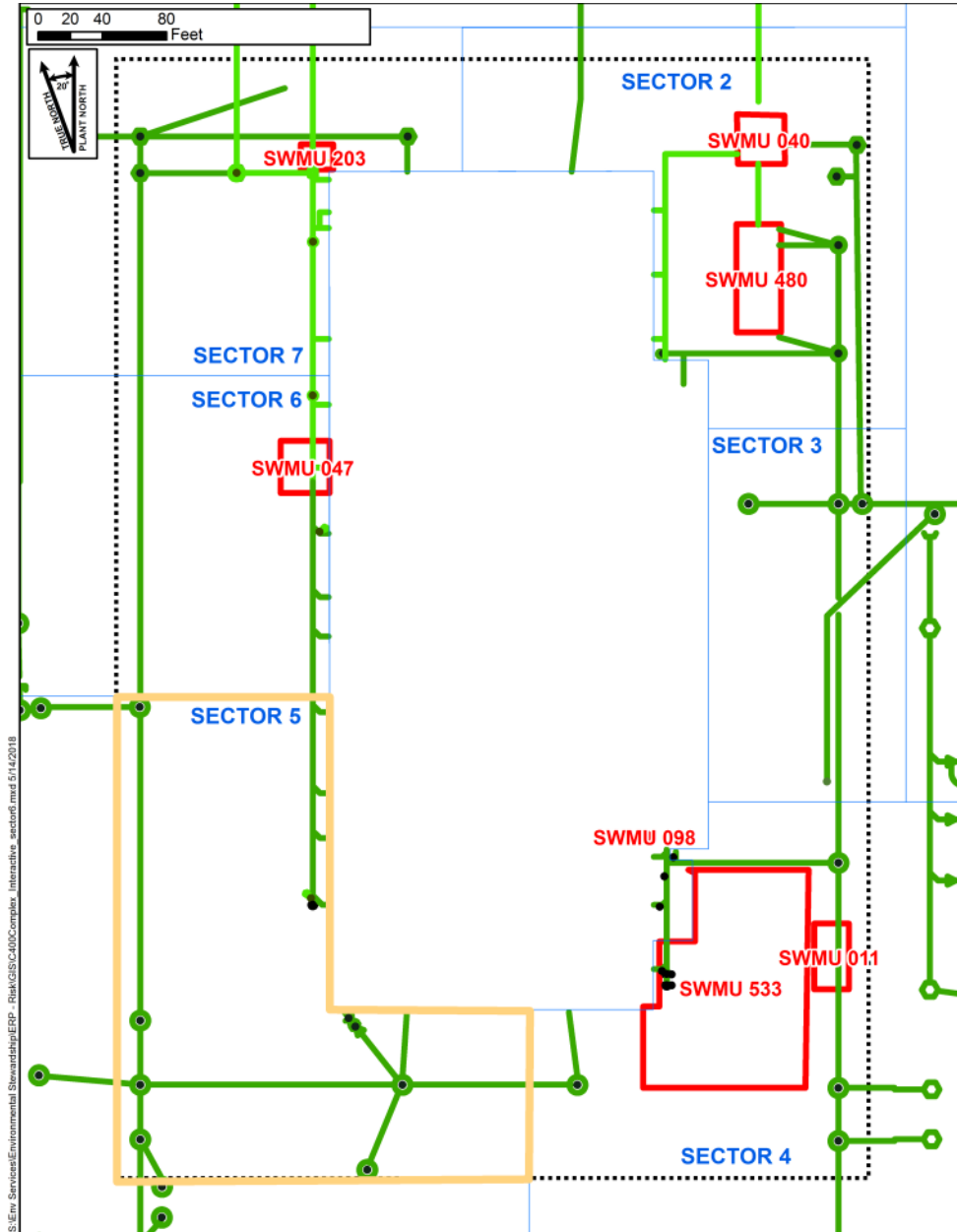




Sampling Plan Strategy Sector 5

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Location of Sector 5



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Sector 5 Background

Concrete and gravel/soil covers much of current area of Sector 5

- Area of ~53,000 ft²
- L-shaped area southwest of C-400 Cleaning Building
- Concrete apron on south end of building and mixture of soil, gravel and small concrete drive on the west
- Area of exposed soil estimated at 66%
- Sector 5 does not contain a SWMU

Key context from WAG 6 RI

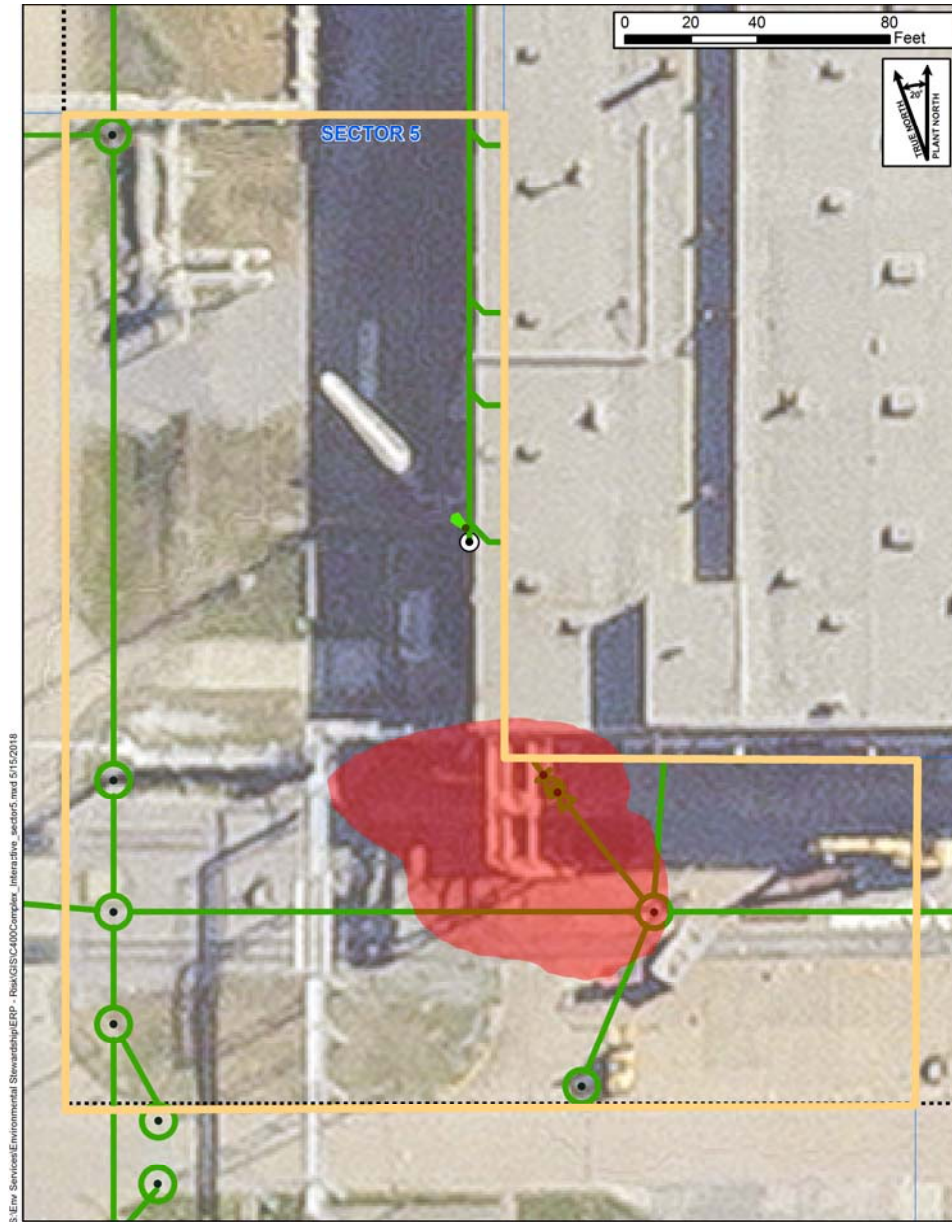
- Surface soils
 - PAHs are present (detects in 6 of 7 samples), locally elevated
 - PCBs are present above the WAG 6 screening level in 3 samples
- Subsurface soils
 - 107 subsurface soil samples from 28 locations
 - Sample depths between 1 and 48 ft bgs
 - Analyzed for VOCs, SVOCs, PCBs, radioactive isotopes, and metals
 - Maximum VOC concentration detected at 168,200 µg/kg
 - 11 samples screened for PCBs with a maximum level of 38µg/kg
 - PAHs present near building (92 analyses with detections as high as 16,000 µg/kg)
 - Four metals (antimony, arsenic, silver and thallium) exceeded PGDP subsurface concentrations by a factor of two or more
 - Beryllium was detected above background levels in 14 samples with the highest detect at 1.05 mg/kg.
- Identified areas of contamination
 - Two areas of contamination were identified in Sector 5 from WAG 6.
 - A VOC source area located in soils on the southwest corner of the building with a maximum TCE value of 168, 200 µg/kg and an depth of an estimated 48 feet. This area treated by Phase I ERH remedial action (Southwest Area).
 - VOC contaminant area adjacent to the C-400 Building in northeast corner of Sector 5 with a maximum TCE concentration of 110 µg/kg. Area is overlain by the Waste Discard drain line.

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Sector 5

Identified Areas of Contamination



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Sector 5 Sampling Strategy: Targeted

Anticipated remedial action(s)

- Excavation of Sector 5 due to elevated PAH contamination.
- Removal of surface soil (likely action for elevated PAHs)

Primary recognized uncertainties

- Nature and extent of subsurface soil contamination adjacent to C-400 Building wall (Eastward extent)(addressed by surface soil removal)

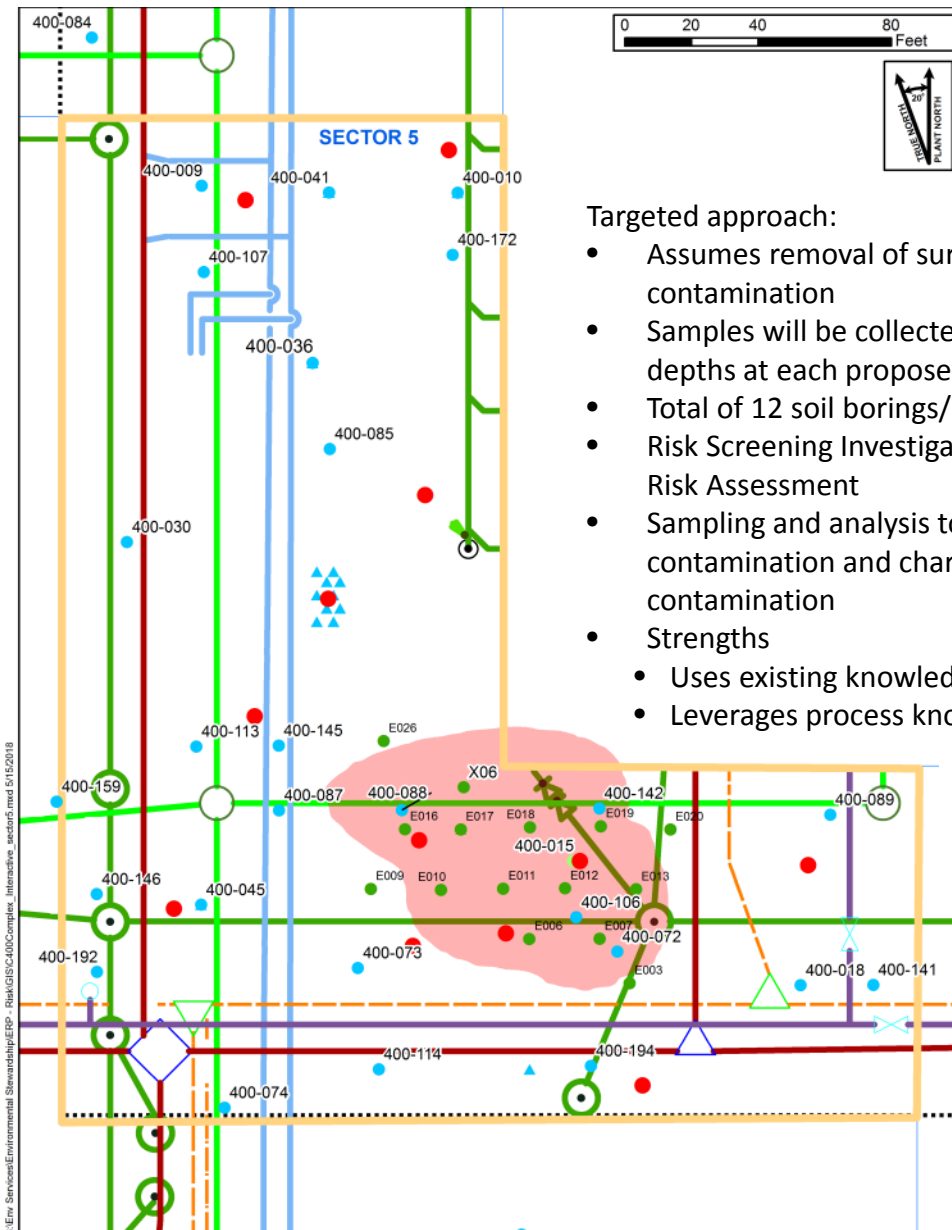
Sample strategy

- No surface soil samples collected for targeted sampling approach.
- Sample 4 soil horizons
 - Surface
 - HU1: ~ 10 ft depth
 - HU2A: ~ 20 ft depth
 - HU3: ~ 35 ft depth
- Targeted – contaminant sources and COCs from WAG 6 RI Baseline Risk Assessment
 - Sampling to update extent of contaminants
 - Assist in confirm removal of contaminants in areas previously having undergone remedial action

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Sector 5 - Targeted Sampling Approach



Targeted approach:

- Assumes removal of surface soil due to PAH contamination
- Samples will be collected from HU1, HU2, and HU3 depths at each proposed sample location
- Total of 12 soil borings/36 soil samples
- Risk Screening Investigation based on WAG 6 RI Baseline Risk Assessment
- Sampling and analysis to confirm nature of contamination and characterize current extent of contamination
- Strengths
 - Uses existing knowledge (WAG 6 RI characterization)
 - Leverages process knowledge of C-400 activities

- WAG 6 Soil Boring
- ▲ Historical Surface Soil Sample
- Recent Historical Soil Boring*
- Proposed Soil Boring

Notes:

- Locations shown are conceptual
- *Data useable based on data use rules

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Sector 5 Analyses

Targeted Sampling Approach (based on WAG 6 RI Baseline Risk Assessment)

- Metals (chromium as total chromium)
- PCBs
- Radionuclides
- SVOCs
- VOCs (includes toluene)

Groundwater samples: To be addressed later

Geotechnical samples (in general):

- Engineering properties, transport properties, and risk assessment
- Geotechnical properties likely consistent across C-400 OU Complex
 - 1 per sector to define characteristic value and variability for C-400 OU Complex
 - Samples from minimally affected soil

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Adaptation of Table 2.1 Significant Chemicals and Radionuclides of Potential Concern at PGDP

from *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
DOE/LX/07-0107&D2/R8/V1

Inorganic Chemicals		Organic Compounds				Radionuclides	
Analyte	CAS Number	Analyte	CAS Number	Analyte	CAS Number	Analyte	CAS Number
Aluminum	7429-90-5	Acenaphthene	83-32-9	Total Dioxins/Furans	1746-01-6	Americium-241	14596-10-2
Antimony	7440-36-0	Acenaphthylene	208-96-8	2,3,7,8-HpCDD	37871-00-4	Cesium-137+D	10045-97-3
Arsenic	7440-38-2	Acrylonitrile	107-13-1	2,3,7,8-HpCDF	38998-75-3	Neptunium-237+D	13994-20-2
Barium	7440-39-3	Anthracene	120-12-7	2,3,7,8-HxCDD	34465-46-8	Plutonium-238	13981-16-3
Beryllium	7440-41-7	Benzene	71-43-2	2,3,7,8-HxCDF	55684-94-1	Plutonium-239	15117-48-3
Boron	7440-42-8	Bromodichloromethane	75-27-4	OCDD	3268-87-9	Plutonium-240	14119-33-6
Cadmium	7440-43-9	Carbazole	86-74-8	OCDF	39001-02-0	Technetium-99	14133-76-7
Chromium III	16065-83-1	Carbon tetrachloride	56-23-5	2,3,7,8-PeCDD	36088-22-9	Thorium-230	14269-63-7
Chromium VI	18540-29-9	Chloroform	67-66-3	1,2,3,7,8-PeCDF	57117-41-6	Uranium-234	13966-29-5
Total Chromium	7440-47-3	1,1-Dichloroethene	75-35-4	2,3,4,7,8-PeCDF	57117-31-4	Uranium-235+D	15117-96-1
Cobalt	7440-48-4	1,2-Dichloroethane	107-06-2	2,3,7,8-TCDD	1746-01-6	Uranium-238+D	7440-61-1
Copper	7440-50-8	1,2-Dichloroethane (mixed)	540-59-0	2,3,7,8-TCDF	5127-31-9		
Fluoride	16984-48-8	trans-1,2-Dichloroethene	156-60-5	Total Carcinogenic PAHs	50-32-8		
Iron	7439-89-6	cis-1,2-Dichloroethene	156-59-2	Benz(a)anthracene	56-55-3		
Lead	7439-92-1	Dieldrin	60-57-1	Benzo(a)pyrene	50-32-8		
Manganese	7439-96-5	Ethylbenzene	100-41-4	Benzo(b)fluoranthene	205-99-2		
Mercury	7439-97-6	Fluoranthene	206-44-0	Benzo(k)fluoranthene	207-08-9		
Molybdenum	7439-98-7	Fluorene	86-73-7	Chrysene	218-01-9		
Nickel	7440-02-0	Hexachlorobenzene	118-74-1	Dibenz(a,h)anthracene	53-70-3		
Selenium	7782-49-2	Naphthalene	91-20-3	Indeno(1,2,3-cd)pyrene	193-39-5		
Silver	7440-22-4	2-Nitroaniline	88-74-4	Total PCBs	1336-36-3		
Thallium	7440-28-0	N-Nitroso-di-n-propylamine	621-64-7	Aroclor 1016	12674-11-2		
Uranium	NA	Pentachlorophenol	87-86-5	Aroclor 1221	11104-28-2		
Vanadium	7440-62-2	Phenanthrene	85-01-8	Aroclor 1232	11141-16-5		
Zinc	7440-66-6	Pyrene	129-00-0	Aroclor 1242	53469-21-9		
		Tetrachloroethene	127-18-4	Aroclor 1248	12672-29-6		
		Toluene	108-88-3	Aroclor 1254	11097-69-1		
		1,1,1-Trichloroethane	71-55-6	Aroclor 1260	11096-82-5		
		1,1,2-Trichloroethane	79-00-5	Vinyl chloride	75-01-4		
		Trichloroethene	79-01-6	Xylenes (Mixture)	1330-20-7		
				p-Xylene	106-42-3		
				m-Xylene	108-38-3		
				o-Xylene	95-47-6		

¹ This list of chemicals, compounds, and radionuclides was compiled from COPCs retained as COCs in baseline risk assessments performed at PGDP between 1990 and 2013 (i.e., DOE 1996a; DOE 1996b; DOE 1999a; DOE 1999b; DOE 2000a; DOE 2001; DOE 2005; DOE 2008; DOE 2010; DOE 2013).

² List may be added to during project scoping based on additional information.

Yellow cells with strikethrough text indicate COPCs that will not be analyzed for C-400 RI/FS.

Green cells indicate additional analytes, not identified as COPCs, that will be analyzed for C-400 RI/FS.

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Sector 5 - Possible Response Actions

Surface Soil

- Excavation, if required

Subsurface Soil

- Above Water Table
 - Thermal – VOCs/SVOCs
 - Soil Vapor Extraction – VOC/SVOCs
 - Solidification/Stabilization - Inorganics/Radionuclides
 - Enhanced Bioremediation - VOCs/SVOCs/Inorganics (contaminant dependent)
 - Excavation and treatment/disposition – (Treatment - contaminant dependent)
 - Chemical Oxidation - VOCs/SVOCs/Inorganics (contaminant dependent)
 - Combination of Technologies
 - Plugging/Excavation pipelines & subsurface/surface infrastructure
- Below Water Table (UCRS)
 - Thermal – VOCs / SVOCs
 - Dual Phase Extraction – VOC / SVOCs
 - Solidification/Stabilization - Inorganics / Radionuclides
 - Enhanced Bioremediation - VOCs/SVOCs/Inorganics (contaminant dependent)
 - Excavation and treatment/disposition – (Treatment-contaminant dependent)
 - Chemical Oxidation - VOCs/SVOCs/Inorganics (contaminant dependent)
 - Barrier/Slurry Wall – VOC/SVOCs/Inorganics/Radionuclides
 - Combination of Technologies

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