DOMINION ENERGY

PERIODIC INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

CHESAPEAKE ENERGY CENTER INACTIVE CCR SURFACE IMPOUNDMENT: BOTTOM ASH POND

APRIL 2023

TABLE OF CONTENTS

APPENDICES

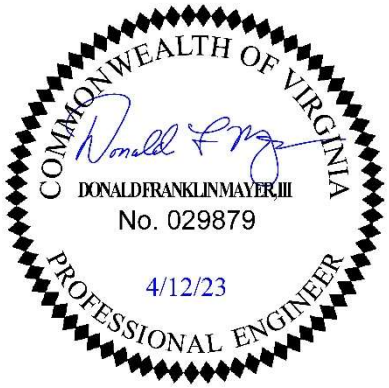
1 CERTIFICATION

This periodic Inflow Design Flood Control System Plan for the Chesapeake Energy Center's Bottom Ash Pond was prepared by WSP USA Inc. (WSP; formerly d/b/a Golder Associates USA Inc.). The document and Certification/Statement of Professional Opinion are based on and limited to information that WSP has relied on from Dominion Energy and others, but not independently verified, as well as work products previously produced by Golder.

On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the Commonwealth of Virginia that this document has been prepared in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances, at the same time, and in the same locale. It is my professional opinion that the document was prepared consistent with the requirements in §257.82 of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015, with an effective date of October 19, 2015 (40 CFR §257.82), as well as with the requirements in §257.100 resulting from the EPA's "Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur" published in the Federal Register on August 5, 2016 with an effective date of October 4, 2016 (40 CFR §257.100).

The use of the word "Certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not be interpreted or construed as a guarantee, warranty, or legal opinion.

Donald Mayer, PE	Vice President
Print Name	Title
	4/12/2023
Signature	Date



2 INTRODUCTION

This periodic Inflow Design Flood Control System (IDFCS) plan was prepared for the Chesapeake Energy Center's (CEC) Coal Combustion Residuals (CCR) inactive surface impoundment known as the Bottom Ash Pond (BAP). This Plan was prepared in accordance with 40 CFR Part §257, Subpart D and is consistent with the requirements of 40 CFR §257.82.

CEC, owned and operated by Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion Energy), is located in the City of Chesapeake, Virginia, at 2701 Vepco Street. CEC includes an inactive CCR surface impoundment, the BAP, as defined by the Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule and Direct Final Rule (40 CFR §257; the CCR Rule). This periodic IDFCS plan has been developed based on the existing BAP topography as of January 15, 2018. No changes have been made to the existing BAP topography since completion of the initial IDFCS. As such, the calculations presented within this periodic update are consistent with those presented in the initial IDFCS, but have been reviewed for consistency and accuracy, along with any changes to the design storm.

3 PURPOSE

This periodic IDFCS plan is prepared pursuant to 40 CFR §257.82(c) of the CCR Rule [40 CFR §257.82(c)]. The initial IDFCS plan was completed in April 2018 and is required to be reviewed every five (5) years pursuant to 40 CFR §257.82(c)(4).

4 PERIODIC INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

As required by §257.82(c)(1), this periodic IDFCS plan includes documentation of how the inflow design flood control system for the BAP has been designed, constructed, operated, and maintained to:

- Adequately manage flow into the BAP during and following the peak discharge of the inflow design flood [40 CFR §257.82(a)(1)];
- Adequately manage flow from the BAP to collect and control the peak discharge resulting from the inflow design flood [40 CFR §257.82(a)(2)]; and
- Adequately handle discharge from the BAP in accordance with the surface water requirements under 40 CFR §257.3-3 [40 CFR §257.82(b)].

4.1 HAZARD POTENTIAL CLASSIFICATION

As indicated in the Periodic Hazard Potential Classification Assessment (Golder, 2023), the BAP is assigned a "Significant" hazard potential rating per 40 CFR §257.73.

4.2 INFLOW DESIGN FLOOD

In accordance with 40 CFR §257.82(a)(3)(ii), a CCR impoundment with a significant hazard potential must collect and control the peak discharge resulting from a 1,000-year flood. Per National Oceanic and Atmospheric Administration (NOAA) Atlas-14, provided in Appendix A, the 1,000-year rainfall event totals for the 24-hour duration is 14.6 inches, consistent with the design flood accounted for the by the initial analysis. The results of the initial analysis were reviewed for consistency and found to be applicable with current BAP conditions. Based on the initial analysis, the BAP has demonstrated adequacy for the inflow design flood control system.

4.3 INFLOW CONTROL

As required by 40 CFR §257.82(a)(1), an inflow design flood control system must be in place for the BAP that is designed, constructed, operated, and maintained to adequately manage flow into the BAP during and following the peak discharge of the inflow design flood.

Inflow to the BAP is primarily stormwater runoff from the adjacent inactive CCR landfill, totaling approximately 23.1 acres of contributing area. The majority of stormwater arrives at the BAP in the northeast corner of the pond from the eastern perimeter channel. The current conveyance systems adequately manage run-on into the BAP during the inflow design flood.

4.4 OUTFLOW CONTROL

As required by §257.82(a)(2), an inflow design flood control system must be in place for the BAP that is designed, constructed, operated, and maintained to adequately manage flow from the BAP to collect and control the peak discharge resulting from the inflow design flood.

The BAP's primary outlet for stormwater is a 30-inch corrugated high-density polyethylene (CHDPE) pipe installed in the western embankment. This pipe drains to the adjacent existing sedimentation basin. The BAP normally does not maintain a pool of water due to the free-draining nature of the bottom ash, for which a small allowance has been made in the hydraulic model. The stage-storage curve for the BAP was developed using the January 15, 2018, topography which shows that the BAP has approximately 13-acre feet of available water storage volume at the embankment crest. No changes have been made to the topography between development of the initial IDFCS plan and the current periodic IDFCS.

4.5 SURFACE WATER REQUIREMENTS

As required by §257.82(b), a control system must be in place for the BAP that is designed, constructed, operated, and maintained to meet the requirements of §257.3-3.

The BAP is operated under Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0004081, a Local Land Disturbance Permit, Stormwater Management Plan, and Stormwater Pollution Prevention Plan (SWPPP). The site is routinely inspected and monitored by Dominion Energy personnel in accordance with the before mentioned plans to minimize potential surface water impacts.

5 CONCLUSIONS

Based on known site conditions, information in this periodic IDFCS plan, as well as work previously performed by Golder including field inspection and document review, it is WSP's opinion that the existing BAP inflow design flood control system complies with the requirements of 40 CFR §257.82 of the CCR Rule for a significant hazard potential impoundment.

REFERENCES

— Golder Associates. Inflow Design Flood Control System Plan, Chesapeake Energy Center CCR Surface Impoundment: Bottom Ash Pond. April 2018.

— National Oceanic and Atmospheric Administration's National Weather Service. NOAA Atlas 14 Point Precipitation Frequency Estimates: VA. Accessed February 3, 2023. Available online: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=va

— WSP USA Inc. (WSP). 2023. Periodic Hazard Potential Classification Assessment, Chesapeake Energy Center Inactive Surface Impoundment: Bottom Ash Pond. March 2023.

APPENDIX

A 2023 Precipitation Frequency Data Server Information (NOAA Atlas 14)

NOAA Atlas 14, Volume 2, Version 3
Location name: Chesapeake, Virginia, USA*
Latitude: 36.7613°, Longitude: -76.3019°
Elevation: 13.16 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.432** (0.393-0.476)	**0.507** (0.461-0.560)	**0.575** (0.522-0.634)	**0.658** (0.595-0.725)	**0.740** (0.667-0.816)	**0.814** (0.731-0.898)	**0.882** (0.788-0.973)	**0.948** (0.842-1.05)	**1.03** (0.906-1.14)	**1.11** (0.966-1.23)
10-min	**0.690** (0.629-0.761)	**0.811** (0.738-0.896)	**0.921** (0.836-1.02)	**1.05** (0.951-1.16)	**1.18** (1.06-1.30)	**1.30** (1.17-1.43)	**1.40** (1.25-1.55)	**1.50** (1.34-1.66)	**1.63** (1.43-1.80)	**1.74** (1.52-1.93)
15-min	**0.862** (0.786-0.951)	**1.02** (0.928-1.13)	**1.16** (1.06-1.29)	**1.33** (1.20-1.47)	**1.50** (1.35-1.65)	**1.64** (1.48-1.81)	**1.77** (1.58-1.95)	**1.90** (1.69-2.09)	**2.05** (1.80-2.27)	**2.19** (1.91-2.42)
30-min	**1.18** (1.08-1.30)	**1.41** (1.28-1.56)	**1.65** (1.50-1.83)	**1.93** (1.74-2.13)	**2.22** (2.00-2.44)	**2.47** (2.22-2.73)	**2.71** (2.42-2.99)	**2.95** (2.62-3.26)	**3.26** (2.87-3.61)	**3.54** (3.09-3.93)
60-min	**1.47** (1.34-1.63)	**1.77** (1.61-1.95)	**2.12** (1.93-2.34)	**2.51** (2.27-2.77)	**2.95** (2.66-3.25)	**3.35** (3.01-3.70)	**3.74** (3.34-4.12)	**4.14** (3.68-4.57)	**4.68** (4.12-5.17)	**5.17** (4.51-5.73)
2-hr	**1.73** (1.56-1.92)	**2.08** (1.87-2.30)	**2.54** (2.29-2.81)	**3.05** (2.75-3.37)	**3.66** (3.28-4.04)	**4.23** (3.77-4.66)	**4.79** (4.24-5.28)	**5.39** (4.75-5.95)	**6.21** (5.42-6.86)	**6.98** (6.04-7.71)
3-hr	**1.86** (1.68-2.08)	**2.23** (2.01-2.49)	**2.74** (2.46-3.05)	**3.31** (2.97-3.69)	**4.01** (3.58-4.46)	**4.69** (4.15-5.20)	**5.37** (4.72-5.94)	**6.11** (5.33-6.75)	**7.13** (6.16-7.89)	**8.11** (6.93-8.99)
6-hr	**2.24** (2.01-2.51)	**2.68** (2.40-3.01)	**3.30** (2.95-3.70)	**4.00** (3.56-4.47)	**4.86** (4.31-5.43)	**5.70** (5.02-6.35)	**6.55** (5.72-7.28)	**7.49** (6.49-8.32)	**8.80** (7.53-9.78)	**10.1** (8.52-11.2)
12-hr	**2.64** (2.36-2.98)	**3.16** (2.81-3.56)	**3.90** (3.47-4.39)	**4.75** (4.21-5.35)	**5.83** (5.13-6.54)	**6.88** (6.01-7.71)	**7.97** (6.90-8.92)	**9.19** (7.87-10.3)	**10.9** (9.21-12.2)	**12.6** (10.5-14.0)
24-hr	**3.00** (2.76-3.27)	**3.65** (3.36-3.98)	**4.71** (4.33-5.14)	**5.61** (5.14-6.11)	**6.94** (6.32-7.54)	**8.08** (7.30-8.78)	**9.34** (8.36-10.1)	**10.7** (9.51-11.7)	**12.8** (11.2-14.0)	**14.6** (12.5-15.9)
2-day	**3.48** (3.20-3.81)	**4.21** (3.88-4.61)	**5.41** (4.98-5.92)	**6.44** (5.90-7.04)	**7.99** (7.26-8.71)	**9.33** (8.41-10.2)	**10.8** (9.65-11.8)	**12.5** (11.0-13.6)	**15.0** (13.0-16.5)	**17.2** (14.6-18.9)
3-day	**3.69** (3.40-4.02)	**4.47** (4.13-4.88)	**5.71** (5.27-6.23)	**6.77** (6.21-7.37)	**8.33** (7.59-9.05)	**9.66** (8.74-10.5)	**11.1** (9.96-12.1)	**12.7** (11.3-13.9)	**15.2** (13.2-16.6)	**17.4** (14.9-19.1)
4-day	**3.90** (3.61-4.24)	**4.72** (4.37-5.14)	**6.02** (5.55-6.54)	**7.09** (6.53-7.69)	**8.66** (7.92-9.40)	**9.99** (9.07-10.8)	**11.4** (10.3-12.4)	**13.0** (11.6-14.1)	**15.3** (13.4-16.8)	**17.5** (15.1-19.3)
7-day	**4.56** (4.24-4.93)	**5.50** (5.12-5.95)	**6.92** (6.42-7.47)	**8.09** (7.48-8.73)	**9.78** (9.00-10.5)	**11.2** (10.2-12.1)	**12.7** (11.5-13.7)	**14.4** (12.9-15.5)	**16.8** (14.8-18.2)	**18.7** (16.3-20.5)
10-day	**5.18** (4.84-5.57)	**6.22** (5.80-6.67)	**7.71** (7.18-8.27)	**8.94** (8.31-9.58)	**10.7** (9.90-11.5)	**12.2** (11.2-13.1)	**13.7** (12.5-14.8)	**15.4** (13.9-16.6)	**17.8** (15.9-19.3)	**19.8** (17.4-21.6)
20-day	**7.02** (6.59-7.52)	**8.37** (7.85-8.95)	**10.2** (9.53-10.9)	**11.6** (10.9-12.4)	**13.7** (12.7-14.7)	**15.4** (14.3-16.5)	**17.2** (15.8-18.4)	**19.1** (17.4-20.5)	**21.8** (19.5-23.5)	**23.9** (21.2-25.9)
30-day	**8.66** (8.16-9.24)	**10.3** (9.70-11.0)	**12.4** (11.6-13.2)	**14.0** (13.2-15.0)	**16.3** (15.2-17.4)	**18.1** (16.9-19.3)	**20.0** (18.5-21.4)	**21.9** (20.1-23.4)	**24.5** (22.3-26.4)	**26.6** (24.0-28.7)
45-day	**10.8** (10.1-11.5)	**12.7** (12.0-13.6)	**15.2** (14.3-16.2)	**17.2** (16.1-18.3)	**20.0** (18.7-21.3)	**22.3** (20.7-23.7)	**24.6** (22.8-26.2)	**27.0** (24.8-28.9)	**30.4** (27.6-32.6)	**33.1** (29.8-35.7)
60-day	**12.9** (12.2-13.7)	**15.2** (14.4-16.1)	**17.9** (16.9-19.0)	**20.1** (18.9-21.3)	**23.0** (21.6-24.4)	**25.3** (23.7-26.9)	**27.6** (25.8-29.4)	**30.0** (27.8-31.9)	**33.1** (30.4-35.5)	**35.6** (32.4-38.2)

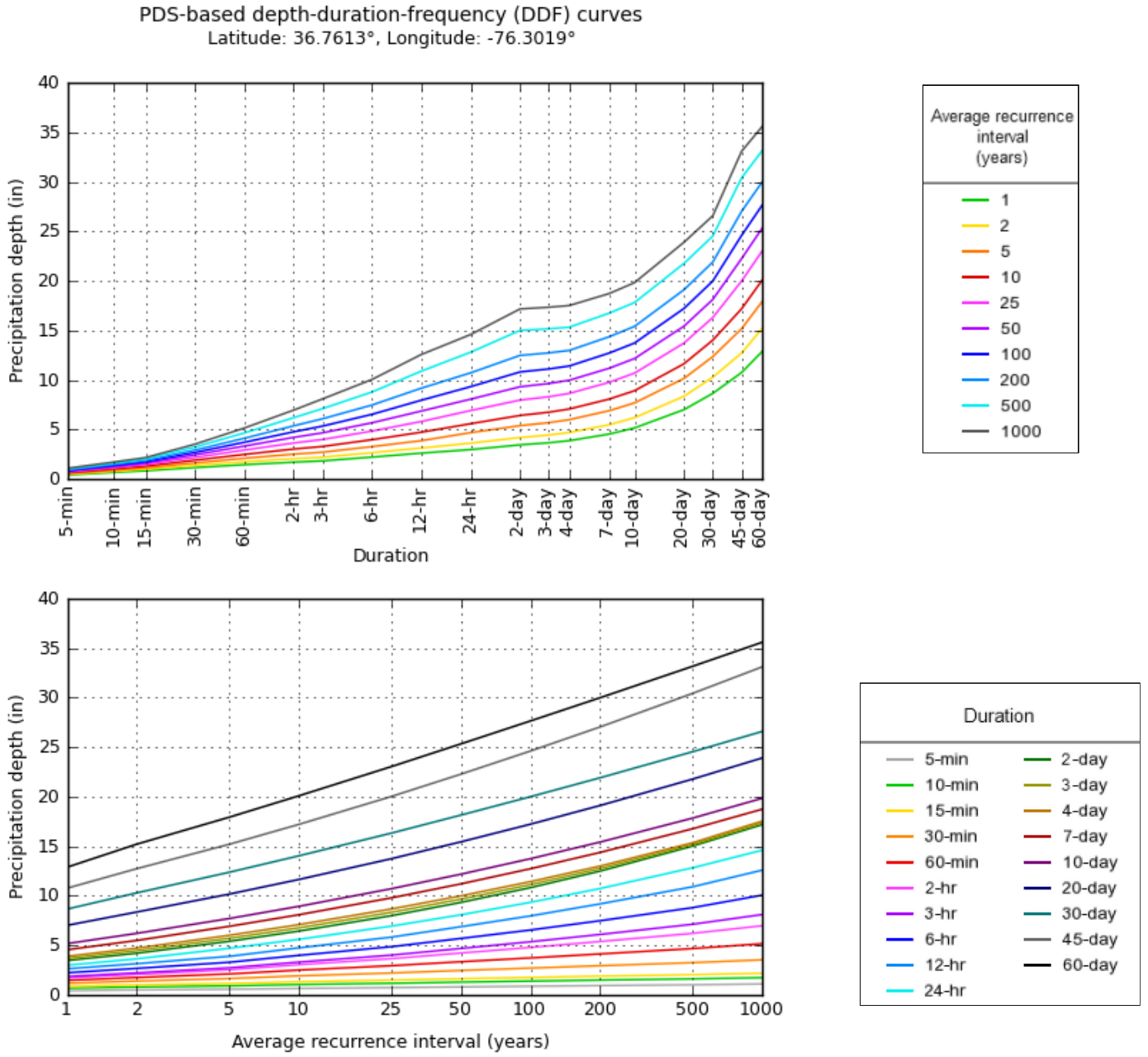
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



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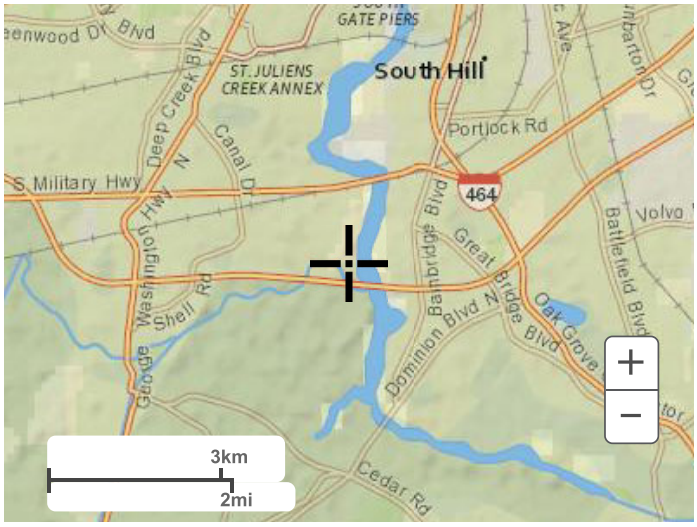
Back to Top

Maps & aerials

Small scale terrain



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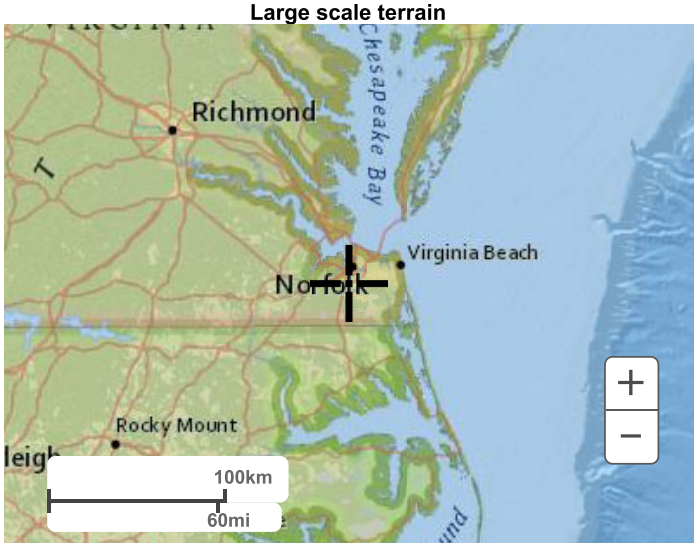
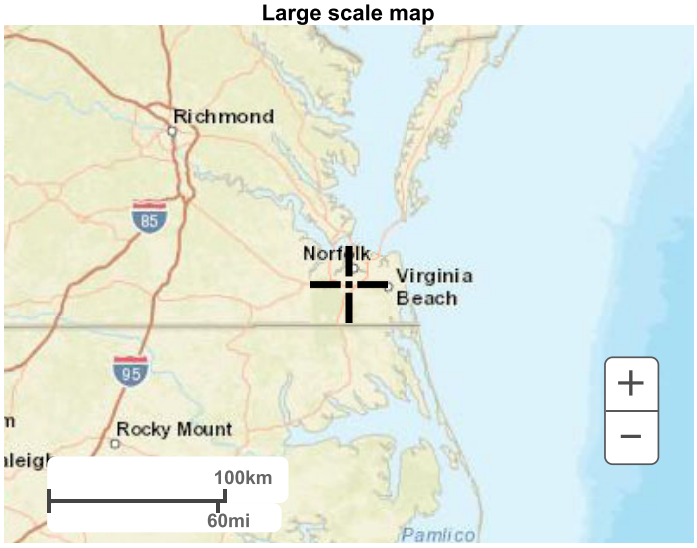


Large scale map



Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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