

APPENDIX O
Ecological Site Visits, October 2003



28 October 2003

TO: Cabrera Services Inc.

FROM: EA Engineering, Science, and Technology, Inc.

SUBJECT: Ecological Site Visit: Dupont Chambers Works Site, OU-2

A site visit was conducted at the DuPont Chambers Works on 15 October 2003 to investigate the need for a radiological ecological risk assessment of Operable Unit 2, consisting of Building J-26 and the Central Drainage Ditch (CDD). Specific questions addressed during this site visit were:

- What ecological receptors exist in or near, and are exposed to Operable Unit 2?
- What exposure pathways are complete?
- Based on this site visit, what adjustments to the Ecological Preliminary Conceptual Site Model may be necessary?

Habitat and Ecological Receptors

The open portion of the CDD is approximately 1,600-ft long, and flows eastward from a point west of Kinetic Road and ultimately discharges into Basin B, and thence to the Delaware River. In the shallower, upper portion of the CDD, numerous small fish were observed that appeared to be mummichog (*Fundulus heteroclitus*), a killifish that is common and abundant in the mid-Atlantic region. No other animals were observed in the upper portion of the CDD, although bird and mammal tracks were noted on the bank of the ditch in one location. It should be noted that the upper approximately 700-ft of the open CDD has no riparian vegetation or other habitat features that would attract mammals or birds, other than occasional incidental visits. In their 2003 draft RI report for OU-1, Weston reported observations of frogs in the CDD as well as fish.

The lower approximately 900-ft of the CDD presents considerably different habitat. There is considerable streamside vegetation throughout this reach, including wetland vegetation. The CDD in this reach is narrow and relatively deep, and no aquatic organisms could be observed. However, a number of birds were observed in and near the lower reach. European starlings and mourning doves were common. A belted kingfisher, a northern mockingbird, and an Eastern phoebe were each observed in the riparian vegetation in the lowermost portion of the CDD. Outside of the immediate CDD, but in proximity, one, and possibly two, kestrels were observed. Also, approximately 50 Canada geese were observed swimming in Basin B.

With the exception of gulls high overhead, there were no animals (or plants) observed near Building J-26. This area is completely covered by pavement or buildings. There is no habitat to attract ecological receptors to Building J-26.

Exposure Pathways

Exposure pathways were discussed by Cabrera Services and EA Engineering in their draft FSP for the RI at OU-2. In their development of a Conceptual Site Model for OU-2 (see below), three possible ecological exposure pathways for contaminants, including uranium products, were identified: 1) indirect contact, i.e., exposure to ionizing radiation; 2) direct contact via root uptake by plants; and 3) direct contact through ingestion of contaminated organisms, or epithelial absorption.

Based on the site visit, and assuming potential contaminants in the CDD water and/or sediment, all of these pathways are complete. Fish were observed in the CDD, and although not observed during this visit, macroinvertebrates undoubtedly exist there also. These animals would be exposed to ionizing radiation and gill or skin absorption of contaminants. They also would be vectors of contaminants when fed upon by higher trophic organisms, e.g., fish-eating birds. The lower portion of the CDD is heavily vegetated along the shore, and consequently, root uptake of contaminants is a viable pathway. A dietary exposure pathway for higher animals was evidenced on site by the presence of a belted kingfisher. This receptor could be exposed by eating fish or drinking water from the CDD.

Ecological Conceptual Site Model

The ECSM was examined in light of observations made during the site visit. Aside from some errors in trophic designation (e.g., the great blue heron is a carnivore [more precisely a piscivore], and not an omnivore), the ECSM appears comprehensive. We would consider it a “master” ECSM that, in the event of any future ecological risk assessment at OU-2, would be greatly simplified to provide a functional guide. We do not suggest that at this time.

Summary and Recommendation

The lower portion of the CDD presents essentially natural riparian habitat features. There are undoubtedly fish in this area (as they were observed upstream), the banks are well vegetated, and a number of birds were observed in this area, including the fish-eating belted kingfisher. The ecological structure of this area could be vulnerable to the presence of radiological contaminants.

We recommend that as radiological data for the CDD sediments become available, they be screened against default radiological dose benchmarks recommended by the U.S. Department of Energy's 2002 guidance, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*. The results could help guide subsequent decisions on whether further ecological risk assessment is warranted.