Virginia Senate Bill 1398
A Response to AECOM's Coal Ash Pond Closure Assessment of Dominion Energy Sites

In 2015, the Environmental Protection Agency issued final rules relating to how electric utilities should treat the large volume of coal ash that has been accumulating on coal generation sites for many decades. The EPA rule was in response to two major failures of coal ash ponds in North Carolina and Tennessee. In keeping with EPA's rule, the Virginia General Assembly enacted Senate Bill 1398 in 2017. The Bill required an assessment of all coal ash impoundments within the Chesapeake Bay watershed, which was to include an evaluation of clean closure through excavation of coal ash residuals (CCR) and its subsequent recycling and reuse or removal to dry, lined storage. Consequently, the evaluation requested by the General Assembly for its review would benefit from an analysis of clean closure using EnCAP-IT's macroencapsulation design with its CCR reuse opportunity and its cost and environmental advantages over the other two alternatives of cap-in-place and excavate-and-haul.

To conduct the evaluation and prepare the assessment, Dominion retained AECOM. The Coal Ash Pond Closure Assessment ("Assessment") of Dominion sites was submitted on December 1, 2017. In the Assessment, AECOM summarily dismisses the EnCAP-IT design solution stating reasons that are erroneous and misleading, demonstrating a lack of education and research on the part of AECOM in evaluating alternative solutions to Dominion's preferred cap-in-place approach. Following are AECOM's specific false allegations disparaging EnCAP-IT's design and the facts that refute AECOM's misrepresentation.

1. *"Ash ponds with more than 65 acres require the construction of multiple MSE walls to segregate the pond into multiple sections. . .. Constructing multiple walls to facilitate this method of closure also raises stability concerns because internal walls could be more than 80 feet tall and built on a substrate that has been an active pond for many years." (p. 267)*

    - EnCAP-IT has never recommended, designed, nor constructed any "wall" with the height of 80 feet. AECOM also uses the term "wall," when an industry expert, in analyzing EnCAP-IT's Encapsulated Mechanically Stabilized Earthen Berm ("eMSE"), would have recognized the engineering distinction between a "wall," which would have been ill-suited to the proposed application, and a reinforced berm. The wall reference suggests a simple vertical compacted berm, while EnCAP-IT's eMSE technology applies additional slope flattening to dramatically improve stability and long-term sustainability. AECOM also fails to point out that a compacted, non-reinforced berm as part of a cap-in-place solution would also raise safety concerns. Even so, a non-biased assessment that would have objectively evaluated the macroencapsulation design as an alternative solution would have discussed the use of industry-standard engineering design for an eMSE berm bunker system. The design height would be a direct result of the number of eMSE berms, volume of CCR utilized and desired safety criteria. Industry-standard techniques would be used in

the design so that even should a berm wall be proposed for a height of 80 feet tall, it would be designed so that it satisfies all regulatory and industry-standard requirements.

- AECOM's reference to 65 acres is another attempt to infer that its rejection of EnCAP-IT's design has a factual basis. However, any investigation or review of its design would show that 65 acres has no relevance as some defining line. EnCAP-IT's design using a series of eMSE berms will benefit any size ash pond as it helps to consolidate the storage capacity of the pond regardless of its initial size, which, in turn, decreases the impoundment's CCR footprint.

- The serial construction of eMSE berms does not section off the ash pond effectively into mini-impoundments as inferred in the report. Rather the design and placement of internal berms consider the pond in its entirety. The purpose of multiple internal berms is several-fold: (i) to enhance site stability as the multiple, reinforced berms significantly enhance the structural stability of the fill; (ii) to support the consolidation of CCR into a smaller area that reduces the footprint of the former impoundment and moves CCR further away from waterways or sensitive areas; and (iii) preserves the opportunity, at a later date when other, lucrative beneficial markets for CCR become available, to exhume the CCR from individual fully-lined sections in sequence without compromising the environmental integrity of the site. The number of eMSE berms is a direct result of volumes, environmental remediation and operational safety.

2. *"The ash is then moved from one section to the other to facilitate installing a liner, which is not anticipated to meet CCR Rule requirements because the liner would not be a composite liner." (p. 267)*

   - AECOM's false claim that liners used in EnCAP-IT's design would not be a composite liner is an attempt to discredit EnCAP-IT. AECOM has no evidence on which to make this claim. In fact, in public comments filed by EnCAP-IT with the EPA on its CCR State Permit Program Guidance, EnCAP-IT affirmed that the excavated site would be lined above the water table with a compliant geomembrane liner system consistent with the state permitting program as approved by EPA's Final Rule. On EnCAP-IT's public website, it ensures the public that its design would contain all coal ash within a Subtitle D equivalent liner system (see www.mseberms.com).

3. *"Moving the ash would add the significant costs of handling and moving the same ash multiple time." (p. 267)*

   - A description of EnCAP-IT's design in the article, "*Using geosynthetics for macroencapsulation for CCR on-site clean closure*," published in the August 2017 Geosynthetics Magazine, addresses this question, stating that the goal of construction of berms in phases is "to minimize the chance of double-handling of CCR while ensuring each phase is properly designed to stage progressive CCR excavation and placement for the remainder of the closure. Options may include a progressive fill sequencing within the first phase or using areas of more suitable CCR to minimize the impact of double-handling."

4. *"In addition, although MSE s have been used widely in civil construction applications, there are no examples of MSE wall construction within the footprint of previously saturated ash ponds." (p. 267)*

- AECOM is attempting to raise environmental and stability concerns by suggesting that the underlying soils making up the base of a berm are soft and therefore could not provide the proper substrate on which to place an eMSE berm. A non-biased assessment would have provided the available research regarding soft soils impact on berm construction to allow the General Assembly, the DEQ, and environmental and community stakeholders to comment on acceptability of whatever risks AECOM comments assume. There are numerous publicly available publications both from academic institutions and from successfully implemented projects that describe the development of traditional MSE berms over soft soils. In fact, eMSE berm technology is specified for such applications, as opposed to non-reinforced berms or rigid walls, as the eMSE berms accommodate settlement while retaining functionality. In any eMSE berm design there are many calculations that account for "settlement" and are designed to incorporate such movement.

5. Finally, AECOM twice makes statements in an attempt to downplay the amount of coal ash that could be beneficially used as part of the containment material:

"EnCAP-IT – encapsulated mechanically stabilized earth berms. a closure method that would beneficially use a small portion of the CCR material." (p.53)

"In this process, only a small portion of the material would be beneficially used . . ." (p.267)

- AECOM appears to be attempting to downplay the reuse opportunity EnCAP-IT's solution offers by demeaning the size of this CCR reuse opportunity and implicating that CCR reuse would not have a notable effect on the CCR storage footprint. The fact is that the overall volume of CCR used within the berms, as a proportion of the entire volume residing in a CCR impoundment, will naturally vary depending upon the site size and configuration and the design of the berm. Still, CCR materials can constitute up to 99.7% of the construction fill requirements for the eMSE berms. In any event, the use of CCR in replacement of any other structural fill not only lowers costs, but is that much less CCR needing to be stored.

- The opportunity for the beneficial reuse of coal ash as a substitute construction fill material within an eMSE berm is one of the advantages of EnCAP-IT's CCR storage solution. This proven technology has been successfully utilized at two landfills in Virginia. An objective assessment that would have included an analysis of EnCAP-IT's macroencapsulation design would have explained the distinction between non-encapsulated and encapsulated methods and how the beneficial reuse of coal ash in EnCAP-IT's berm construction is protective of the environment.

- An objective assessment would have also noted the reuse advantage of EnCAP's CCR storage design to serve as a warehouse for CCR. The capping system for the eMSE bunker design provides for ease of re-entry into the bunker in order to recover CCRs, allowing the CCR to be used as future inventory for growing beneficial reuse markets.

- Finally, an objective assessment would have also added that the CCR placed in the subtitle D equivalent lined areas between the interior stabilization berms can be configured for beneficial post-closure use for public benefits, such as solar power generation or recreation.

In closing, it is worth noting that EnCAP-IT and AECOM have not had a conversation, a meeting nor have exchanged any information. No inquiries were made by AECOM to EnCAP-IT during the preparation of the CCR Assessment. As an "independent" consultant performing an assessment of options, it is unclear to EnCAP-IT as to where AECOM got its information to produce these statements. An independent and objective assessment would have, and should have, provided an evaluation of EnCAP-IT's macroencapsulation approach as a total solution for CCR management and storage.

AECOM attempts to justify its summary rejection of EnCAP-IT's macroencapsulation design because it would cost more than Dominion's cap-in-place proposal, but without also weighing the additional environmental security that it would provide. Had AECOM objectively and fully assessed the macroencapsulation design, its comparative costs and environmental advantages would have demonstrated it to be a superior alternative to either cap-in-place with its greater environmental risk or the costlier excavate and haul approach.