

**TECHNICAL REPORT IN SUPPORT OF APPLICATION
OF UNISTAR NUCLEAR ENERGY, LLC
AND UNISTAR NUCLEAR OPERATING SERVICES, LLC
FOR CERTIFICATE OF PUBLIC CONVENIENCE AND
NECESSITY BEFORE THE MARYLAND PUBLIC SERVICE
COMMISSION FOR AUTHORIZATION TO CONSTRUCT
UNIT 3 AT CALVERT CLIFFS NUCLEAR POWER PLANT
AND ASSOCIATED TRANSMISSION LINES**

Dated as of November, 2007

PUBLIC VERSION

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Table of Acronyms

Acronym	Definition from text
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter of air
$\mu\text{mhos}/\text{cm}$	microsiemens per centimeter
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ANSI/IEEE	American National Standards Institute/Institute of Electrical and Electronics Engineers, Inc.
APE	Area of Potential Effect
AQCR	Air Quality Control Region
BACT	Best Available Control Technology
BEA	U.S. Bureau of Economic Analysis
BGE	Baltimore Gas & Electric Company
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand [Sec. 4 says Biological]
BTA	Best Technology Available
CBCA	Chesapeake Bay Critical Area
CBP	Chesapeake Bay Program
CCWS	Component Cooling Water System
CDC	Centers for Disease Control and Prevention
CES	Constellation Environmental Services
cfs	cubic feet per second
CLCWS	Closed Cooling Water System
CLV	Critical Lane Volume
cm	centimeter

CO	Carbon Monoxide
COL	Combined License
COMAR	Code of Maryland Regulations
CORMIX	Cornell Mixing Zone Expert System
CPCN	Certificate of Public Convenience and Necessity
CPTs	cone penetrometer tests
CWA	Clean Water Act
CWIS	Cooling Water Intake Structures
CWS	Circulating Water System
CZMA	Coastal Zone Management Act
CZM	Coastal Zone Management
dB(A)/dBA	A-weighted sound level (measure of noise in decibels)
DBA	Design Basis Accident
dBA	A-weighted sound level
DBH	diameter at breast height
DNR	Department of Natural Resources
DO	dissolved oxygen
dscf	dry standard cubic foot
EDG	Emergency Diesel Generator
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
EPR	Evolutionary Power Reactor
ESWS	Essential Service Water System
FFD	Farm and Forest District
FID	Forest Interior Dwelling
FRP	Fiberglass Reinforced Plastic
ft	feet
FTE	Full Time Equivalent
ft/s	feet per second
ft ³ /yr	cubic feet per year
ft ³ /s	cubic feet per second
gal/yr	gallons per year
gpd	gallons per day
gpm	gallons per minute
HAP	Hazardous Air Pollutant
HAPC	Habitat Areas of Particular Concern
HAZMAT	Hazardous Materials
HCT	Hybrid Cooling Tower
Hectare	2.47 acres
HUD	U.S. Department of Housing and Urban Development
IDA	Intensely Developed Area
in	inch
IP	Individual Permit
ISFSI	Independent Spent Fuel Storage Installation
kg/ft ³	kilograms per cubic foot
kg/ha	kilograms per hectare
kg/yr	kilograms per year
Km	Kilometer
kV	kilovolt(s)

LAER	Lowest Achievable Emission Rate
lb/ft ³	pounds per cubic foot
lb/yr	pounds per year
Ldn	24 hour day-night sound level
Leq	average acoustic energy
Leq	Equivalent Noise Level
LNG	liquefied natural gas
LOCA	loss of coolant accident
LOS	level of service
lpd	liters per day
lpm	liters per minute
LWA	Limited Work Authorization
l/yr	liters per year
m	meter(s)
MACT	Maximum Achievable Control Technology
MBTA	Migratory Bird Treaty Act
MD	Maryland State Highway [followed by a number] Maryland Route [followed by a number]
MDE	Maryland Department of the Environment
MDWCT	Mechanical Draft Wet Cooling Tower
mg/L	milligrams per liter
mg/m ³	milligrams per cubic meter of air
MHT	Maryland Historical Trust
MPA	Maryland Port Authority
MPN	most probable number per 100
m/s, mps	meters per second
msl	mean sea level
MVA	Megavolt Ampere
MWd/MTU	Megawatt days per Metric Ton of Uranium
MWe	Megawatt electric
MWt	Megawatt thermal
m ³ /s	cubic meters per second
m ³ /yr	cubic meters per year
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NAVD	North American Vertical Datum
NDWCT	Natural Draft Wet Cooling Tower
NESC	National Electric Safety Code
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NPDWA	National Primary Drinking Water Regulation
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSDWA	National Secondary Drinking Water Regulation

NSPS	New Source Performance Standard
NTU	nephelometric turbidity unit
NWS	National Weather Service
ODS	Ozone-Depleting Substance
°c	degrees centigrade
°F	degrees Farenheit
OSHA	Occupational Safety & Health Administration
PCB	Polychlorinated Biphenyl
ppm	parts per million
PPRP	Maryland Power Plant Research Program
ppt	parts per thousand
PSC	Public Service Commission
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
PWR	Pressurized Water Reactor
RCA	Resource Conservation Area (within CBCA)
RCS	Reactor Coolant System
RO	Reverse Osmosis
RV	recreational vehicle
SAAQS	state ambient air quality standards
SACTI	Seasonal/Annual Cooling Tower Impact
SAV	Submerged Aquatic Vegetation
SBO	Station Blackout (Generators)
scfm	standard cubic feet per minute
SHPO	Maryland State Historic Preservation Officer
SIP	State Implementation Plan
SMECO	Southern Maryland Electric Cooperative
SOx	Sulfar Oxides
SPCC	Spill Prevention, Control, and Countermeasures
SPP	Stormwater Pollution Prevention
SPPP	Spill Pollution Prevention Plan
SU	Standard Units (pH)
SVOC	semivolatile organic compound
SVOCs	semivolatile organic compounds
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRO	Seawater Reverse Osmosis
TAP	Toxic Air Pollutant
T-BACT	Toxics Best Available Control Technology
TDS	total dissolved solids
TIA	Traffic Impact Analysis
TKN	total Kjeldahl nitrogen
TMDL	Total Maximum Daily Load
TON	threshold odor number
TSA	Temporary Storage Area
TSS	Total Suspended Solids
UHS	Ultimate Heat Sink
UNO	UniStar Nuclear Operating Services, LLC
USACE	Baltimore District of the U.S. Army Corps of Engineers

U.S. FWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VOCs	volatile organic compounds
vph	vehicle per hour
WQ	Water Quality
WWTP	Wastewater Treatment Plant
WY	water year
Δt	Change in temperature

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TECHNICAL REPORT

EXECUTIVE SUMMARY

UniStar Nuclear Energy, LLC (UNE) and UniStar Nuclear Operating Services, LLC (UNO) (Co-Applicants) are proposing to construct and operate a new nuclear power unit on the existing Calvert Cliffs Nuclear Power Plant (CCNPP) site located in Lusby, Calvert County, Maryland. The new unit will be designated as CCNPP Unit 3. The purpose of the proposed new nuclear power unit is to generate electricity for sale at wholesale.

This document constitutes the Technical Report of the Application for a Certificate of Public Convenience and Necessity (CPCN) (the Technical Report) addressing the requirements of the Maryland Annotated Code, Public Utility Companies Article, and the Code of Maryland Regulations (COMAR), Title 20 Public Service Commission, Subtitle 79, "Applications Concerning the Construction or Modification of Generating Stations and Overhead Transmission Lines."

UNIT DESCRIPTION

CCNPP Unit 3 will be an AREVA advanced reactor, the U.S. Evolutionary Power Reactor (U.S. EPR), with a rated core thermal power of 4,590 MWt. The rated and design gross electrical output for the U.S. EPR is approximately 1,710 MWe. CCNPP Unit 3 will be located on a 1,108 site immediately south and west of Units 1 and 2 which are operated by Calvert Cliffs Nuclear Power Plant, Inc., a wholly owned subsidiary of Constellation Energy Nuclear Group, an entity related to the Co-Applicants.

No new offsite transmission corridors are required to connect Unit 3 to the grid; modifications and upgrades to onsite transmission facilities will be required. Some modifications to existing offsite substations will also be needed. The integrated design of the CCNPP Unit 3 minimizes impacts on the environment through use of a recirculating cooling system to limit Chesapeake Bay water use and thermal loading and a desalination unit to avoid reliance on groundwater for many site water needs.

CPCN TECHNICAL REPORT

This Technical Report addresses the requirements of COMAR 20.79.01-.04. This includes:

- Project overview and schedule.
- Description of generating station, linear facilities, and design features.
- Upgrades required to electric system.
- Listing of federal and state regulatory requirements for authorizing construction and operation.
- Description of baseline conditions and potential impacts from construction and operation, and proposed mitigation to land use including aesthetics and cultural sites, the terrestrial and aquatic environment, air and water quality, and the socioeconomics of the area including the economic benefits.

- Required permits to authorize construction under Maryland Department of the Environment (MDE) regulations for air emissions, use and appropriation of water, and impacts to tidal and nontidal wetlands.
- Copies of environmental impact studies conducted by the Co-Applicants, or their corporate affiliates.

Additional environmental permits will also be needed and will be secured at the appropriate time such as the national pollution discharge elimination system (NPDES) water discharge permit, the Coastal Zone Management Act Consistency Certification, and the Water Quality Certification pursuant to Section 401 of the Clean Water Act.

CONCURRENT LICENSING PROCEEDINGS

Licensing is currently underway with the Nuclear Regulatory Commission (NRC). The NRC regulates the construction and operation of nuclear power facilities in the United States. The application process for obtaining a combined license (COL) from the NRC for CCNPP Unit 3 has commenced with the filing of an Environmental Report and related documents on July 13, 2007. The potential radiological impacts associated with the construction and operation of CCNPP Unit 3 are addressed in the COL application submitted to the NRC. All safety and environmental requirements prescribed by the NRC will be met.

The Chesapeake Bay Critical Area Commission (CAC) regulates, with local governments, the use of the 1,000-foot buffer surrounding the Chesapeake Bay. The Co-Applicants will present the project to the CAC because portions of the security perimeter fencing, water intake and discharge facility, upgrades to existing facilities, and related structures will be sited within the 1,000 foot setback from the Bay.

The U.S. Army Corps of Engineers (U.S. ACE) retains exclusive jurisdiction to issue permits for construction projects that impact wetlands larger in size than those covered by the Maryland Programmatic General Permit-3. The Co-Applicants will be filing a separate application with the U.S. ACE for an individual dredge and fill permit authorizing the temporary impact on approximately 1.6 acres and permanent impact on approximately 14.3 acres of nontidal wetlands and associated wetland buffers and for construction of intake and discharge facilities, upgrade of the existing barge slip, and dredging of a previously dredged channel in tidal waters. In both this Technical Report and in the forthcoming application to the U.S. ACE Co-Applicants are proposing mitigation that will assure no net loss of wetlands. The application to the U.S. ACE will proceed in parallel with this application for a CPCN.

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