United States
Environmental Protection
Agency

Region 10
Hanford Project Office
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EPA

March 30, 1993

Robert K. Stewart
U.S. Department of Energy
P.O. Box 550, A5-19
Richland, Washington 99352

Re: White Bluffs Pickling Acid Crib Expedited Response Action - Split Sampling Trip Report

Dear Mr. Stewart:

The U.S. Environmental Protection Agency (EPA) is pleased to submit the White Bluffs Pickling Acid Crib Split Sampling Trip Report prepared for EPA by PRC Environmental Management, Inc. (PRC). The split sampling was done as part of the characterization effort for the expedited response action (ERA) for 100-IU-5, the White Bluffs Pickling Acid Crib. The analysis report for the samples will be done as a separate effort. Pending receipt of the validated data package from the Department of Energy, PRC will execute a comparison of the data results.

If you have any questions or concerns regarding the trip report, please contact me at (509) 376-4919.

Sincerely,

Pamela S. Innis
Unit Manager

Enclosure

cc A. DeAngeles, PRC, w/o Enclosure
R. Stanley/ D.R. Jansen, Ecology, w/Enclosure
D. C. Teel, Ecology
B. A. Austin, WHC
W. L. Johnson/J.M. Frain, WHC
B. Drost, USGS
Administrative Record (Pickling Acid Crib ERA)

FINAL WHITE BLUFFS PICKLING ACID CRIB SPLIT SAMPLING TRIP REPORT HANFORD SITE RICHLAND, WASHINGTON

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

Prepared by

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EPA Region	:	10
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Contract No.	:	068-W9-0009
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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) requested that PRC Environmental Management, Inc. (PRC) oversee field activities and collect split samples under work assignment 012-C10002 of EPA contract 068-W9-0009. Westinghouse Hanford Company (WHC) conducted an expedited response action (ERA) on the Hanford site at the White Bluffs pickling acid crib (WBPAC).

PRC attended a site safety meeting for the ERA on November 30, 1992, within the 1100 Area. PRC collected split soil sampling and observed field activities at the WBPAC from November 30 through December 4, 1992.

The objectives of the field oversight and split sampling were to determine if WHC field activities comply with the ERA project plan (Frain and Mitchell 1992) and are consistent with EPA protocols and WHC Environmental Investigation Instruction procedures, and to evaluate the quality of the analytical laboratory used by WHC.

2.0 SITE DESCRIPTION

The WBPAC is within the 100-IU-5 operable unit, and south of the White Bluffs town site in the 600 area of the Hanford site. The WBPAC is one-half mile southwest of Route 2 and 600 feet south of Federal Avenue in Richland, Washington. The WBPAC is believed to be a disposal area for wastes originating in a pipe fabrication facility that operated between approximately 1943 and 1959.

The site consists of two adjacent cribs (leach fields) approximately 10 feet apart. The east crib measures approximately 50 feet by 225 feet; the west crib measures approximately 40 feet by 200 feet. Both cribs are oriented north-south. The east crib is offset to the north from the west crib by approximately 80 feet. Subsurface pipelines enter the cribs from the north

and connect to a distribution pipe network. Figure 1 shows the WBPAC site layout.

3.0 FIELD OVERSIGHT

PRC field activities during the ERA at the WBPAC included overseeing WHC exploratory trenching, soil sampling, and field screening for pH, metals, and radioactivity. PRC personnel on-site during the ERA were Crystal Bailey and Joseph Mollusky. Key WHC personnel on-site during the ERA were field team leader Ron Mitchell, project coordinator Jill Frain, and site safety officer Bruce Tuttle.

3.1 Trenching

Trenches were dug within the cribs to confirm the configuration predicted by geophysical surveys (Frain 1992). Trenches were also dug north of the cribs to confirm the locations of the pipelines connecting the cribs to the former pipe fabrication shop. Trenching also provided access to subsurface soil sampling locations within and below the cribs.

The trenches were excavated using a track hoe operated by WHC personnel. Trench locations within the cribs were consistent with the locations proposed in the ERA project plan (Frain and Mitchell 1992). Additional trenches were excavated north of the cribs to track the piping runs from the former pipe fabrication shops. The trenches were installed in the order specified in the ERA project plan: trenches A, E, B, C1, C3, C4, and additional unlabelled trenches north of the cribs. Trenching progressed from west to east at all locations within the cribs (A, E, B). The trenches were left open and the spoil piles were left uncovered next to the trenches. The trenches were to be backfilled using a front end loader at a later date. The trenches had not been backfilled when PRC left the site on December 4, 1992.

3.2 Pickling Acid Crib Configurations

Trenches dug during the ERA exposed the subsurface construction of the west and east cribs, revealing that both were similarly constructed but had slightly different design features. Two separate main distribution pipelines entered each of the cribs.

The main distribution pipeline from the former pipe fabrication shop entered the west crib at its north end, and appeared to be 3-inch-diameter, carbon steel pipe. This pipeline ran approximately north and south in the west crib from the north end to approximately 20 feet north of the south end. Lateral pipes running east and west joined the main pipeline and were approximately 7 feet apart. The lateral pipes appeared to be 1-inch-diameter, carbon steel pipe, with three 1-inch-diameter risers per lateral pipe. Risers were located at the east and west ends of the lateral pipes; one additional riser was located near the middle of the crib. Most of the risers were capped at the surface. The piping seemed to be intact but was very rusted.

The piping system was constructed in a drainage bed consisting of uniform cobbles. The main distribution piping was approximately 2 feet below grade. Cobbles extended below the piping systems to approximately 10 to 12 feet below ground surface (bgs). Native soils encountered below the crib consisted of brown sands with rounded gravels.

The east crib configuration was similar to the west crib except for the distribution piping network and the depth of the crib cobble bedding. The main pipeline entered the north end of the east crib and branched into three parallel pipelines running north and south to approximately 25 feet north of the cribs south end. All distribution pipelines appeared to be 3-inch-diameter, carbon steel pipe. One-inch-diameter, carbon steel, capped risers extended to the surface directly from the main pipelines at approximately 5-foot spacings. Cobbles in the east crib were larger and less uniform than those in the west crib, and extended to depths of 5 to 6 feet bgs. Native soils beneath the crib are sands with gravels.

3.3 Sampling

Soil samples were collected from the trenches by WHC personnel. PRC collected split samples at approximately 20 percent of the WHC sample locations for a total of eight soil samples. PRC also collected an equipment rinsate blank, a trip blank and a field transfer blank. Table 1 summarizes sampling at the pickling acid crib from December 1 through December 4, 1992.

3.3.1 Soil Sampling

Several soil samples were collected at each trench location. The WHC sampling strategy was to collect soil samples from the middle and the ends of each crib. Samples were collected at the cobble/gravel-soil interface and from 5 feet below the interface.

Because of the depths of the trenches and the confined space hazard associated with them, access was restricted. Therefore, soil samples were collected from the bucket of the track hoe, while taking care to avoid contact with the sides of the bucket. Volatile organic compound samples were collected first, directly from the bucket. Next soils were removed from the bucket with stainless steel spoons or shovels, homogenized in a stainless steel bowl, and placed in sample containers.

Trench A was excavated in the west crib on December 1 and 2, 1992. Three soil samples were collected at depths of approximately 8 to 10 feet bgs. One additional sample was collected at approximately 15 feet bgs from the middle of the west crib. Trench E was excavated in the east crib on December 2, 1992. Two samples were collected from the middle of the east crib at approximately 7 feet bgs and 12 feet bgs.

Trench B was excavated across the west and east cribs on December 3 and 4, 1992, progressing from west to east. Soil samples were collected from the sides of the west crib at approximately 7 feet bgs and from the middle of the crib at 11 and 16 feet bgs. From the east crib, soil samples were collected from the middle and both ends at depths of 5 to 6 feet bgs and 10 to

11 feet bgs. WHC planned to collect additional soil samples from trenches C1, C2, C3, and C4 north of the cribs; and from area D in a depression south of the east crib after PRC left the site .

WHC submitted samples for either a full set or a short set of laboratory analyses as shown on Table 1. Full set and short set of laboratory analyses were not defined by WHC. However, per the ERA project plan all samples were to be analyzed for ICP metals, lead, pH, nitrite/nitrate, anions, and total activity. Selected samples were to be analyzed for volatile organics, semivolatile organics, and total petroleum hydrocarbons (diesel and other range).

3.3.2 Split Sampling

PRC collected split samples of soils collected by WHC personnel at approximately 20 percent of the sample locations. From the first sample location at trench A (PRC sample PC-A-S2-10), split sample containers were provided to the WHC sampler who collected all samples at that location. At all subsequent sample locations, PRC collected split samples using stainless steel spoons and bowls provided by WHC. The spoons and bowls had been decontaminated offsite and wrapped in aluminum foil. PRC collected split soil samples at seven locations as listed on Table 1.

Before release from the site, each sample was submitted by WHC to the Hanford 222-S laboratory for a total radioactivity analysis, which was performed within 24 hours; analytical results (Appendix A) were faxed to WHC samplers and copies of the results were provided to PRC. Split samples were placed on ice in a cooler sealed with custody seals during the one-day wait for radioactivity analytical results. Custody of the split samples was released to WHC for on-site overnight storage in a locked trailer. Upon receipt of the analytical results for total radioactivity, the health physics technical (HPT) reviewed the data and officially released the samples for off-site transport. 222-S laboratory analytical results indicated that total radioactivity was not detected in any sample above the quantitation limits. A sticker was placed on the coolers by the HPT to document the sample release. PRC packaged all

samples and sent them to the EPA Manchester laboratory via Federal Express on December 3rd and 4th, 1992.

Split samples were submitted for total metals, volatile organic compounds, semi volatile organics, pH, nitrite/nitrate, ammonia, anions, and total petroleum hydrocarbons analyses. Analytical results are anticipated to be received from the Manchester laboratory within 30 days from receipt of the samples.

3.3.3 Quality Assurance/Quality Control Samples (QA/QC)

Split samples were collected to determine the quality of WHC sample procedures and to evaluate the completeness, representativeness, comparability, precision and accuracy of the analytical data.

PRC collected a duplicate sample (PC-B-S3-5) and equipment rinsate samples (PC-F-S1-0), trip blank (PC-G-S1-0), and transfer blank (PC-H-S1-0) as quality assurance/quality control (QA/QC) samples. One duplicate sample was collected at one soil sample location to determine sample precision. Also, additional soil was collected at one soil sample location as a matrix spike/matrix spike duplicate sample to determine analytical accuracy and precision. One equipment rinsate blank sample was collected by pouring deionized water over a decontaminated stainless bowl that was used for sampling. The equipment rinsate blank will be used to check for possible cross contamination from soil sampling equipment and to check the thoroughness of decontamination procedures. The trip blank and a field transfer blank were also collected to determine whether contaminants were introduced to the samples during handling and shipping.

3.4 Field Screening

WHC personnel screened for radiation, pH, and metals in the field during the ERA.

3.4.1 Radiation Screening

A HPT screened for total beta and total gamma radiation. The site was surveyed for radiation prior to the ERA; no radiation was detected, but HPT coverage was provided intermittently during trenching. Excavated soils and spoil piles were surveyed by the HPT, as were all sample containers prior to removal from the exclusion zone. The HPT also initially surveyed personnel leaving the exclusion zone. After several radiation surveys it was determined that no radiation hazard existed at WBPAC and subsequently, only the excavated materials and samples were surveyed.

3.4.2 pH Screening

All soil samples were screened on-site for pH. A soil container was partially filled with soil and deionized water was added to the sample. The pH of the soil slurry was measured using a portable pH meter; measurements are shown on Table 1. WHC performed a calibration of the pH meter prior to PRC arriving on-site. Only two samples (B07PY8 and B07PY9 from Trench A), exhibited pH measurements within the slightly acidic range. All other samples exhibited pH measurements above neutral.

3.4.3 X-Ray Fluorescence Screening

All soil samples were field screened for selected metals using a portable x-ray fluorescence (XRF) unit manufactured by Outokumpu Electronics, Inc., the X-Met 880 (McCain and Guzek 1992). Screening samples were collected in a plastic bag and submitted for metals screening.

XRF screening was performed within the WHC trailer without PRC oversight. Results of the XRF screening were not available to PRC during the sampling. Subsequent draft results provided by WHC indicated that pickling acid crib samples were XRF-screened for heavy metals. The draft results provided only

channel intensities for different metals using different models. The intensities were not converted to soil concentrations.

Although the XRF screening results were not available to PRC, WHC personnel decided downgrade the level of respiratory protection required from level C to level D. WHC informed PRC that the XRF screening indicated that metals concentrations at WBPAC were comparable to background concentrations.

4.0 OBSERVATIONS AND CONCLUSIONS

The following significant observations and conclusions were made during the White Bluffs pickling acid crib ERA:

(1) The configuration of the pickling acid cribs indicated a liquid waste disposal system that received wastes at the surface and allowed liquids to infiltrate through the crib cobbles. This is not a conventional drain field design which typically uses perforated pipes for subsurface distribution of liquid wastes. Staining observed on crib cobbles suggested that the bubble system discharged liquids at the surface. The WBPAC design may have been used to allow visual verification that the distribution system was functioning and not clogged or leaking, or to release gases to the atmosphere.

(2) The distribution piping within the cribs was rusted, but seemed to be intact. Therefore, if acidic solutions were disposed of in the cribs, it is likely that one or all of the following occurred:

   (a) Only very dilute acidic solutions were disposed of within the cribs.
   (b) Acidic solutions were neutralized prior to disposal.
   (c) Relatively small volumes of acidic solutions were discharged to the cribs.

(3) The main lines leading to the east and west cribs were not connected and angled to different areas north of the cribs. These areas were disturbed and had some burnt debris, cinder block, and bricks. Since the supply pipelines to the east and west cribs are separate, the cribs may have received different wastes from different sources.

(4) The trench excavations confirmed that the crib and piping configurations determined by geophysical surveys were accurate.

(5) WHC soil samples were collected conscientiously according to EII sampling procedures and EPA sampling protocol.

(6) The use of plastic sample containers by WHC may not provide a proper seal during sample handling and shipping to the analytical laboratory. Glass containers should be considered for future sampling events.

(7) The delineation of the exclusion zone and an additional control zone was based only partially on health and safety considerations; the additional control zone was unnecessary. Also, determination of the required level of respiratory protection by WHC was unsubstantiated. Level C was initially required because of an airborne dust inhalation hazard, and air purifying respirators with particulate filters were provided. The required personal protective equipment was down-graded to level D based on XRF field screening results, which indicated that sample metals concentrations were consistent with background levels. However, background locations and levels were not identified. Further, field screening results would only provide concentrations of contaminants in soil, not air. Continuous air samples, using filters that can be shipped to an analytical laboratory for quick-turn around, should be considered for future excavation projects.

(8) The track hoe bucket was not decontaminated between trench locations until PRC brought this to WHC's attention. This practice leaves the potential for cross contamination between samples locations. Subsequently, a decontamination was performed on the bucket using water to remove soil that had adhered to the bucket.

(9) Field screening procedures were not specified in the ERA project plan and therefore were left to the discretion of the field team. The project plan indicated that the pH would be tested for using litmus paper and/or colormetric methods; a portable pH meter was actually used. This is a preferred pH measurement method, but is inconsistent with the project plan. Also, XRF screening procedure and a possible interferences were not discussed in the project plan and were therefore impossible to verify in the field. Screening results and analytical results should be closely compared, when the data are available, to evaluate the accuracy of field screening methods.

(10) Delays in releasing samples from the Hanford site because of the total radioactivity analysis may affect the holding times for some analyses such as pH and nitrite/nitrate.

(11) WHC personnel were generally cooperative during the ERA.

5.0 REFERENCES

Frain, J.M. and R.M. Mitchell 1992. White Bluffs Pickling Acid Crib Expedited Response Action Project Plan. WHC-SD-EN-AD-113. October 20, 1992.

Frain, J.M. 1992. Geophysical Survey of White Bluffs Crib Site. WHC-SD-EN-ER-002. November 13, 1992.

McCain, R.G. & S.N. Guzek 1992. Field Screening for Heavy Metals with Portable XRF Units. WHC-SA-1665-FP. May, 1992.

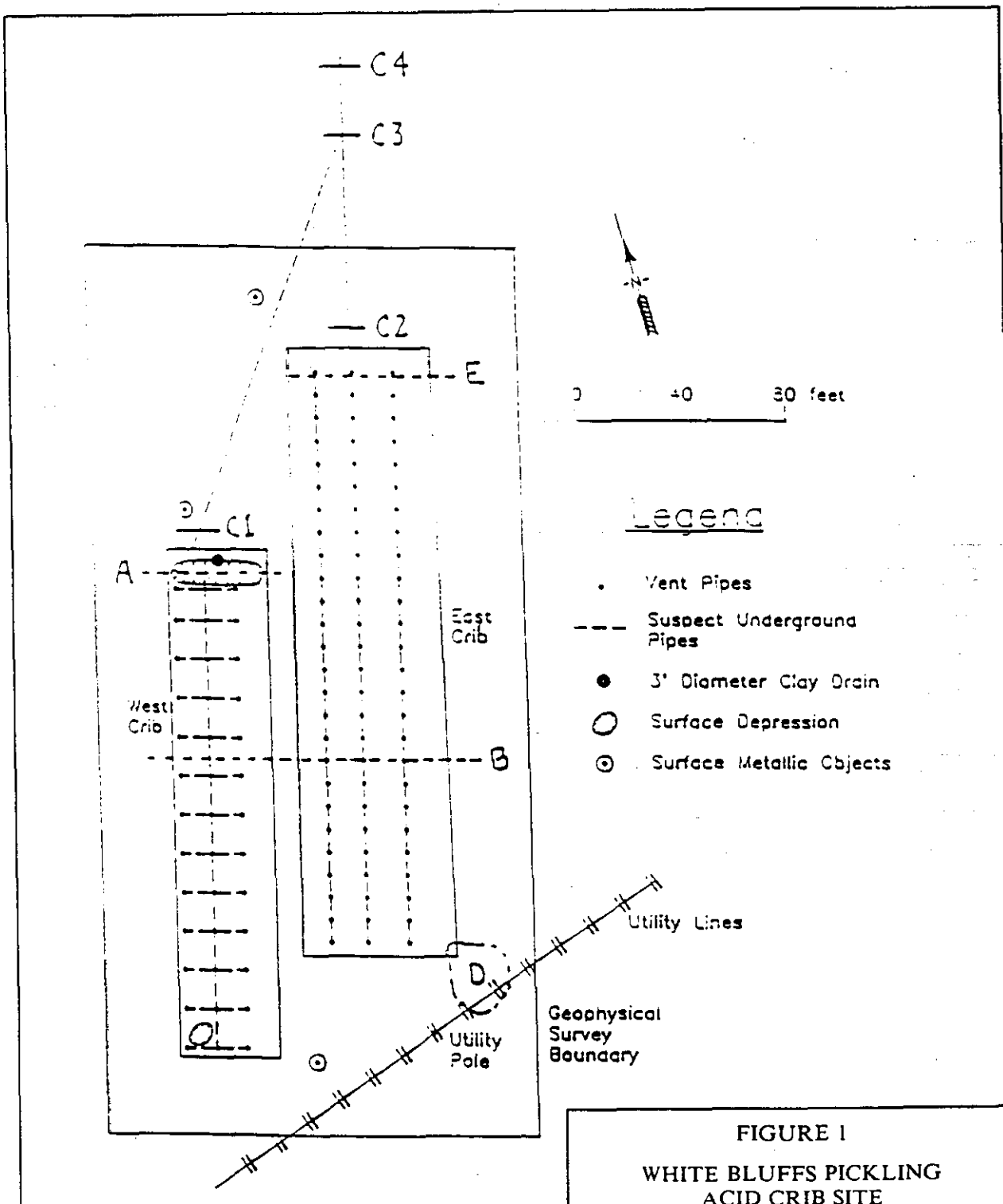

FIGURE 1

WHITE BLUFFS PICKLING
ACID CRIB SITE

Source: Frain and Mitchell 1992

PRC Environmental Management, Inc.

TABLE 1

PICKLING ACID CRIB SOIL SAMPLING SUMMARY

WHC SAMPLE NO.	PRC SAMPLE NO.	DATE	TIME	WHC TRENCH LOCATION	DEPTH (FEET)	TRENCH SECTION	WHC SAMPLE SET	pH	CRIB LOCATION
B07PY8	PC-A-S1-10	12/01	1435	A1	10	Middle	Full	5.6	West Crib
B07PY9	PC-A-S2-8	12/02	1050	A3	8	West Side	Short	6.6	West Crib
B07P20	--	12/02	1145	EQUIPMENT BLANK - SILICA SAND					
B07P21	PC-A-S1-15	12/02	1020	A2	15	Middle	Full	7.0	West Crib
B07P22	PC-A-S1-7	12/02	1435	E1	7	Middle	Full	7.2	East Crib
B07P23	--	12/02	1330	A4	8	East Side	Short	7.1	West Crib
B07P24	PC-E-S1-12	12/02	1500	E2	12	Middle	Full	9.1	East Crib
B07P25	--	12/03	1010	B1	7	West Side	Short	8.4	West Crib
B07P26	PC-B-S1-11	12/03	1055	B2	11	Middle	Full	8.0	West Crib
B07P27	--	12/03	1130	B3	16	Middle	Full	7.8	West Crib
B07P28	--	12/03	1300	B4	6 to 7	East Side	Short	8.5	West Crib
B07P29	--	12/03	1330	B5	5 to 6	West Side	Short	9.0	East Crib
B07Q00	--	12/03	1340	B6	10 to 11	West Side	Short	8.2	East Crib
B07Q01	PC-B-S2-5	12/03	1350	B7	5 to 6	Middle	Full	8.6	East Crib
B07Q02	PC-B-S3-5	12/03	1350	B7	5 to 6	Middle	Full	8.6	East Crib
B07Q03	--	12/03	1415	B8	10 to 11	Middle	Full	9.2	East Crib
B07Q04	--	12/04	0935	B9	5 to 6	East Side	Short	--	East Crib
B07Q05	--	12/04	0945	B10	10 to 11	East Side	Short	--	East Crib
--	PC-F-S1-0	12/02	1315	eqpt. rinsate	--	--	--	--	--
--	PC-G-S1-0	11/30	1600	trip blank	--	--	--	--	--
--	PC-H-S1-0	12/02	1350	transfer blank	--	--	--	--	--

APPENDIX A

222-S LABORATORY TOTAL RADIOACTIVITY ANALYTICAL RESULTS

SAMPLE STATUS REPORT FOR E 6440. E-BLANK B07PY8 TIME: 12/ 2/92 8: 9
DISPATCHED: 12/ 1/92 15: 4 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 12/ 2/92 7:53

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	YLBB1

END OF REPORT

SAMPLE STATUS REPORT FOR E 6442. E-BLANK B07PY9 TIME: 12/ 3/92 8:10
DISPATCHED: 12/ 2/92 12:49 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 12/ 3/92 7:49

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	YLBB1

END OF REPORT

JK Parker 12-3-92

SAMPLE STATUS REPORT FOR E 6443. E-BLANK B07PZ1 TIME: 12/ 3/92 8:10
DISPATCHED: 12/ 2/92 12:50 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 12/ 3/92 7:49

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	YLBB1

END OF REPORT

JK Porter 12-3-92

SAMPLE STATUS REPORT FOR E 6444. E-BLANK B07PZ2 TIME: 12/ 3/92 8:10
DISPATCHED: 12/ 2/92 12:50 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 12/ 3/92 7:49

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	YLBB1

END OF REPORT

JK Porter 12-3-92

AMPLE STATUS REPORT FOR E 6445. E-BLANK B07PZ3 TIME: 12/ 3/92 8:10
ISPATCHED: 12/ 2/92 12:50 SAMPLE HAS NOT BEEN SLURPED
ECEIVED: 12/ 3/92 7:49

XT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
***	********	**********	***	***	******
271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	YLBB1

END OF REPORT

JKPatin 12-3-92

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
P. S. Innis, EPA	R. K. Stewart, RL	Incoming: 9303071

Subject: WHITE BLUFFS PICKLING ACID CRIB EXPEDITED RESPONSE ACTION - SPLIT SAMPLING TRIP REPORT

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		J. M. Frain	H6-04	X
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		P. J. Mackey	B3-15	
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		R. D. Wojtasek, Assignee	H6-27	
		EDMC	H6-08	X
		Field File Custodian (Pickling Acid Crib ERA File)	H6-08	X
		kla	H6-04	