

North Wing Wall

South Wing Wall

NOTE: 4 SOIL SAMPLES WERE TAKEN 5/7/98 AT OUTER EDGES NEAR SIDE WALLS.

NO WIPES WERE TAKEN DUE TO WET SURFACES.

DIRECT READINGS MAY NOT BE TRUE AS THE SURVEY POINTS WERE VERY DAMP.

LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
NE ELECTRA	5435/5436	9-18-98
NE ELECTRA	5397/5407	7-14-98
	NFE	

C[redacted]	HP# 8407	Date: 5/7/98
Completed by: (Print Name) [redacted]		
Counted by: (Signature) N/A	HP# N/A	Date: N/A
Counted by: (Print Name) N/A		
Reviewed/Approved by: (Signature) [redacted]	HP# 5996	Date: 5/7/98
Re[redacted]		

ML-9620 (2-98)

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		NA		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		NA		

COMMENTS: PREVIOUS SURVEYS SHOW NO REMOVABLE CONTAMINATION

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.

004357 , 28.1920 , 13.0580 , 12:44:17PM May/12/1998,
CF-4 , 5801 , 640.000 , CA800887 NA Twin 60's Rec. 5/12/98

Sample Filename:	C4_01915.S0
Sample Identification:	004357
Title:	CA800887 NA Twin 60's Rec. 5/12/98
Begin Collection Time & Date:	12:44:17PM May/12/1998
Detector Identification:	CF-4
User Identification:	5801
Sample Quantity:	640.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	28.1920	13.0580	

28.2 pCi/g

CWA 29 Aug 99

Density:	1.34737
Efficiency:	0.00370700
Concentration:	28.1920

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98-0004-227
RD

Q04358 , 0.000000 , 19.3557 , 12:45:10PM May/12/1998,
CF-5 , 5801 , 593.000 , CA800888 NA Twin 60's Rec. 5/12/98

Sample Filename:	C5_01793.S0
Sample Identification:	004358
Title:	CA800888 NA Twin 60's Rec. 5/12/98
Begin Collection Time & Date:	12:45:10PM May/12/1998
Detector Identification:	CF-5
User Identification:	5801
Sample Quantity:	593.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	19.3557	Use MDA value

19.4 pCi/g U

99

Density: 1.24842
Efficiency: 0.00358000
Concentration: 0.000000

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90% out ~ 227
RD

004359 , 3.96303 , 18.6931 , 12:59:34PM May/12/1998,
CF-3 , 5801 , 541.000 , CA800889 NA Twin 60's Rec. 5/12/98

Sample Filename:	C3_02002.S0
Sample Identification:	004359
Title:	CA800889 NA Twin 60's Rec. 5/12/98
Begin Collection Time & Date:	12:59:34PM May/12/1998
Detector Identification:	CF-3
User Identification:	5801
Sample Quantity:	541.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	3.96303	18.6931	Use MDA value

18.7 pCi/g U
4.0 pCi/g J

Density:	1.13895
Efficiency:	0.00355000
Concentration:	3.96303

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RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) 044 CANAL TWIN 60's	SURVEY NO. 98-044-151
PURPOSE: WEEKLY SURVEY OF FCA ON WING WALLS OF TWIN 60'S	RWP NO. N/A
	DATE: 4-2-98
	TIME: 1530

MAP/DRAWING

NOTE: SEE ATTACHED MAP

LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct cont. measurement in dpm/100cm^2

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
NE ELECTRA	5435/5436	9-19-98
BICRON	3857	6-18-98
	NFE	

[redacted]	HP# 8407	Date: 4/2/98
Completed by: (Print Name) [redacted]		
[redacted]	HP# 8407	Date: 4/2/98
Counted by: (Print Name) [redacted]		
[redacted]	HP# 6996	Date: 4/8/98
[redacted]		

ML-9620 (2-98)

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	<1000	<20	N/A	SEE MAP
2	<1000	<20		
3	<1000	<20		
4	<1000	<20		
5	<1000	<20		
6	<1000	<20		
7	<1000	<20		
8	<1000	<20		

NFE

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

NA

COMMENTS: NA

NOTES:

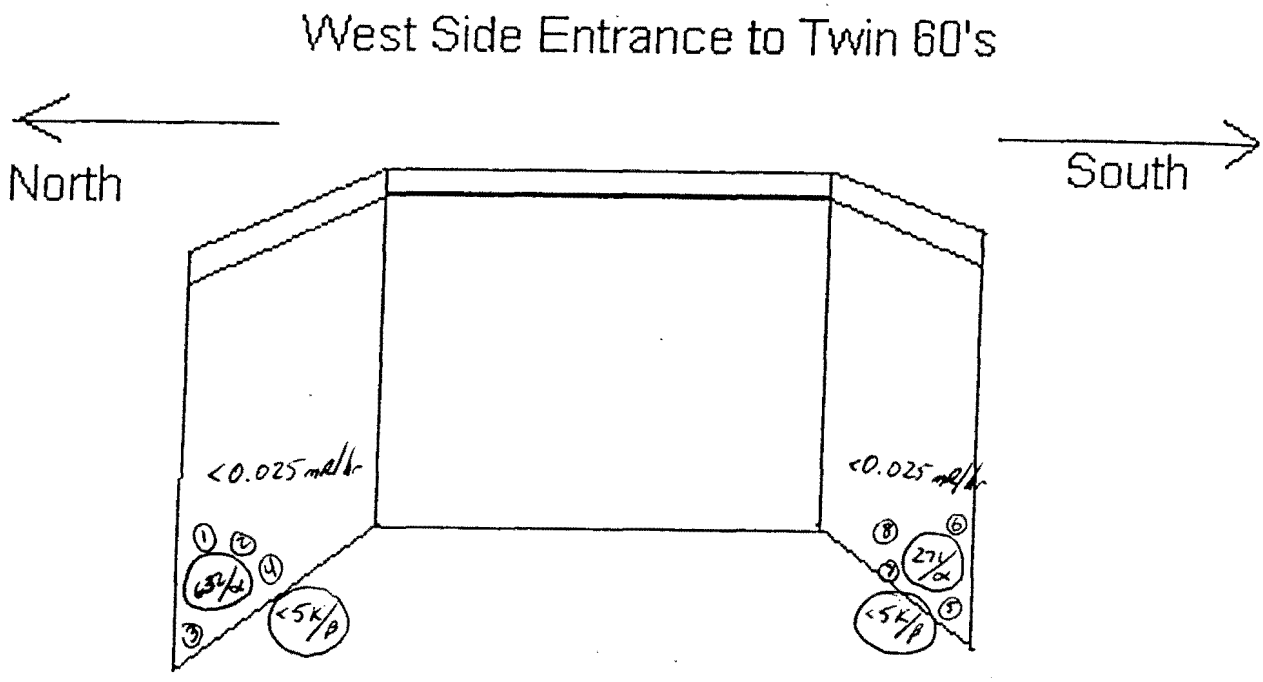
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type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

RADIOLOGICAL SURVEY DATA SHEET

MAP/DRAWING Continuation Page

Survey No. 98-004-151

MAP/DRAWING



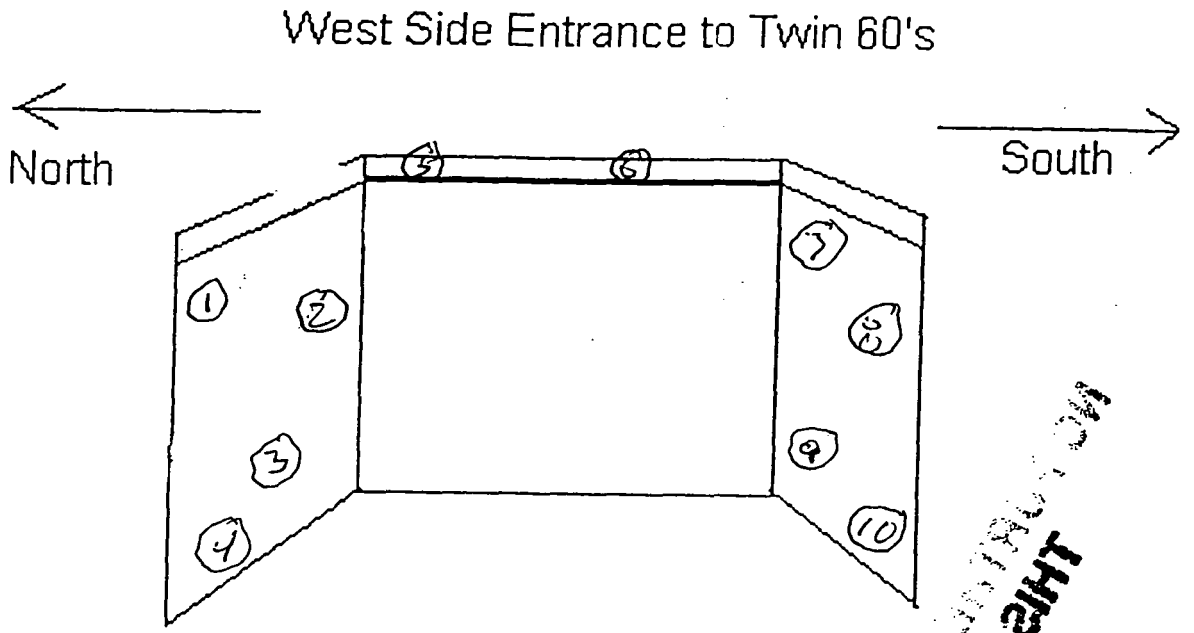
NOTE: ONLY THE WINK WALLS WERE SURVEYED AS ENTRANCE INTO THE TWIN 60'S WOULD BE A CONFINED SPACE ENTRY.

LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
= mrem/hr neutron
= air sample number
= swipe number
#/α or /β = direct cont. measurement in dpm/100cm^2

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) CANAL	SURVEY NO. 98-044-202
PURPOSE: 12/4/23/98 TWIN 4/23/98 CONTAMINATION & SURVEY OF ~~TWIN~~ 60S	RWP NO. N/A
	DATE: 04/23/98
	TIME: 1445

MAP/DRAWING



ALL SWIPES

THIS PAGE

LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
NE	5461/5397	6/14/98
MICRO-REM	3857	6/18/98
NFE	NFE	NFE

[redacted]

	HP# 2442	Date: 04/23/98
	HP# 2442	Date: 04/23/98
	HP# 5996	Date: 5/19/98

ML-9620 (2-98)

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	<1K	<20	N/A	NORTH WALL
2	<1K	<20		NORTH WALL
3	<1K	<20		NORTH WALL
4	<1K	<20		NORTH WALL
5	<1K	<20		TOP
6	<1K	<20		TOP
7	<1K	<20		SOUTH WALL
8	<1K	<20		SOUTH WALL
9	<1K	<20		SOUTH WALL
10	<1K	<20		SOUTH WALL

NO FURTHER ENTRIES THIS PAGE

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

NO FURTHER ENTRIES THIS PAGE

COMMENTS:

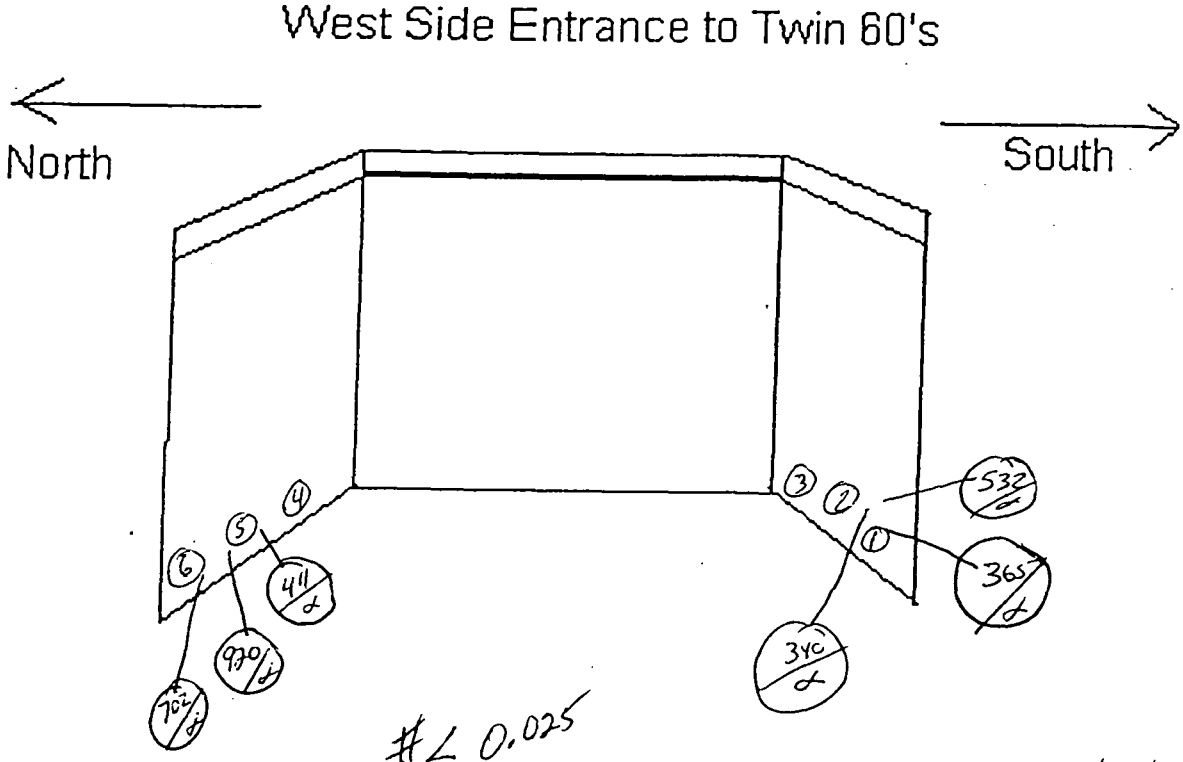
NOTES:

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.

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) OU4- CANAL	SURVEY NO. 98-OU4-206
PURPOSE: Weekly - Wing Wall only at Twin 60's	RWP NO. N/A
	DATE: 4-28-98
	TIME: 1410

MAP/DRAWING



#< 0.025 ALL LOCATIONS

Note: ONLY The wing walls were checked AND ONLY below The OLD WATER LINE MARK - NO CONTAMINATION WAS FOUND ABOVE WATER LINE - Today The CONCRETE WAS VERY DRY - LAST week The CONCRETE WASN'T AS DRY Thus the Lower Readings

LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
= mrem/hr neutron
= air sample number
= swipe number
#/α or /β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
MICRO Rem	3857	6-18-98
NE	5435/5436	9-19-98
	NFE	

Completed by: (Signature) [redacted]	HP# 5520	Date: 4-28-98
Completed by: (Print Name) [redacted]		
Counted by: (Signature) [redacted]	HP# 5520	Date: 4-28-98
Counted by: (Print Name) [redacted]		
Re[redacted]	HP# 5996	Date: 4/28/98
Re[redacted]		

ML-9620 (2-98)

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1		<20		See Front
2		<20		
3		<20	N/A	
4		<20		
5		<20		
6		<20		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
			N/A	

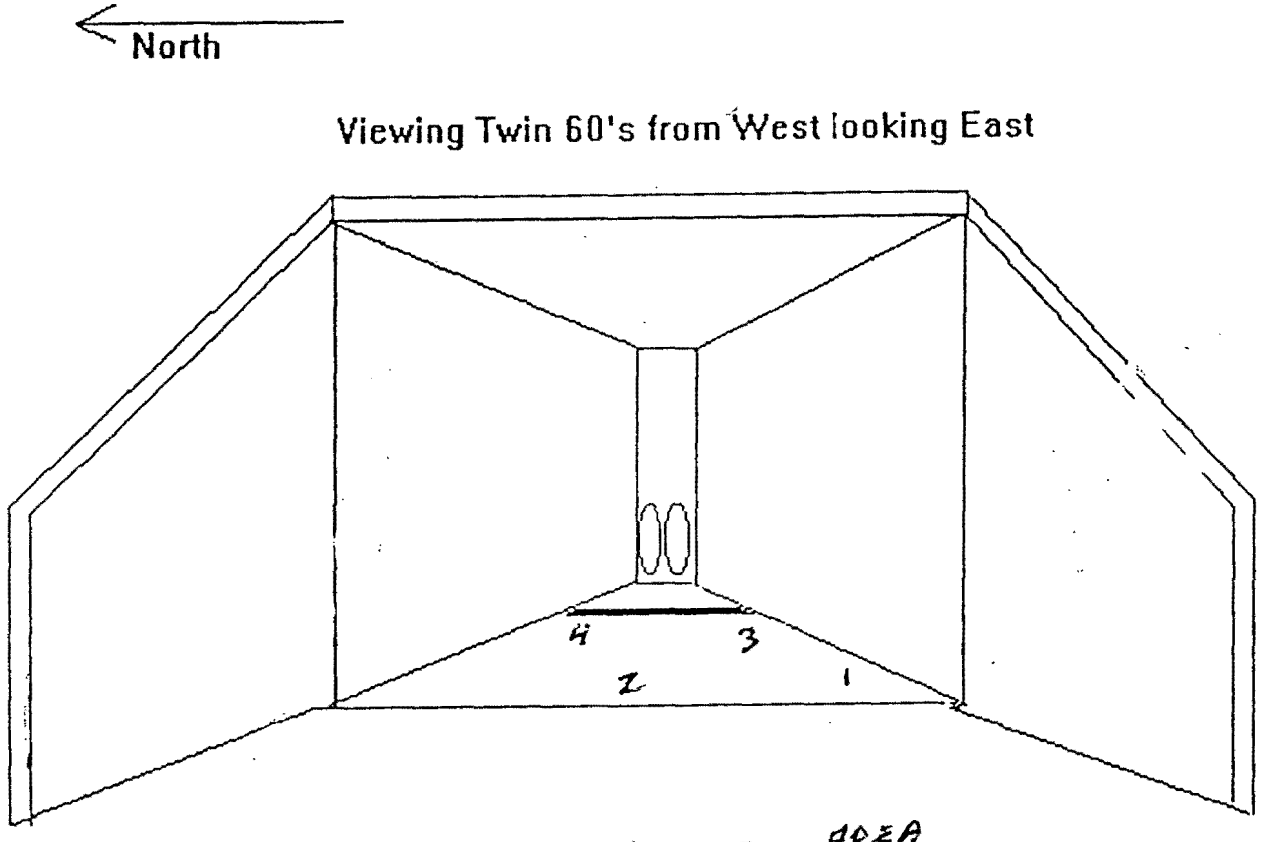
COMMENTS: N/A

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.

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) CANAL	SURVEY NO. 98-044-227
PURPOSE: Soil samples Twin 60s	RWP NO. LS-001-98
	DATE: 5/07/98
	TIME: 0900

MAP/DRAWING



LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
N/A	N/A	N/A

[redacted]	HP# 2442	Date 5/7/98
Counted by: (Signature) N/A	HP# N/A	Date: N/A
Counted by: (Print Name) N/A		
[redacted]	HP# 5996	Date 5/19/98

ML-9620 (2-98)

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

NO FURTHER ENTRIES THIS PAGE

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

NO FURTHER ENTRIES THIS PAGE

COMMENTS:

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.

004356 , 0.000000 , 20.6095 , 12:43:12PM May/12/1998,
CF-3 , 5801 , 644.000 , CA800886 NA Twin 60's Rec. 5/7/98

Sample Filename:	C3_02001.S0
Sample Identification:	004356
Title:	CA800886 NA Twin 60's Rec. 5/7/98
Begin Collection Time & Date:	12:43:12PM May/12/1998
Detector Identification:	CF-3
User Identification:	5801
Sample Quantity:	644.000 grams

Isotope	Energy (keV)	Concentration (pCi/gram)	MDA (pCi/gram)	Flag
Pu-238	15-20	0.000000	20.6095	Use MDA value

20.6 pCi/g U

AWT 24 Aug 99

Density:	1.35579
Efficiency:	0.00355000
Concentration:	0.000000

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WORK PLAN FOR ENVIRONMENTAL RESTORATION OF THE DOE MOUND SITE, THE MOUND 2000 APPROACH

FEBRUARY 1999

Final

(Revision 0)

Department of Energy

Babcock & Wilcox of Ohio

Table 1

SURFACE CONTAMINATION GUIDELINES

Allowable Total Residual Surface Contamination (dpm/100 cm²)[1]				
Radionuclides[2]	**Average[3,4]**	**Maximum[5,6]**	**Removable[6]**	
Group 1 - Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	100	300	20	α
Group 2 - Th-Natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232	1000	3,000	200	
Group 3 - U-Natural, U-235, U-238, and associated decay products, alpha emitters	5,000	15,000	1,000	
Group 4 - Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous[7] fission) except for Sr-90 and other noted above.	5,000	15,000	1,000	β/γ
Tritium	N/A	N/A	10,000	

1. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

2. Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exits, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

3. Measurements of average contamination should not be averaged over an area of more than 1m². For objects of smaller surface area, the average should be derived for each object.

4. Dose Rate: The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr and 1.0 mrad/hr, respectively, at 1 cm. Since building materials have naturally occurring radioactive material, background should be accounted for.

5. The maximum concentration level applies to an area of not more than 100 cm².

6. The amount of removable material per 100 cm² of surface area should be determined by wiping the area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped.

Page Redacted

Contains Proprietary Information