



Site Selection Process for Calvert Cliffs, Unit 3

May 8, 2009
Rockville, Maryland

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Agenda

- Overview of NEPA Obligation
- Regulatory Bases for Site Selection Process
- UniStar Site Selection Process
- Conclusion

NEPA - Environmental Impacts of Alternatives

- NEPA requires "a detailed statement [of] alternatives to the proposed action." 42 U.S.C. § 4332(2)(C)(ii).
- Alternatives are central to the NEPA process
 - Identify range of reasonable alternatives to the proposed site
 - The goals of an action delimit the universe of reasonable alternatives
 - Review alternative sites to determine if there is an "obviously superior" site in terms of environmental impacts and economic costs compared to the proposed site

Environmental Impacts of Alternatives

- NEPA does not require that a nuclear plant be constructed on the single best site for environmental purposes.
 - Requires that alternative sites be considered, and
 - Requires that alternative sites be carefully studied and factored into the ultimate decision

A proposed site is acceptable even when an alternative is marginally better than the proposed site, so long as it is not obviously superior

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Regulatory Bases for Site Selection

- 10 C.F.R. Part 51
- Reg. Guide 4.2, “Preparation of Environmental Reports for Nuclear Power Stations”
- Reg. Guide 4.7, “General Site Suitability Criteria for Nuclear Power Stations”
- NUREG-1555, Section 9.3, “Site Selection Process”
 - Rev. 0 (October 1999)
 - Draft Rev. 1 (July 2007)

Comparison of ESRP Guidance on Site Selection

| | NUREG-1555 (1999) | NUREG-1555 (2007) |
|-----------------------------|--------------------------|--------------------------|
| Region of Interest | at 9.3(III)(4)(b) | at 9.3-7 |
| Candidate Areas | - | at 9.3-7 |
| Potential Sites | - | at 9.3-8 |
| Candidate Sites | at 9.3(III)(4)(c) | at 9.3-9 |
| Screening Process | at 9.3(III)(4)(d) | at 9.3-10 |
| Alternative Site Evaluation | at 9.3(III)(4)(e) | at 9.3-10 |

Key Terminology

- **Region of Interest – NUREG-1555, 9.3(III)(4)(b) (1999)**
 - Geographic area considered for searching potential and candidate sites
- **Candidate Areas – NUREG-1555, 9.3-7 (2007)**
 - One or more areas within ROI remaining after unsuitable areas have been removed
- **Potential Sites – NUREG-1555, 9.3-8 (2007)**
 - Those sites within candidate areas identified for preliminary assessment in establishing candidate sites

Key Terminology

- Candidate Sites – NUREG-1555, 9.3(III)(4)(c) (1999); 9.3-1 (2007)
 - Potential sites (at least four) within the ROI and that are considered in the comparative evaluation of sites to be among the best that can reasonably be found for the siting of a nuclear power plant
 - Includes the proposed site and the alternative sites
- Alternative Sites – NUREG-1555, 9.3(III)(4)(e) (1999)
 - Those candidate sites that are compared to the proposed site to determine if there is an obviously superior site
- Proposed Site
 - Candidate site submitted to the NRC as the proposed location for a nuclear power plant

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Overview of UniStar Site Selection Process

UniStar Process

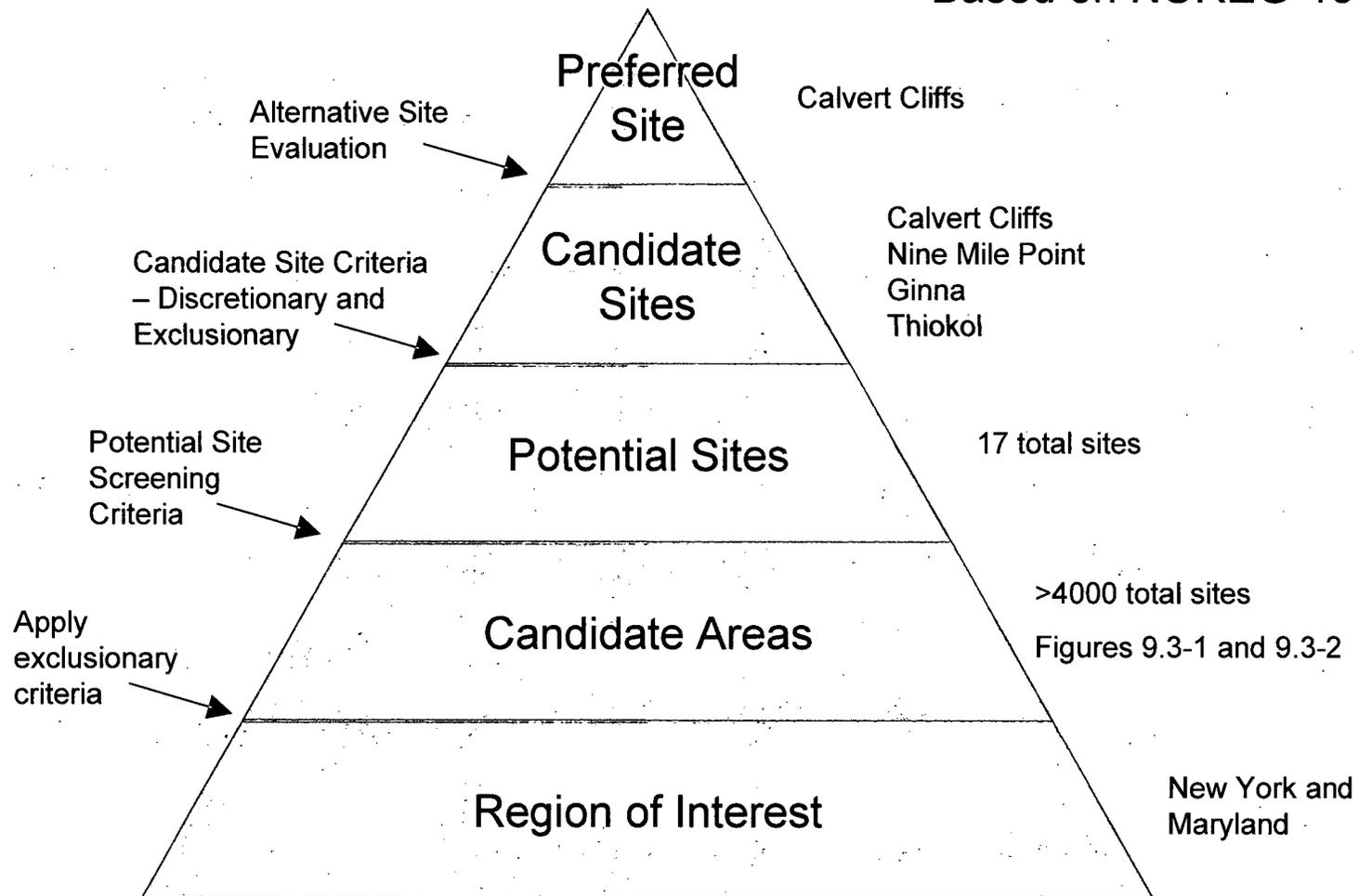
- Siting Objectives
- Region of Interest
- Candidate Area Screening
- Potential Site Screening
- Select Candidate Sites
- Siting Criteria
- Alternative Sites
- Alternative Site Evaluation
- Proposed Site

NUREG-1555 (2007)

- Objectives and Procedures
- Region of Interest
- Process for Candidate Areas
- Process for Potential Sites
- Process for Candidate Sites
- Compare Sites
- Alternatives Sites
- Alternative Site Evaluation
- Proposed Site

Site Selection Process Overview

Based on NUREG-1555



Siting Objectives

- Select site that meets the following:
 - Applicant's business plan and objectives
 - NRC site suitability requirements
 - NEPA requirements for consideration of alternative sites

Purpose and Need – RAI Response 1011-1

- NUREG-1555 (1999) states: "Applicants may be power generators rather than utilities; therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type."
- Merchant Plant for Generating Baseload Power
 - Business model based on baseload power sales to the PJM power market

UniStar's goals should be taken into account in defining purpose and need and siting the project

**Region of Interest – ER 9.2.1.2; RAI No. 196
NUREG-1555 at 9.3(III)(4)(b) (1999); at 9.3-7 (2007)**

- Need not be contiguous, but should be consistent with Purpose and Need (i.e., have a logical basis)
 - No relevant service territory for merchant generator
 - Region of Interest based on business objectives
 - Familiarity with regulatory environment/commercial market
 - Probability of success/competitive advantages (e.g., existing sales and assets)
- Region of Interest
 - New York
 - Maryland

Need for Power

- Consistent with "need for power" analysis in Chapter 8
 - Sites in New York would sell power to the Maryland PJM-East power market under this model
 - Transmission capabilities exist, but could necessitate some upgrades
 - Thus, only a Maryland (PJM-East) "need for power" analysis is provided
 - Need for Power in NY discussed in NMP COLA, but not relevant here since project goal is to meet need in PJM-East
 - Maryland PSC has issued preliminary order regarding Certificate of Public Convenience and Necessity
 - New large source of power that would benefit citizens of MD and
 - Locating at site of existing nuclear plant will reduce impacts

Candidate Area Screening – ER 9.3.1.1; RAI 1011-2

- Applied exclusionary criteria to Region of Interest
 - Performed at high level
 - Consistent with NUREG-1555 (1999)
- Exclusionary Criteria include:
 - Proximity to Major Population Centers (< 300 persons/mile)
 - Proximity to Adequate Transmission Lines (within 30 miles of 345- or 500-kV lines)
 - Suitable Source for Cooling Water
 - Acceptable Land Use (not located within parks, major historic sites, or tribal lands)

Candidate Area Screening (cont.)

- Scan Region of Interest using Google earth satellite imagery
- Obtain information on electric power plants from DOE, New York, and Maryland
- Obtain data on brownfields from New York and Maryland
- Applied iterative process to identify discrete parcels of land approximating the size needed for an EPR station (420 ac)

Sites Within Candidate Areas – ER 9.3.1.2; RAI 1011-2

- Potential sites within ROI candidate areas identified for further screening
 - ~4000 remediation sites
 - 14 hydroelectric sites
 - 21 natural gas sites
 - 25 other power generating stations (coal, wood, oil)
 - 4 nuclear sites

Figure 9.3-1: Candidate Area Exclusionary Criteria and Region of Interest – New York

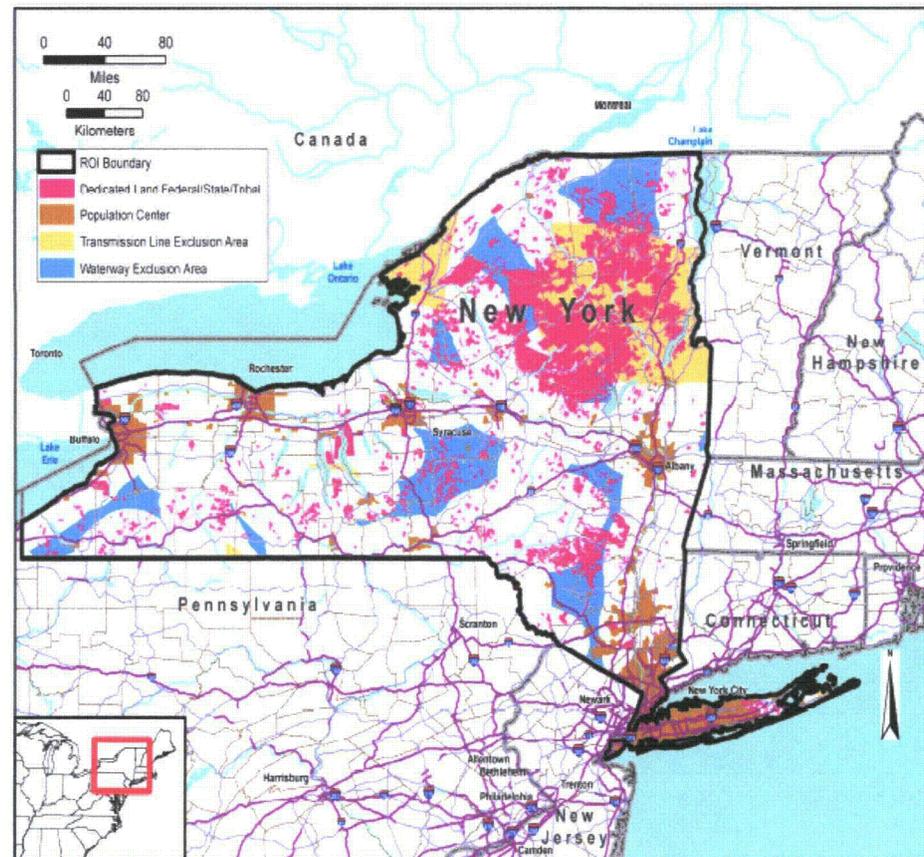
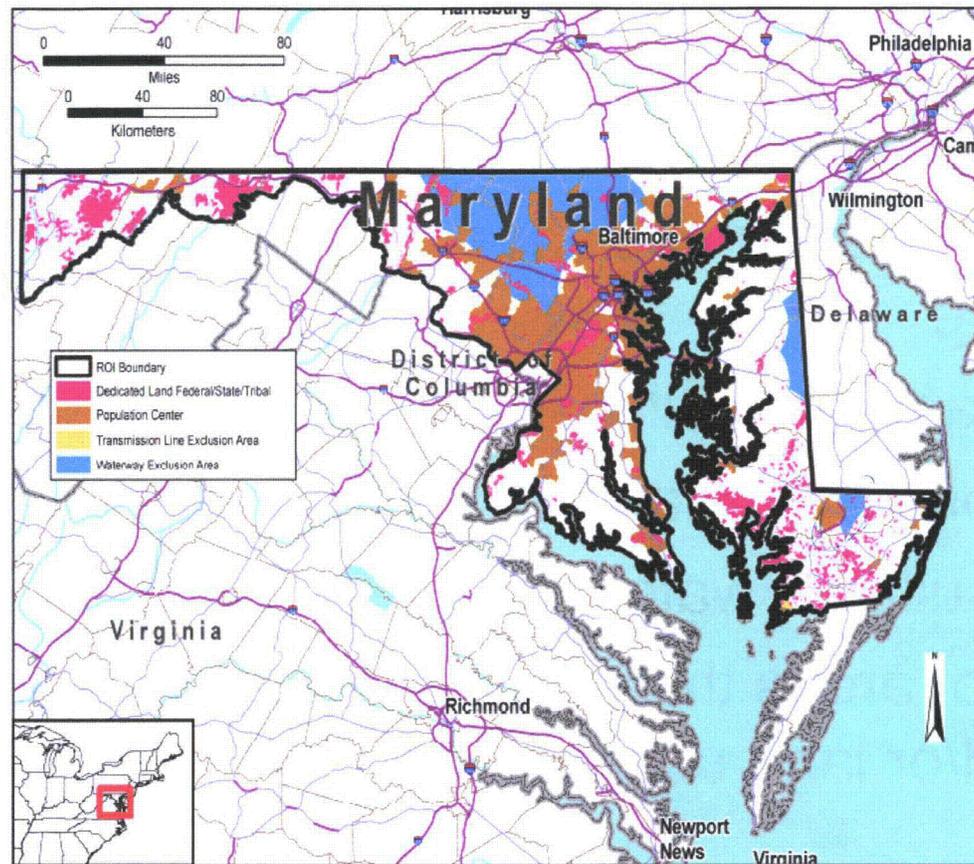


Figure 9.3-2: Candidate Area Exclusionary Criteria and Region of Interest – Maryland



Potential Site Screening – ER 9.3.1.2; RAI 1011-2 NUREG-1555, at 9.3-8 (2007)

- Proximity to 345- or 500-kV transmission lines
- Distance from towns, villages, and developed areas
- Proximity of existing nuclear power generating infrastructure
- Ownership and/or availability of adequate land area
- Distance from industrial areas (airports, refineries)
- Land near suitable water supply sources
- Avoidance of areas that contain threatened or endangered species and/or land use restrictions

Potential Sites – ER 9.3.1.2; RAI 198

- Goal of screening was to use logical process that produces list of best potential sites located within candidate areas
- Screening resulted in the 17 potential sites:
 - CEG-owned nuclear stations (Calvert Cliffs, NMP, Ginna)
 - Another nuclear station (Fitzpatrick)
 - Other electric power stations (coal and hydro)
 - Suitable brownfield sites, and
 - Generic greenfield site

Candidate Site Selection Objectives

- Select Candidate Sites
 - 3-5 sites in addition to proposed site
 - Identify sites that are among the best sites that could reasonably be found for siting a nuclear power station
 - Least environmental impact while satisfying U.S. EPR requirements

Candidate Site Selection – NUREG-1555, 9.3(III)(4)(c) (1999); at 9.3-9 (2007)

Three-Step Evaluation Process

1. Identify discretionary criteria to evaluate each potential site
 - Discretionary Criteria - EPRI Siting Guide, UniStar goals
2. Score and rank each potential site
 - Scoring/ranking performed by team consisting of topical experts
3. Apply exclusionary criteria to identify candidate sites
 - Exclusionary Criteria - NUREG-1555, Section 9.3

Candidate Site Discretionary Evaluation Criteria ER Section 9.3.1.2

- Available land (420 acres)
- Distance to cooling water
- Flooding potential
- Distance to population centers
- Regional population density
- Ecology
- Wetlands
- Railroad access
- Transmission access
- Existing transmission corridors
- Additional land availability/land acquisition
- Environmental remediation
- Expansion potential
- Ownership criteria

Table 9.3-6 – Evaluation of Potential Sites

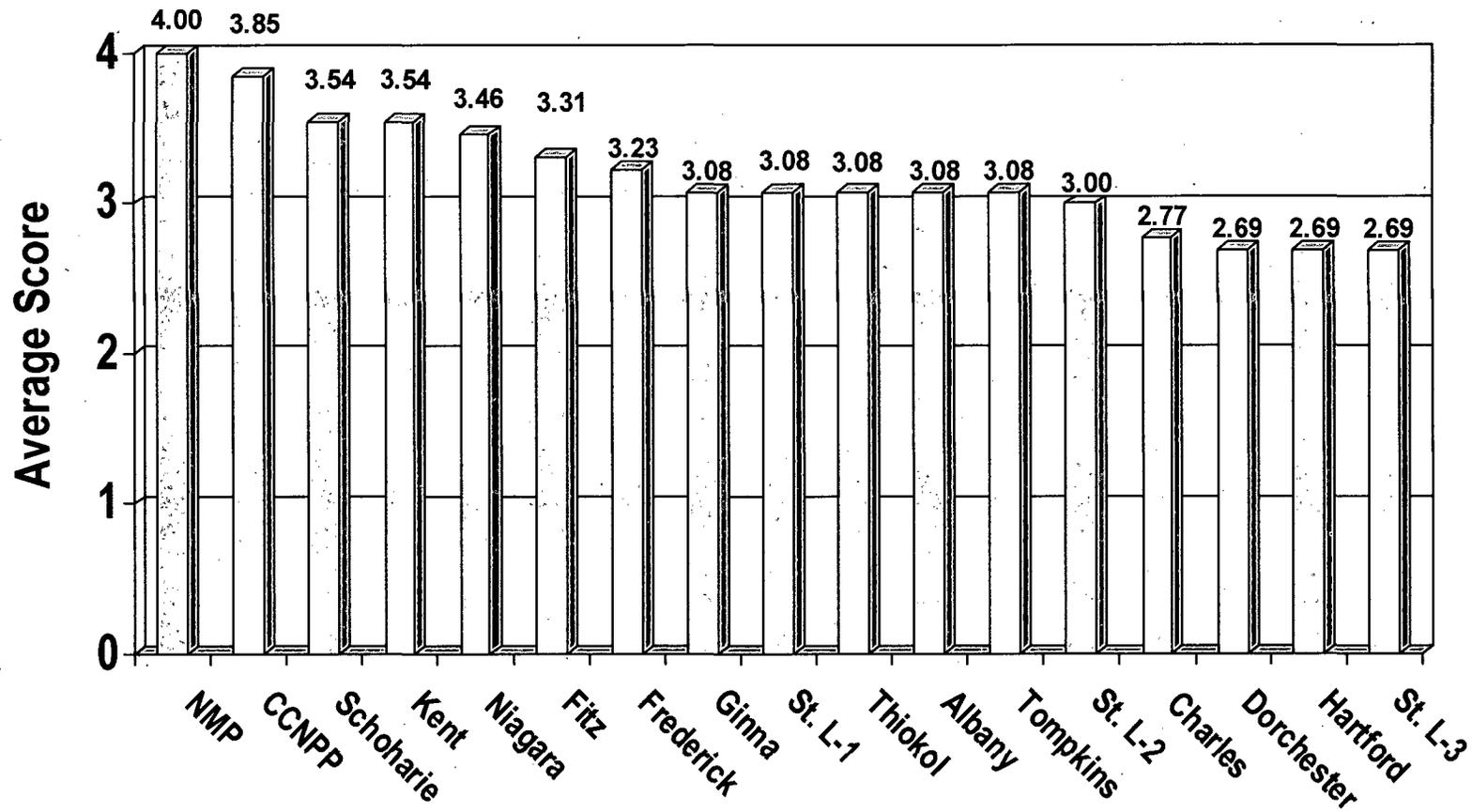
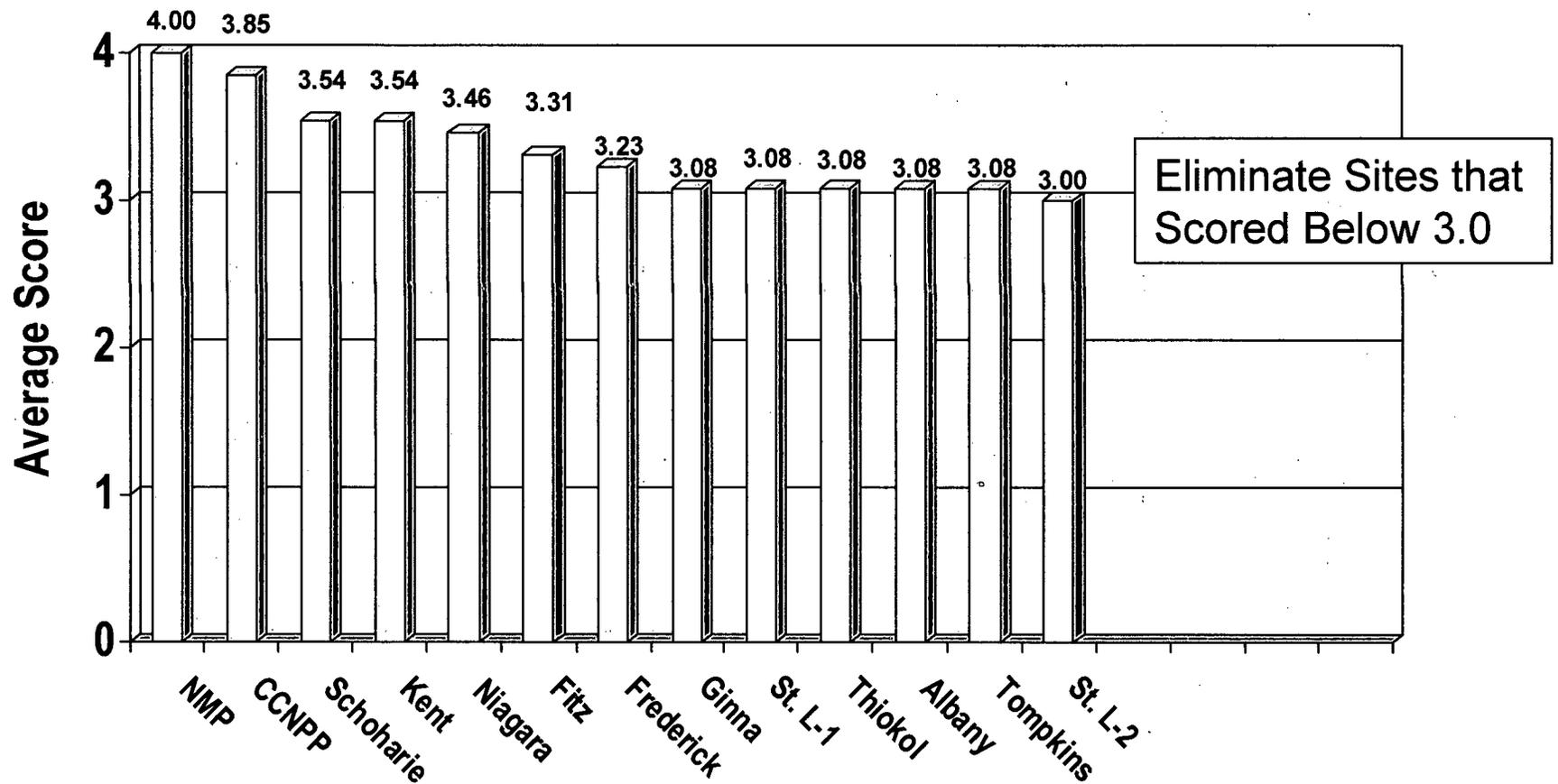


Table 9.3-6 – Evaluation of Potential Sites



Candidate Site Exclusionary Criteria - ER Section 9.3.1.2 NUREG-1555, at 9.3-9 (1999); 9.3-10 (2007)

- Consumptive water use
- Threatened or endangered species
- Impacts on spawning grounds or nursery areas for important aquatic species
- Impacts on water quality objectives
- Impacts on specially designated lands
- Impacts on terrestrial and aquatic ecosystems
- Population density (1999)
- Other issues that affect cost by 5% or preclude use (1999)
- No other significant issues that preclude use of site (2007)

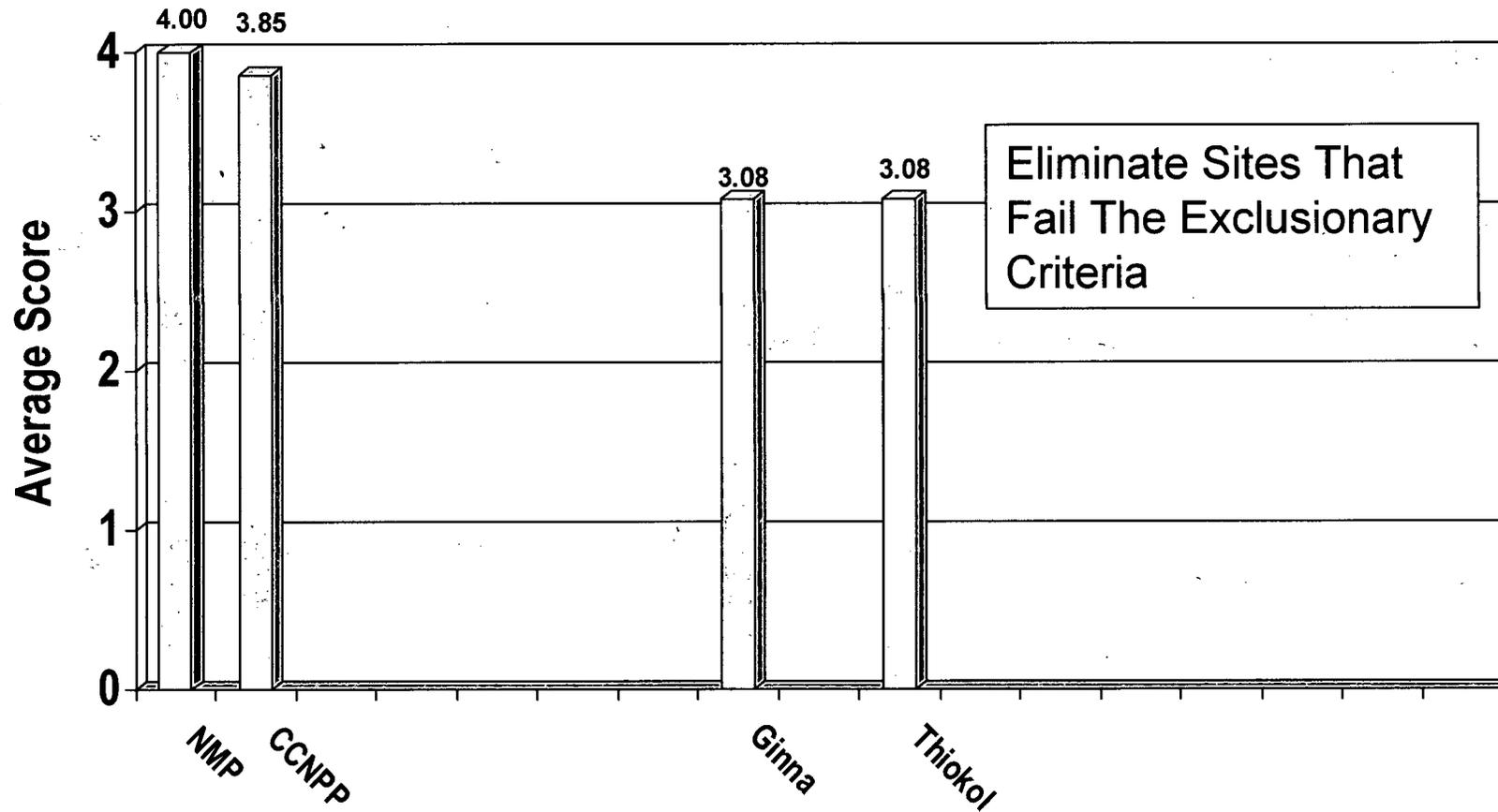
Application of Exclusionary Criteria to Some Potential Sites

| Site | Exclusionary Criteria |
|----------------|--|
| Schoharie | Increase cost by >5% (non-nuclear*, not in MD**, not owned) |
| Kent | Availability of land uncertain; distance to cooling water |
| Niagara | Increase cost by >5% (non-nuclear, not in MD, not owned) |
| Fitzpatrick | Increase cost by >5% (owned by competitor; near NMP) |
| Frederick | Use precluded by nearby aluminum smelter; floodplain |
| St. Lawrence 1 | Increase cost by >5% (non-nuclear, not in MD, distance to transmission/rail) |
| Albany | Increase cost by >5% (non-nuclear, not in MD); floodplain; regional population density |
| Tompkins | Increase cost by >5% (non-nuclear, not in MD, distance to transmission) |
| St. Lawrence 2 | Increase cost by >5% (non-nuclear, not in MD, distance to transmission/rail) |

* "Non-nuclear" – increases initial costs; increases uncertainty

** "Not in MD" – increases cost of transmitting power; not in PJM-East

Table 9.3-6 – Evaluation of Potential Sites



Candidate Sites – ER 9.3.2; RAI 1011-3

- Calvert Cliffs site
- Nine Mile Point site
- R.E. Ginna site
- Former Thiokol Brownfield site

Evaluation of Candidate Sites

Categories of Information Considered in ER

- Air Quality
- Water
- Terrestrial Ecology and Sensitive Species
- Aquatic Ecology and Sensitive Species
- Transmission Corridor
- Socioeconomics
- Historical, Cultural, and Archeological Resources
- Environmental Justice
- Land Use
- Transportation

**Table 9.3-5 – Comparison of Candidate Sites
NUREG-1555, at Table 9.3-2 (1999)**

| | CCNPP | NMP | Ginna | Thiokol |
|-----------------|-------------------|-------------------|-------------------|-------------------|
| Land Use | Small | Small | Small | Small to Moderate |
| Air Quality | Small | Small | Small | Small |
| Water | Small | Small | Small to Moderate | Small |
| Terrestrial | Moderate | Moderate | Moderate | Moderate to Large |
| Aquatic | Small | Small | Small to Moderate | Moderate to Large |
| Socio-Econ | Small | Small | Small | Small |
| Cultural | Small | Small | Small | Small |
| Env't'l Justice | Small | Small | Small | Small |
| Transmission | Small | Small | Moderate | Moderate to Large |
| Transportation | Small to Moderate | Small to Moderate | Small to Moderate | Small to Moderate |

Alternative Site Evaluation

- Performed logical, reproducible comparison of alternative sites (Table 9.3-5)
- No alternative sites are environmental preferable
- No alternative sites are obviously superior

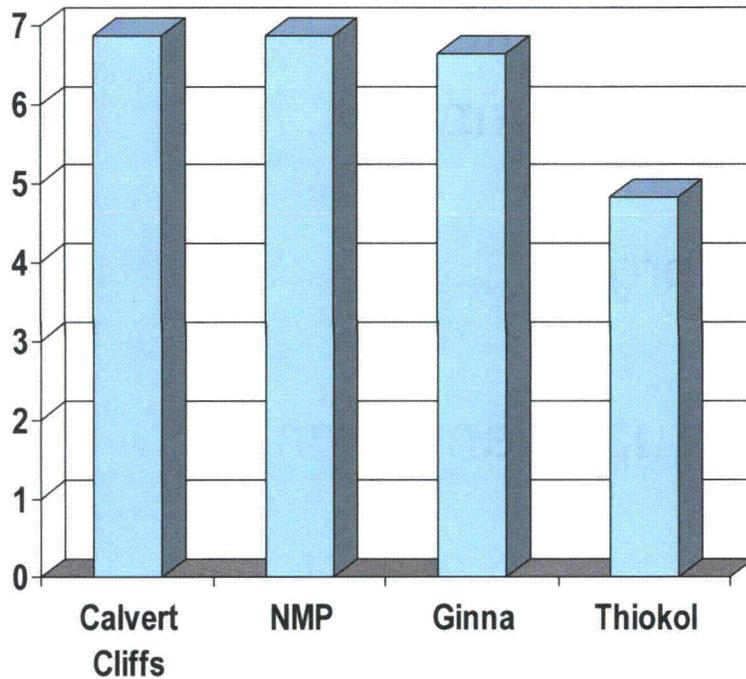
| | CCNPP | NMP | Ginna | Thiokol |
|------------------------------------|--------------|------------|--------------|----------------|
| Candidate Site? | Yes* | Yes | Yes | Yes |
| Alternative Site? | Yes* | Yes | Yes | Yes |
| Environmentally Preferable? | * | No | No | No |
| Obviously Superior? | * | No | No | No |

* Preferred Site

Candidate Site Evaluation (RAI 1011-3; Table 9.3-7)

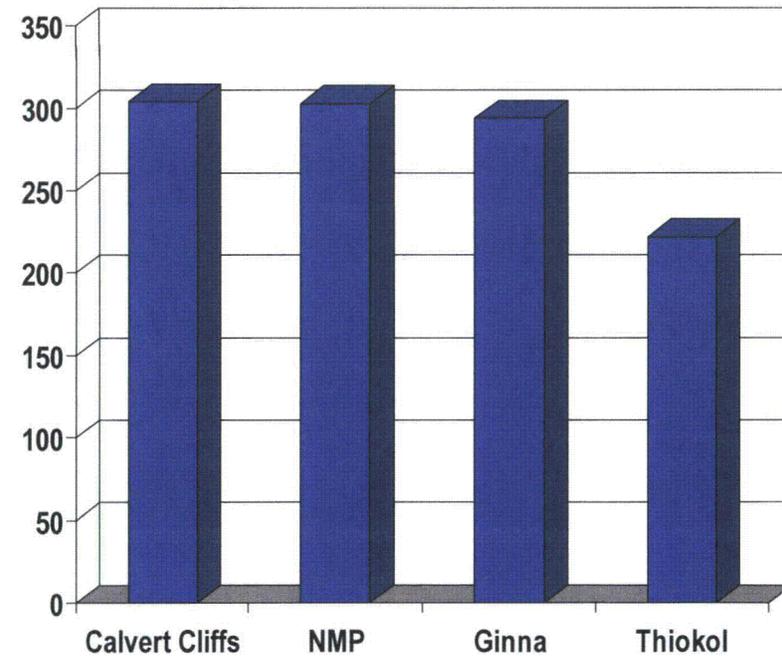
| | Calvert Cliffs | NMP | Ginna | Thiokol |
|--|-----------------|-----------------|-----------------|-----------------|
| Construction/Operational | | | | |
| Land Area | 52 | 52 | 52 | 37 |
| Transportation | 28 | 29 | 29 | 20 |
| Construction Impact | 29 | 31 | 31 | 22 |
| Transmission | 36 | 28 | 18 | 15 |
| Heat Sink | 23 | 23 | 23 | 11 |
| Geology | 28 | 32 | 32 | 26 |
| Climate/Meteorology | 15 | 15 | 15 | 13 |
| Socioeconomic | | | | |
| Local Infrastructure/Support | 37 | 36 | 36 | 36 |
| Health and Safety | | | | |
| Operations/Transportation/ EP | 22 | 22 | 22 | 16 |
| Environmental (Federal, State, and Local Requirements/Permits) | | | | |
| Special Areas | 34 | 35 | 36 | 26 |
| Grand Total | 304/6.86 | 303/6.86 | 294/6.63 | 222/4.82 |

Overview of Candidate Site Evaluation Results



Weighted Average Score

Raw Composite Score



Proposed Site - Calvert Cliffs

- Consumptive use no greater than other sites
- Similar threatened/endangered species impacts; no spawning
- Similar impacts from effluent discharges
- Greater land use impacts
- No greater impacts on terrestrial/aquatic environment
- Low population density
- Does not require decommissioning of existing facilities
- Centrally located to serve PJM-East region
- Existing facility operates under NRC license and was found acceptable previously

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Conclusion

- UniStar considered a reasonable range of alternative sites
 - UniStar studied the alternative sites carefully and factored that evaluation into its decisionmaking process
 - No obviously superior site exists
- The ER confirms that Calvert Cliffs 3 site selection process satisfies the NEPA criteria for an alternative site analysis