

APPENDIX C

Soil Logs & Well Construction Diagrams

- C-1: Geoprobe Soil Logs
- C-2: Cone Penetrometer Testing (CPT) Soil Logs
- C-3: Subsurface Drilling Soil Logs & Well Construction Diagrams
- C-4: Test Pit Logs – OU 1

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Sent: Thursday, August 22, 2002 10:40 AM
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Subject: Revised Approach to Excav. Invest. - Conf. Call 8/21/02 - Chambers Works FUSRAP site

APPROACH TO EXCAVATION INVESTIGATION

Below is the revised approach to the excavation investigation based on the consensus items reached during the conference call on 21 August 2002 with CENAB (Debra Ford, Karl Ford, Vernon Griffon), CENAP (George Bock), WESTON (David Pohl, Matt Egan, John Gerhard, Dan Strobridge) and Cabrera (Dave Watters). The changes to the outline submitted previously are shown in italics.

Elevator Shaft

- A backhoe with a quick disconnect, a grappler attachment and concrete punch attachment will be used to remove the soil fill and debris in the elevator shaft down to the concrete slab.
- The concrete punch will break through the concrete and a section of the concrete brought to the surface, broken up and up to three samples collected for radiological analysis.
- The backhoe bucket will be used to collect the soil samples below the concrete for analysis.
- *3 concrete and 3 soil samples below the concrete will be analyzed by the on-site gamma spec lab and at least one concrete and one soil will be sent for off-site gamma spec and alpha spec analysis.*
- Based on the telephone conversation George Bock had with Frank Furanca from NJDEP on 8/8/02, the contents for the elevator shaft can be returned to the shaft.
- Large debris removed from the shaft will be field frisked with detectors capable of measuring alpha, beta and gamma radiation. This scanning shall obtain a measurement in dpm/100 cm³.
- The soil/fill/debris removed from the elevator shaft will be placed on a temporary liner system composite of geotextile and PVC liner to control and possible migration of contaminant. The debris pile will also be covered with a tarp to control generation of contact water and dust emissions.
- *A water supply and hose capable of spraying a fine mist will be used to control dust from the debris as necessary.*
- The field team will consist of field supervisor (Matt Egan), site health and safety officer (Larry Wertz to be trained by Brian Murphy this week), Level B support person (Dulton Moore this week/Rich Flack next week), backhoe operator (James Hogan), rad safety and field instrument operator (Blain Beltcher), and environmental sampler/logger/sample coordinator (Dan Strobridge backup Theron Grim).
- The on-site gamma spec lab will be used to screen samples of the debris, concrete and subsoils.
- The fill material to a depth of 4 ft did not indicate radiological activity based on the auger samples collected earlier in the RI. This "clean" fill material will be segregated such that this material will be returned last to the shaft in accordance with the sequencing method discussed with the NJDEP.
- The work will be done in Level B unless the weather conditions allow for productive work without the use of the core cooling suits. The backhoe operator will use Level C since the cab is air conditioned.

Suspected Uranium Oxide

- *A trackhoe with a scraping edge will be used to carefully push aside the existing cover to expose the yellow material in order to visually determine the extent of this suspected uranium oxide. The exposed material will be photographed.*
- *After the extent of the suspected uranium oxide (source material) is visually defined, the trackhoe will push to the side the existing gravel cover within a 15 ft. radius from the source material. This radius will be confined by the concrete slab of the building on two sides. Only the gravel cover will be removed to expose the underlying soils. An existing sand pile to the east of the source material will also be push aside to expose the underlying soils. The depth of the exposed soils will be noted with regard to the original gravel cover surface.*
- *A water supply and hose capable of spraying a fine mist will be used to control dust from the debris as necessary.*
- *After the underlying soils are exposed, the area will be surveyed with a Geiger Muller counter and sodium iodine detector. This survey will be performed using transects from the source material and obtaining readings every 2.5 ft and recording these measurements. The locations where a significant decrease in counts from the source and where the counts approach site background levels will be noted. The professional judgment of the rad instrument operator will be used define an estimate limit of impacted soil from the source material. This extent will be marked by pin flags.*

- *Defining Horizontal Extent - Surface soil samples will be collected using shovels or hand augers to a depth of approximately 1-1.5 ft below the exposed soil surface. Samples will be collected along the estimated limits of the impacted area to confirm the field instrument readings. Samples will also be taken along transects from the source material to the limit of the impact areas to define the contamination gradient. All samples will be analyzed at the on-site gamma spec lab. Sampling equipment shall be properly decontaminated between sampling points and decon verified by wipe samples.*
- *Defining Vertical Extent - At the suspected localized source material, the trackhoe bucket will remove 2 ft. of material at place this to the side. A surface soil sample will then be taken by the sampler using a hand auger or shovel. The trackhoe will then remove another 2 ft of material and place this aside. A sample will then be taken at 4 to 4.5 ft below the source material. The sides of the excavation must be at a 4:1 slope to allow access by the sampler for the sample at 4 ft. The backhoe bucket may be used to collect the sample, but it must be properly decontaminated and a wipe sample collected to verify decon.*
- *The material pushed aside for these vertical delineation samples will be returned to the excavation in the same sequence removed. The gravel cover will then be pushed back on the exposed soil after horizontal sampling is completed. The area will be surveyed to document any remaining activity.*
- *The rad and environmental sampler shall have personnel air sampling conducted during this activity at the source material area.*
- *No additional off-site samples are planned at this time unless directed by the USACE on-site representative.*

Test Pits in the F Corral

- *Two test pits will be completed in the area of the former Building 708 (new revised location). Results from the Geoprobe and auger sampling indicate radiological activity above background this area. These test pits will be located near to boreholes where:*
 - building debris has been encountered;*
 - the material above and below the debris has been characterized;*
 - the debris layer was not characterized because a split spoon or Geoprobe sample was not possible; and*
 - based on the geophysical survey, building debris is suspected.*
- *The test pits shall not be located near suspected or know utilities*
- *The test pits will be approximately 3 x 6 x 8. The test pits will be excavated until the debris layer is encountered and the debris segregated on the liner from the material above the debris. If the test pit reveals large debris, this material will be removed from the pit and placed on a liner at the surface to allow for the scanning of these materials with radiological instruments. If a concrete is encountered, a sample will be collected for analysis at the on-site laboratory.*
- *Since the material is characterize above and below the debris, only samples of the debris will be scanned and wipe samples obtained where possible. If the debris is in small fragments, a sample will be collected for analysis by the on-site lab.*
- *Large debris removed from the shaft will be field frisked with detectors capable of measuring alpha, beta and gamma radiation. This scanning shall obtain a measurement in dpm/100 cm².*
- *No test pit is planned at location 2BH024, where metallic debris was encountered and the auger rig was not able to advance below the debris layer. The results of the on-site laboratory for samples collected above the metallic debris were below the MDL. Scans of the metal debris brought to the surface along with concrete chips also indicated no activity.*
- *Based on the telephone conversation George Bock had with Frank Furanca from NJDEP on 8/8/02, the contents for these test pits can be returned to the pit.*
- *The fill material at the surface will segregated such that this material will be returned last to the pit in accordance with the sequencing method discussed with the NJDEP.*
- *Site restoration will include placing a geotextile over the backfilled test pits and then placing the pieces of asphalt on the geotextile and tamping it with the trackhoe bucket. A radiological survey of the backfilled test pits will be performed and documented.*

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Subject: OUTLINE OF PROPOSED APPROACH TO EXCAVATION INVESTIGATION - Chambers Works FUSRAP Site

OUTLINE OF PROPOSED APPROACH TO EXCAVATION INVESTIGATION

Below is an outline of the approach to the excavation investigation. Included in the outline for the test pits in F Corral, is the results of the GPR geophysical survey and the auger and concrete coring program. It is recommended that WESTON/Cabrera and USACE review and finalize the approach to this investigation by on-site meeting/conference call tomorrow. I will be at the site tomorrow. Please let me know your availability. Thank you

Elevator Shaft

- A backhoe with a quick disconnect, a grappler attachment and concrete punch attachment will be used to remove the soil fill and debris in the elevator shaft down to the concrete slab.
- The concrete punch will break through the concrete and a section of the concrete brought to the surface, broken up and up to three samples collected for radiological analysis.
- The backhoe bucket will be used to collect the soil samples below the concrete for analysis.
- The analysis of 3 concrete and 3 soil samples is already costed in the original SOW.
- Based on the telephone conversation George Bock had with Frank Furanca from NJDEP on 8/8/02, the contents for the elevator shaft can be returned to the shaft.
- Large debris removed from the shaft will be field frisked with detectors capable of measuring alpha, beta and gamma radiation. This scanning shall obtain a measurement in dpm/100 cm³.
- The soil/fill/debris removed from the elevator shaft will be placed on a temporary liner system composite of geotextile and PVC liner to control and possible migration of contaminant. The debris pile will also be covered with a tarp to control generation of contact water and dust emissions.
- The field team will consist of field supervisor (Matt Egan), site health and safety officer (Larry Wertz to be trained by Brian Murphy this week), Level B support person (Dulton Moore this week/Rich Flack next week), backhoe operator (James Hogan), rad safety and field instrument operator (Blain Beltcher), and environmental sampler/logger/sample coordinator (Dan Strobridge backup Theron Grim). The field team will work 10 hrs/day, with the exception of the field supervisor, SSHO and rad safety person who are assumed to work 12 hrs/day to complete daily reports, COCs, data management, calibration of instruments, and preparation for the next days activities.
- The on-site gamma spec lab will be used to screen samples of the debris, concrete and subsoils.
- It has been discussed with the USACE concerns regarding the likely difficulty in removing debris from the elevator shaft with the backhoe due to limited space. The elevator shaft is approximately 8 ft x 8 ft. This confined space may restrict the maneuverability of the backhoe bucket and limit its capability to removed the debris down to the concrete slab. The actual site conditions will be monitored and communicated to the USACE on-site representative. If large debris is encountered that can not be removed with the trackhoe, then this will be communicated with the USACE and operations can then move to the yellow cake area until a plan to address these conditions is agreed to with the USACE.
- The fill material to a depth of 6 ft did not indicate radiological activity based on the auger samples collected earlier in the RI. This "clean" fill material will be segregated such that this material will be returned last to the shaft in accordance with the sequencing method discussed with the NJDEP.
- The work will be done in Level B unless the weather conditions allow for productive work without the use of the core cooling suits. The backhoe operator will use Level C since the cab is air conditioned.

Suspected Uranium Yellow Cake

- A backhoe with a scrapping edge will be used to carefully push aside the existing cover to expose the yellow material. The exiting clean gravel cover will be segregated from the underlying soil cover. This gravel material will be placed over disturbed areas after the investigation is complete. The soil cover will be pushed away and the extent of the yellow material visually identified. The rad safety person will use field instruments to estimate the extent of the high impacted soil area. Surface soil samples will then be taken along this extent of contamination and analyzed in the on-site lab. The horizontal extent of the impacted area will then be delineated by these on-site lab results. Several soil samples will also be taken using the backhoe below the surface soils to delineate the vertical extent.
- The same field team for the elevator shaft will be used.
- The area is assumed to be localized and can be delineated in a day.

- No additional off-site samples are planned at this time unless directed by the USACE on-site representative.

Test Pits in the F Corral

- Based on conversations with USACE the week of 12 August, an estimated 2-3 test pits are proposed in the F Corral. These test pits were to be located where metallic and other building debris is suspected based on the geophysical surveys. Where a building foundation is suspected based on the geophysical surveys and historical aerials, a concrete core was attempted using the auger rig. In areas where general fill is suspected and the geophysical survey indicates a high amount of metallic debris, a test pit was planned to characterize the fill materials. If the test pit reveals large debris, this material will be removed from the pit and placed on a liner at the surface to allow for the scanning of these materials with radiological instruments. If a concrete is encountered, a sample will be collected for analysis at the on-site laboratory. If the field instruments indicate radiological activity above background from the debris, soil samples above and below the debris will be collected and sent to the on-site laboratory for analysis. Selected samples may also be sent off-site for gamma spec analysis to confirm on-site lab results.
- The results of the GPR survey at the auger locations indicated that a intact and continuous concrete slab was not present at most sampling locations, rather it appeared to be more broken up concrete and miscellaneous fill. At only one location, 2BH024, was metallic debris encountered and the auger rig was not able to advance below the debris layer. The results of the on-site laboratory for samples collected above the metallic debris were below the MDL. At all other auger locations, a concrete core was collected or the auger advanced through the debris layer composed of broken up concrete and other debris. Soil samples above and below the debris layer were collected and analyzed at the on-site laboratory. All the data is available on the web-site with the exception of 2BH026, 2BH033, 2BH032 and 2BH019. Only 2BH026 had detections above the MDL, and these were limited to the upper 4 ft. and ranged from 2 to 6 pCi/g.
- Based on the telephone conversation George Bock had with Frank Furanca from NJDEP on 8/8/02, the contents for these test pits can be returned to the pit.
- Large debris removed from the shaft will be field frisked with detectors capable of measuring alpha, beta and gamma radiation. This scanning shall obtain a measurement in dpm/100 cm³.
- The soil/fill/debris removed from the elevator shaft will be placed on a temporary liner system composed of geotextile and PVC liner to control and possible migration of contaminant. The debris pile will also be covered with a tarp to control generation of contact water and dust emissions.
- The field team will be the same as the elevator shaft investigation.
- The on-site gamma spec lab will be used to screen samples of the debris, concrete and subsoils.
- The fill material at the surface will segregated such that this material will be returned last to the pit in accordance with the sequencing method discussed with the NJDEP.
- There is no cost for restoration of the test pit areas to an asphalt cover. USACE is to discuss this with DuPont to determine if clean gravel can be placed on top of the disturbed area, or does the asphalt cover need to be replaced.

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AOC 1 TEST PIT LOGS

TEST PIT LOG

LOCATION ID: 1TP001-1TP021

CLIENT: USACE	ELEVATION:	DRILL METHOD
SITE NAME: DuPont Chambers	NORTHING:	START DATE: 8/26/2002
PROJECT NO:	EASTING:	END DATE: 8/26/2002
DRILLING CO: Weston	DEPTH: 1.5 ft bgs	
LOGGED BY: Strobridge		

Interval Start	Interval End	PID Reading	ASTM Description	USCS Code	Moisture Code	Color	Sorting
0	0.25		Poorly Graded Gravel Notes: Gravel is fine to medium and subangular.	GP	D	Light Gray	Medium Sorting
0.25	0.5		Poorly Graded Sand Notes:	SP	M	Brown	Medium Sorting
0.5	1.5		Poorly Graded Sand Notes: Material is dark gray to black and has aggregate like asphalt, but is dense/loose instead of tarry and cohesive. Hit concrete at 1 - 1.5 ft below gravel at several locations.	SP	M	?	Medium Sorting



TEST PIT LOG

LOCATION ID: 1TP022

CLIENT: USACE	ELEVATION:	DRILL METHOD
SITE NAME DuPont Chambers	NORTHING:	START DATE 8/26/2002
PROJECT NO:	EASTING	END DATE 8/26/2002
DRILLING CO: Weston	DEPTH: 1.5 ft bgs	
LOGGED BY: Strobridge		

Interval Start	Interval End	PID Reading	ASTM Description	USCS Code	Moisture Code	Color	Sorting
0	0.25		Poorly Graded Gravel Notes: Gravel is fine to medium and subangular.	GP	D	Light Gray	Medium Sorting
0.25	0.75		Poorly Graded Sand Notes:	SP	M	Brown	Medium Sorting
0.75	1.5		Silty Sand Notes: Material is dark gray to black and has fine to medium angular aggregate like asphalt but is loose instead of tarry and cohesive. Hit concrete at 1.5 ft below top of gravel.	SM	M	?	Poorly Sorted



TEST PIT LOG

LOCATION ID: 1TP023

CLIENT: USACE		ELEVATION:		DRILL METHOD	
SITE NAME DuPont Chambers		NORTHING:		START DATE 8/26/2002	
PROJECT NO:		EASTING		END DATE 8/26/2002	
DRILLING CO: Weston		DEPTH: 1.5 ft bgs			
LOGGED BY: Strobridge					

Interval Start	Interval End	PID Reading	ASTM Description	USCS Code	Moisture Code	Color	Sorting
0	0.25		Poorly Graded Gravel Notes: Gravel is fine to medium and subangular.	GP	D	Light Gray	Medium Sorting
0.25	0.75		Poorly Graded Sand Notes:	SP	M	Brown	Medium Sorting
0.75	1.5		Silty Sand Notes: Material is dark gray to black and has fine to medium angular aggregate like asphalt but is loose instead of tarry and cohesive. Hit concrete at 1.5 ft below top of gravel.	SM	M	?	Poorly Sorted



TEST PIT LOG

LOCATION ID: 1TP024

CLIENT: USACE	ELEVATION:	DRILL METHOD
SITE NAME: DuPont Chambers	NORTHING:	START DATE: 8/26/2002
PROJECT NO:	EASTING:	END DATE: 8/26/2002
DRILLING CO: Weston	DEPTH: 2.5 ft bgs	
LOGGED BY: Strobridge		

Interval Start	Interval End	PID Reading	ASTM Description	USCS Code	Moisture Code	Color	Sorting
0	0.25		Poorly Graded Gravel Notes: Gravel is fine to medium and subangular.	GP	D	Light Gray	Medium Sorting
0.25	1		Well Graded Sand w/Silt & Gravel Notes: Material is dark gray to black and has fine to medium angular aggregate like asphalt but is loose instead of tarry and cohesive.	SW-SM	M	Black	Poorly Sorted
1	1.5		Poorly Graded Sand Notes:	SP	W	Brown	Medium Sorting
1.5	2.5		Poorly Graded Sand Notes: Mottled brown.	SP	W	Gray	Medium Sorting



TEST PIT LOG

LOCATION ID: 1TP025

CLIENT: USACE	ELEVATION:	DRILL METHOD
SITE NAME DuPont Chambers	NORTHING:	START DATE 8/22/2002
PROJECT NO:	EASTING	END DATE 8/22/2002
DRILLING CO: Weston	DEPTH: 7 ft bgs	
LOGGED BY: Strobridge		

Interval Start	Interval End	PID Reading	ASTM Description	USCS Code	Moisture Code	Color	Sorting
0	0.75		Poorly Graded Gravel Notes: Gravel fill is fine to medium and subangular.	GP	D	Light Gray	Medium Sorting
0.75	2		Unknown Notes: "Organic fraction" composed of: 40% red bricks, 10% 4-ft lengths of angle iron, and 10% broken lumber and other fragments.	UK	W	Dark Brown	Poorly Sorted
2	5.3		Unknown Notes: Same as above, but higher concentration of misc iron and steel, including a pulley and steel cable. Water level at 2.25 ft. Rainbow sheen on water.	OH	S	Dark Brown	Poorly Sorted
5.3	6.5		Unknown Notes: Concrete.	UK			
6.5	7		Silty Sand Notes: Mottled orange-brown.	SM	S	Gray	Poorly Sorted



AOC 2 TEST PIT LOGS

TEST PIT LOG

LOCATION ID: 2TP001

CLIENT:	USACE	ELEVATION:	
SITE NAME	DuPont Chambers	NORTHING:	
PROJECT NO:		EASTING	
DRILLING CO:	Weston	DEPTH:	4.5 ft bgs
LOGGED BY:	Strobridge		
		DRILL METHOD	
		START DATE	8/26/2002
		END DATE	8/26/2002

Interval Start	Interval End	PID Reading	ASTM Description	USCS Code	Moisture Code	Color	Sorting
0	0.5		Poorly Graded Sand Notes: Asphalt.	SP			
0.5	1.2		Poorly Graded Sand Notes: Northeast wall of pit formed by a building foundation.	SP	M	Light Brown	Medium Sorting
1.2	1.8		Poorly Graded Sand Notes: Concrete with quarter inch thick rebar mesh. Took out the top of an abandoned (grouted) steel pipe.	SP			
1.8	3		Well Graded Sand w/Gravel Notes: Saturated at 2.5 ft bgs. Some brick and wood fragments.	SW	S	Brown	Poorly Sorted
3	4.5		Elastic Silt w/Sand Notes: More brick and wood fragments along with some concrete rubble and terracotta fragments. Another metal pipe (horizontal) observed at the NW wall of the pit.	MH	S	Dark Brown	Poorly Sorted

