

**Memorandum For: Ms. Rachael Thompson, Executive Director
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**From: Frank Anastasi, P.G., Community Technical Advisor
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Date: September 30, 2019

**Subject: Review of U.S. EPA's Superfund Proposed Plan
LCP Chemicals Georgia Superfund Site
Operable Unit 3 – Upland Soil**

Introduction

The U.S. Environmental Protection Agency (EPA) in August 2019 issued the Proposed Plan (the Plan) for the Upland Soil portion of the LCP Chemicals Georgia Superfund Site. This part of the site is also referred to as Operable Unit 3 (OU 3). The site is located between the Turtle River and New Jesup Highway, just northwest of the Brunswick city limits. It is owned by Honeywell, who along with former owners/operators are the primary responsible parties (PRPs) that have cooperated with EPA to remediate the site.

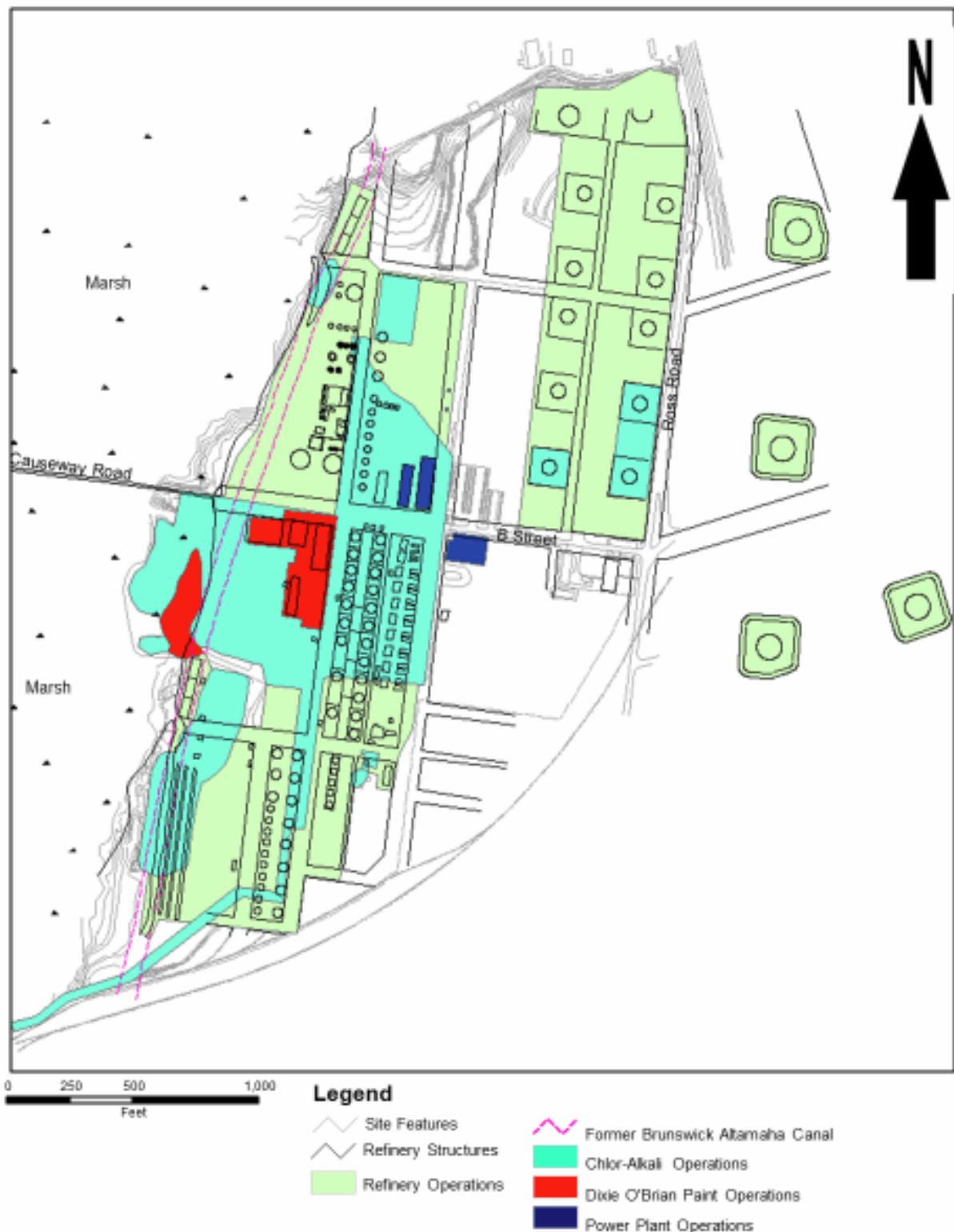
EPA proposes that no further remedial action be taken to protect human health and the environment from residual soil contamination in the Upland Soil portion of the site, providing it is not developed for residential use in the future.

In a separate action, EPA would use its authority under an existing agreement with the PRPs to create an Institutional Control for this part of the LCP Chemicals plant site. The control would prevent future residential development there, in the form of a universal environmental covenant. This would be a deed restriction and a permanent part of the property records that would be enforced by State and local government agencies.

Background

The LCP Chemicals Superfund Site is an 813-acre property with a 100-year history of industrial activity, including oil refining and storage, coal-fired power plant, and chemical and paint manufacturing plants. Past activities contaminated soil, ground water, and adjacent surface waters and marshlands until operations ceased in 1994.

Figure 4 from the Plan on the following page shows where these activities took place. Contaminants of concern include polychlorinated biphenyls (PCBs), mercury, lead, and cancer-causing polycyclic aromatic hydrocarbons (cPAHs). EPA oversaw removal of contaminated soil and industrial wastes from the site in the mid-1990s.



Areas of Former Industrial Activities at LCP Chemicals Georgia Superfund Site
Source: EPA Proposed Plan, August 2019, Figure 4

The Superfund cleanup project is being managed in three parts: OU 1 – Estuary and Salt Marsh; OU 2 – Cell Buildings area and Groundwater; and, OU 3 – Upland Soils (where industrial activities took place). EPA is currently overseeing remedial actions for OU 1, including limited removal of sediments and capping portions of the contaminated marsh with sand and/or other materials.

For OU 2, action has been taken to reduce mercury contamination in ground water, and studies are ongoing to define the full extent of residual ground water contamination associated with the mercury cell buildings and the subsurface caustic brine pool.

Previous Removal of Soil and Industrial Wastes

Between 1994 and 1998, approximately 130,000 cubic yards of contaminated soil and industrial wastes were removed from the site. This work was done in the marsh, around the mercury cell buildings, and at numerous former operations areas in the Upland portion of the site. Many former industrial buildings and facilities were demolished, including the above-ground portions of the mercury cell buildings.

Soil cleanup levels used by EPA during the removal actions included 20 parts per million (ppm) for mercury; 25 ppm for PCBs; 50 ppm for cPAHs; and 500 ppm for lead. Some areas of soil containing higher levels of these contaminants are known to remain at the site, especially in the mercury cell buildings area. A soil cover was placed over the buildings' concrete foundation slabs to prevent exposure to that contamination temporarily. Figure 5 from the Plan shows the removal areas (see following page).

Basis for EPA's Proposal for No Further Action

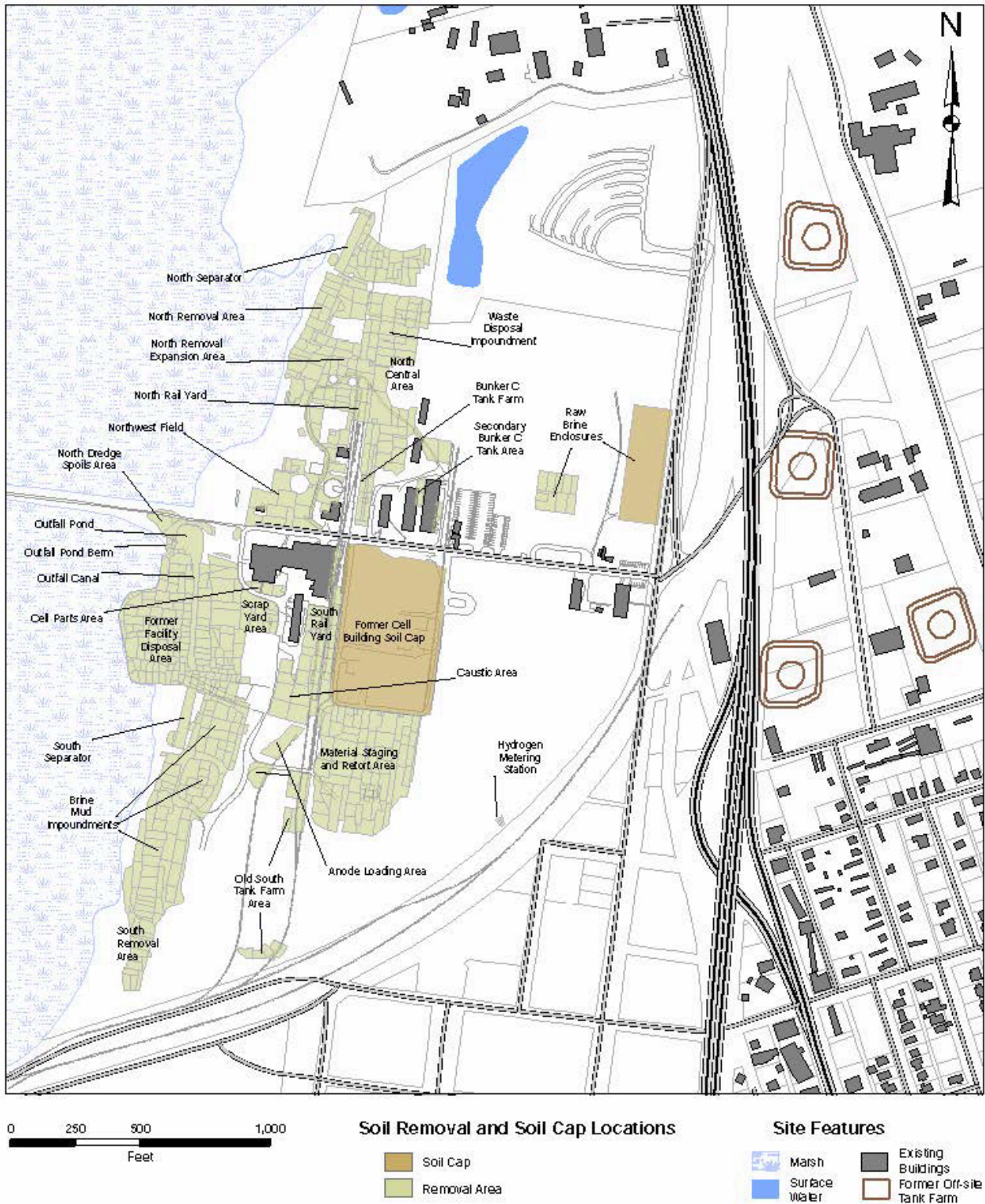
EPA's proposal for No Further Action (NFA) is based on three premises:

- Human-health and ecological risk assessments estimate no unacceptable risks from the residual soil contamination unless people live there in the future;
- Contamination known to be present at the cell buildings area is not included in this action and will be addressed later in a remedial action for OU 2; and
- Future development of the site could be for commercial and industrial uses, but residential use would not be allowed without additional sampling and/or cleanup.

The reader is referred to the Plan for additional details of the historical site investigations, removal actions, and risk assessments conducted for the LCP site. It can be found at < <https://semspub.epa.gov/work/04/11120293.pdf> >.

Risk Assessments

The Plan explains in detail how human health and ecological risks were estimated. For human health, OU 3 was divided into four parcels (about 40 acres each). For ecological risks, the site was broken down into four-acre parcels. For each parcel, the average concentrations of contaminants of concern (COCs) in soil were calculated using data

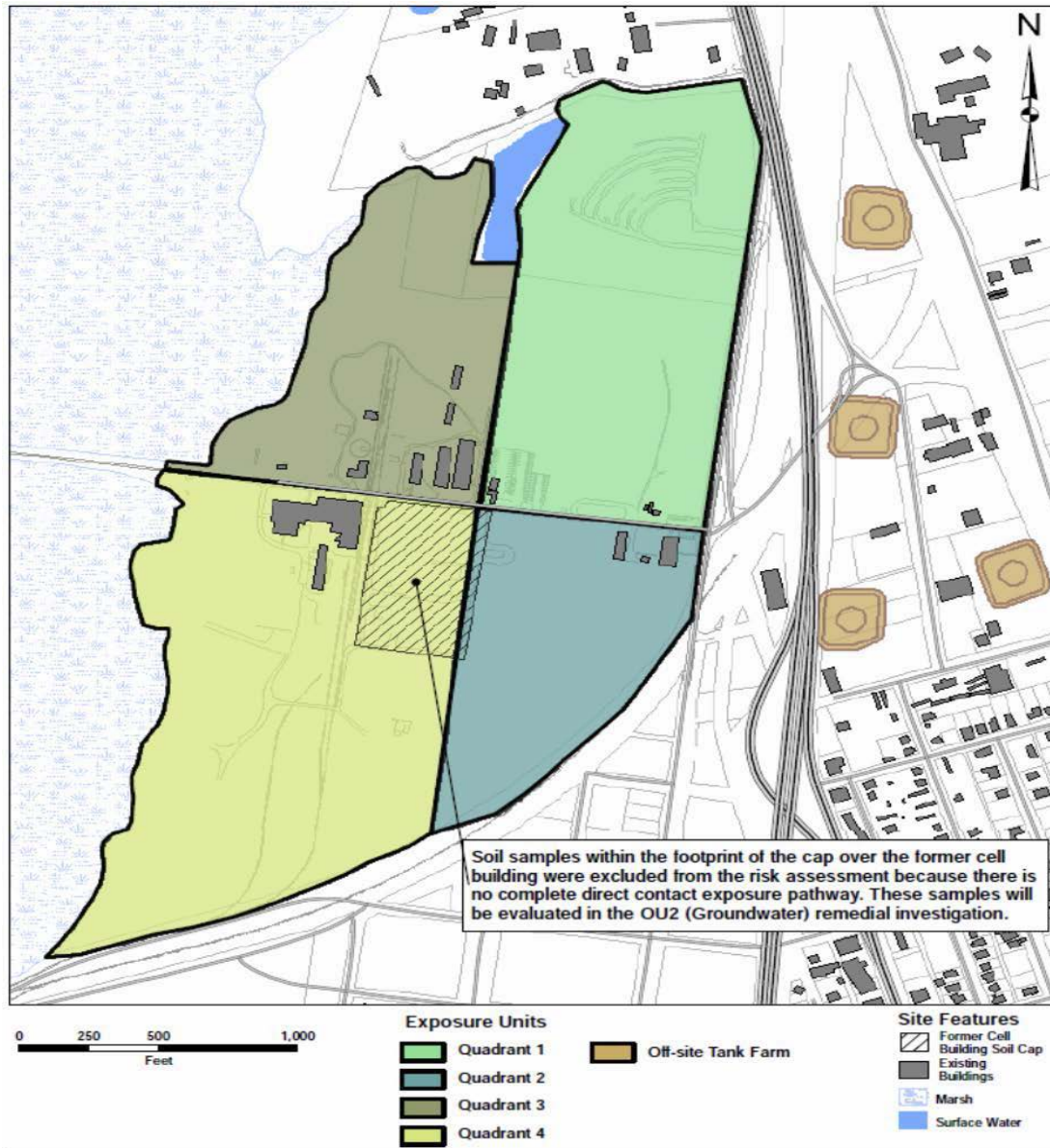


Areas of Soil and Industrial Wastes Removal and Soil Cover at LCP Chemicals Georgia Superfund Site. Source: EPA Proposed Plan, August 2019, Figure 5

from site investigations. Those average concentrations in each parcel were used to estimate risks for various future exposure scenarios (human health) and for numerous animals.

Human Health Risk Assessment

Exposures scenarios for future site uses included residential use, commercial/industrial use, construction excavation work, and trespassing. The risk assessment process, assumptions, and uncertainties are detailed in Section 4 of the Plan (begins on p. 15). Figure 2 from the Plan shows the four parcels used to estimate health risks (see below).



Four Parcels of OU 3 used for Human Health Risk Assessment at LCP Chemicals Georgia Superfund Site. Source: EPA Proposed Plan, August 2019, Figure 2

EPA defines “acceptable” health risks for Superfund Sites as 1) for cancer, not more than one excess cancer occurrence in 10,000 people, and 2) for non-cancer adverse health effects, a “hazard index” of less than 1. The hazard index is a cumulative measure of non-cancer health effects from multiple exposure pathways (e.g., ingestion, dermal contact, and inhalation).

Unacceptable health risks were estimated for residential use scenarios, but not for the other scenarios evaluated. Initially, a non-cancer risk above the hazard index threshold (HI = 1) was indicated for an excavation worker who would be exposed to subsurface PCB contamination at one part of the site. As explained in the Plan on pp. 18-19, three soil samples with high levels of PCBs were the cause of this elevated risk.

In 2018, EPA collected new soil samples at the locations of the three original samples. Results showed much lower or non-detectable concentrations of PCBs compared to the original samples, which EPA stated is consistent with historical sampling in nearby areas. The following data for these soil samples are presented on p. 18 of the Plan.

	Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268		Total PCB	
	Prior	New	Prior	New	Prior	New	Prior	New	Prior	New
LC-204 (0-1ft)	ND	ND	110	ND	NA	0.094	NA	0.083	110	0.177
LC-639 (0-1ft)	6.9	ND	160	ND	NA	1.25	NA	1.54	166.9	2.79
LC-639 (1-2ft)	9.2	ND	120	ND	NA	0.112	NA	0.111	129.2	0.223
	ND	not detected		all units in mg/kg						
	NA	not analyzed								

⁴ Note that Table 3 summarizes the risk/hazard estimates using the data sets, excluding those from the initial on-site laboratory which operated early during the late 1990s removal. The initial mobile laboratory was, after a time, recognized to have unacceptable quality control and was replaced by another mobile laboratory.

Ecological Risk Assessment

The adverse effects of soil contaminants on 10 wildlife receptors were estimated as described on pp. 21-24 of the Plan. A food-web based approach was used to model potential wildlife effects; the assessment was not based on observed health of animals at the site. Potential effects on a variety of ecological receptors were evaluated, including invertebrates, three types of both terrestrial-feeding birds and terrestrial-feeding mammals, five types of estuarine-feeding birds, and three estuarine-feeding mammals.

For the ecological assessment, average soil contamination levels for each COC were calculated for each of the four-acre parcels. The table on p. 23 of the Plan presents the estimated maximum and average hazard quotient (HQ) for each animal (far-right column) based on maximum and average exposure concentrations; an HQ greater than 1 indicates elevated risk. The species with the greatest estimated risks are noted below:

- Mercury caused the highest estimated risks for the Meadow Vole (maximum HQ = 4.1) and for the Short-tailed Shrew (maximum HQ = 5.1);
- PCBs (as Aroclor 1268) caused the next highest risks for the Vole and the Shrew (both with maximum HQ = 2.9);
- Lead caused elevated risk for the Mourning Dove (maximum HQ = 2); and
- Methylmercury caused elevated risk for the Broad-winged Hawk (maximum HQ = 2.3).
- When risks were estimated using average exposure concentrations, the only animal to score an HQ greater than 1 was the pied-billed grebe, due to methylmercury (average HQ of 1.3).

EPA characterized the risks to the animals cited above as “marginally of concern” for the hawk; “a potential concern” and “moderate risk” for the vole and the shrew. The overall finding of the ecological assessment was that no unacceptable ecological risks result from current site conditions.

Comments

1. The Plan is consistent with EPA’s policies and procedures for Superfund projects

The Plan is based on results of previous studies and reports done by the former and current site owners (now Honeywell) and its consultants, with oversight, review and comments by EPA. These studies include a Remedial Investigation and Feasibility Study (RI/FS), Baseline Ecological Risk Assessment, and Human Health Risk Assessment. These and other documents are available at
< <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.docdata&id=0401634>. >

EPA offered the traditional 30-day public comment period, which it extended based on requests from the public for more time. The comment period now runs until December 2, 2019. EPA will then decide to move forward with this proposal, or a modified plan, after considering public comments.

2. This Plan is unusual in that no other remedial alternatives are presented

Typically, a Proposed Plan would present a summary of multiple alternatives for remediation, including No Action. The costs and benefits of each alternative would have been evaluated previously in a Feasibility Study. EPA usually summarizes the costs and benefits of each alternative, and demonstrates why it selected the preferred alternative. In this case, the previous removals of soil and industrial waste were judged to be adequate to reduce site risks to acceptable levels, so other alternatives were not considered.

Residual soil contamination remains in parts of OU 3 above the cleanup levels used during the removals in the mid-1990s. Based on a different health risk assessment by another U.S. government agency, this residual contamination could cause unacceptable

risks to future site workers (as detailed in No. 4 below). Other alternatives to address the residual contamination might provide more certainty for preventing future exposures.

Alternative remedies might include removal of soil contamination, or containment of soil contamination under engineered barriers, or more-specific institutional controls targeted at the areas of residual contamination, to prevent unacceptable risks in the future.

3. The Plan does not explain how No Further Action is consistent with the Superfund requirement for compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The July 2019 Feasibility Study (that preceded the Plan) did not include an evaluation of ARARs as one typically does. For example, EPA has a PCB Spill Cleanup Policy for soil with a cleanup level of 25 ppm PCBs applicable for industrial settings (which was used in the removal actions). EPA also used established cleanup levels for mercury (20 ppm) and lead (500 ppm was used in the mid-1990s removals but more recently 400 ppm has been used).

It is not clear why compliance with ARARs was not evaluated in the FS and the Plan, especially after specific cleanup levels for COCs were judged applicable for industrial site use when the removal actions were conducted in the mid-1990s. It would be helpful if EPA could explain this apparent shortcoming of the Plan (and the FS as well)

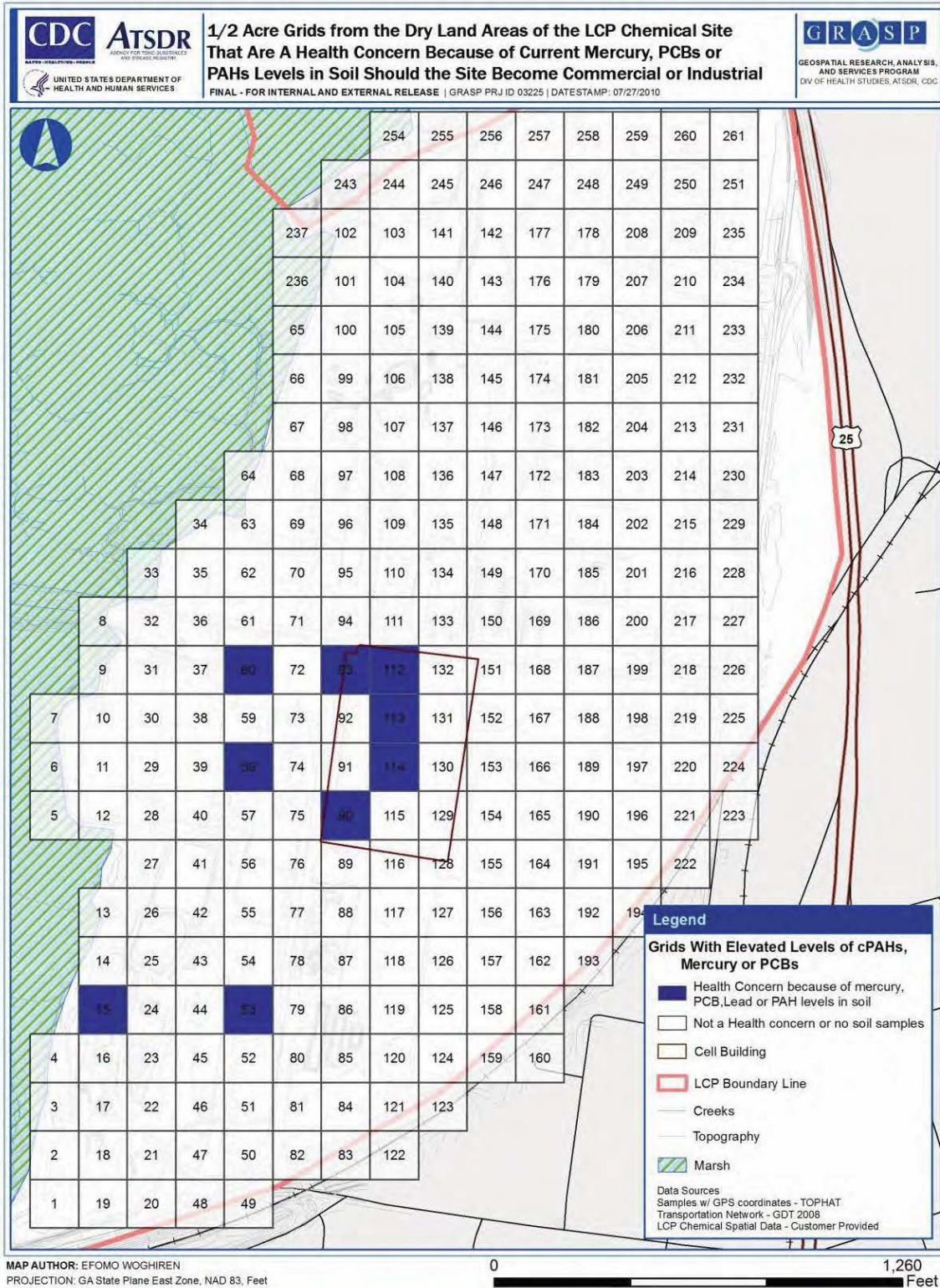
4. EPA's proposal appears to be inconsistent with the findings of the Agency for Toxic Substances and Disease Registry (ASTDR)

ATSDR conducted a detailed Public Health Assessment of the LCP OU 3 Uplands soil contamination. The final version of the report was published in 2014. ATSDR maintains a webpage with this and more information at < <https://www.atsdr.cdc.gov/sites/lcp/> >.

ATSDR evaluated the site much more closely than the Superfund risk assessment, looking at residual contamination in one-half-acre parcels, compared to approximately 40-acre parcels used in the Superfund risk assessment. This produced higher values for average contaminant levels that were used to estimate health risks compared to the levels used in the Superfund risk assessment (which were averaged over 40-acre parcels).

ATSDR identified “hot spots” – localized areas of higher residual PCBs, mercury, and/or cPAHs in soil – at nine, one-half-acre parcels that could harm the health of future commercial and/or industrial workers (see ATSDR map of hot spots on the next page).

EPA was asked at the September 12, 2019 public meeting about the ATSDR findings compared to the Superfund risk assessment. EPA noted basic differences in the risk assessment assumptions, such as exposure durations and sizing of exposure parcels (i.e., 40-acre parcels vs. one-half-acre parcels), that produce different results. EPA believes that average contaminant concentrations for 40-acre parcels is realistic for exposure scenarios for commercial/industrial uses vs. the one-half-acres parcels used by ATSDR.



ATSDR's One-half-acre parcels with Elevated Levels of Contamination at LCP Chemicals Georgia Superfund Site. Source: ATSDR April 2014 Public Health Assessment, Figure 46

ATSDR's findings are summarized below.

- PCBs exceed EPA Cleanup Standard of 25 parts per million (ppm) at nine parcels; see ATSDR Table 4 and Figure 34.
- Mercury levels in four parcels could harm the health of a developing fetus in pregnant women workers; the health of non-pregnant women and men could be harmed by levels in one of those parcels; see ATSDR Table 29, Figure 37.
- Mercury in 10 parcels exceeds the EPA Cleanup Standard of 20 ppm; see ATSDR Table 29, Figure 37.
- cPAH levels in two parcels could harm the health of workers; see ATSDR Table 35, Figure 41.

While some of these hot spots are in the cell buildings area, which EPA is excluding from this action, others are located beyond that area. The elevated levels of contamination at the locations cited by ATSDR that are not in the cell buildings area are shown in the following table (ATSDR location grid numbers shown on map on previous page).

Contaminant of Concern	EPA Cleanup Level*	ATSDR Location Grid No.	Average Concentration	Maximum Concentration	Number of Samples in 1/2-Acre Parcel
PCBs	25 ppm	53	42.3 ppm	167 ppm	7
		58	122 ppm	122 ppm	1
		60	34 ppm	34 ppm	1
Mercury	20 ppm	53	27.7 ppm	82 ppm	3
		60	85 ppm	85 ppm	1
cPAHs	50 ppm	15	9.6 ppm	Not Reported	5

*Concentrations used in mid-1990s soil and industrial waste removal actions

ATSDR made several specific recommendations, which are summarized below:

- Soil sampling was inadequate over approximately one-half of the site (see ATSDR Figures 22-25); those parts of the site require additional sampling in order to be sure that those areas are not contaminated (for example, see the ATSDR map for inadequate sampling for PCBs on the following page).
- Restricting some areas from commercial or industrial use is recommended, unless further steps are taken to prevent contact with PCB, mercury, and PAH contamination that remains in soil on the property.
- Additional soil sampling is recommended in and around the former cell buildings' footprint because of residual soil contamination if future plans include development of this area.

5. It may be prudent for EPA to consider if the findings of recent investigations and ground water treatment at the cell buildings area might impact a No Action decision
- EPA and GAEPD indicate that significant mercury contamination was found in the expanded area of investigation, and the extent of the underground caustic brine pool is expanding to the north based on the additional investigations.
 - The recent expanded area of ground water treatment to reduce dissolved mercury could increase levels of mercury in soil.
 - The Plan could specify an approximate area around the cell buildings (possibly including a buffer beyond the currently known extent of soil contamination) that would be excluded from the No Further Action plan.
 - EPA and the Georgia Environmental Protection Division indicate that some type of containment will likely be required over the cell buildings area. The Plan could discuss the suitability of the existing soil cover (which is not a multilayer cap typically used to contain hazardous wastes at Superfund sites) to contain the residual contamination if the site were to be released for commercial and industrial uses.

Next Steps

I will attempt to get clarification from EPA on the above-mentioned matters over the next few weeks. With the public comment period ending on December 2, 2019, we should have ample time to gauge the community's level of concern about these and other issues about the proposal for No Further Action.

I trust that this memorandum provides GEC and the community a good sense of what EPA has proposed for OU 3, the basis for its decision, and some potential issues that have been raised as EPA solicits and considers input from the public and local authorities.

Feel free to contact me if you require any additional information or wish to discuss these matters.