

New human, animal, and in vitro studies published since the 2002 IARC Monograph, 2002 do not change the overall classification of ELF as a possible human carcinogen (p. 347).

Acute biological effects [i.e., short-term, transient health effects such as a small shock] have been established for exposure to ELF electric and magnetic fields in the frequency range up to 100 kHz that may have adverse consequences on health. Therefore, exposure limits are needed. International guidelines exist that have addressed this issue. Compliance with these guidelines provides adequate protection. Consistent epidemiological evidence suggests that chronic low-intensity ELF magnetic field exposure is associated with an increased risk of childhood leukaemia. However, the evidence for a causal relationship is limited, therefore exposure limits based upon epidemiological evidence are not recommended, but some precautionary measures are warranted (WHO, 2007, p. 355).

Exponent reviewed studies published after the WHO report and these studies do not alter the weight of the evidence reviewed by the WHO and other national and international health and scientific agencies that electric or magnetic fields are not a cause of cancer or any other disease process at the levels we encounter in our everyday environment. Exponent's summary of the WHO conclusions and major subsequent peer-reviewed studies is included in Exhibit 5.3 to this Section 5.

The WHO has recommended that exposures be limited by guidelines, such as those published by ICNIRP¹⁸ and ICES,¹⁹ and that low or no cost measures be taken to minimize exposures to EMF. As the proposed project will give rise to levels of EMF that are far below these guidelines and has incorporated designs to minimize the fields produced by adjacent transmission lines, it will meet these recommendations.

5.3.11 Tree Clearing

The existing environment and impacts and mitigation measures for the Preferred Northern Route and the Noticed-Alternative Southern Route are in the following subsections.

5.3.11.1 Existing Environment

The existing tree clearing for the Preferred Northern Route and the Noticed-Alternative Southern Route are summarized below.

¹⁸ International Commission on Non-Ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). *Health Phys.* 74:494-522, 1998.

¹⁹ International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 3 kHz C95. 6-2002. Piscataway, NJ: IEEE, 2002.

5.3.11.1.1 Preferred Northern Route

The Preferred Northern Route is aligned principally along existing ROWs, where the vegetation is maintained as shrub-scrub pursuant to transmission line operating requirements. As a result, any forested habitat is generally limited to the outer edges of these ROWs. However, slight widening of the ROW will be required along approximately 4.7 miles (2.8 miles in Agawam and 1.5 miles in Chicopee) of the 23-mile Preferred Northern Route. This ROW widening will range from 10 to 35 feet, and was shown above in Table 5-7, which is reproduced for convenience here and labeled Table 5-25. Along the remaining segments of the Preferred Northern Route, the proposed structures will replace existing structures within the existing ROW limits. Locating the new structures at the approximate location of the existing structures significantly reduces the amount of additional vegetation removal compared to placing new structures adjacent to existing structures, as would occur on the Noticed-Alternative Southern Route.

Table 5-25: Summary of ROW Expansion along the Preferred Northern Route

| Town(s) | From | To | Mileage ¹ | Existing ROW (ft) | Proposed ROW (ft) | Additional Width (ft) | Acres of Additional ROW ¹ |
|----------|-------------------------|-----------------------------|----------------------|-------------------|-------------------|-----------------------|--------------------------------------|
| Agawam | CT/MA Border | S. Agawam Switching Station | 2.3 | 100 | 110 | 10 | 2.79 |
| Agawam | Silver Substation | Agawam Substation | 0.5 | 100 | 135 | 35 | 2.12 |
| Chicopee | E. Springfield Junction | Exit 6 Junction | 1.5 | 100 | 125 | 25 | 4.55 |
| Totals | --- | --- | 4.3 | --- | --- | --- | 9.46 |

Notes:

¹.Excludes ROW expansion on property owned by WMECO.

In a portion of those areas of widening, forest habitat exists. Prevalent tree species in upland areas include eastern white pine (*Pinus strobus*), red oak (*Quercus rubra*), sweet birch (*Betula lenta*), gray birch (*Betula populifolia*) and red maple (*Acer rubrum*). The dominant tree species in forested wetland areas along the route is red maple.

5.3.11.1.2 Noticed-Alternative Southern Route

No forest habitat exists within the footprint of proposed work along the majority of Noticed-Alternative Southern Route. However, selection of this route would not preclude the need to impact trees along the common route lengths shared with the Preferred Northern Route. ROW expansion for this route was elaborated in Table 5-7 above, which is reproduced here for convenience and relabeled as Table 5-26. The majority of the 345-kV structures will be built adjacent to existing transmission lines for the Noticed-

Alternative Southern Route rather than replace existing structures, this typically increase clearing limits along the ROW by 70 to 100 feet along those corridor segments and therefore have greater impacts.

Table 5-26: Summary of ROW Expansion along the Noticed-Alternative Southern Route

| Town(s) | From | To | Mileage ¹ | Existing ROW (ft) | Proposed ROW (ft) | Additional Width (ft) | Acres of Additional ROW ¹ |
|---------|-------------------|-----------------------------|----------------------|-------------------|-------------------|-----------------------|--------------------------------------|
| Agawam | CT/MA Border | S. Agawam Switching Station | 2.3 | 100 | 110 | 10 | 2.79 |
| Agawam | Silver Substation | Agawam Substation | 0.5 | 100 | 165 | 65 | 3.94 |
| Agawam | Silver Substation | Agawam Substation | 1.9 | 150 | 165 | 15 | 3.45 |
| Totals | --- | --- | 4.7 | --- | --- | --- | 10.18 |

Notes:

¹. Excludes ROW expansion on property owned by WMECO.

Since these areas of widening are shared with the Preferred Northern Route, as indicated above, prevalent tree species in upland areas include eastern white pine (*Pinus strobus*), red oak (*Quercus rubra*), sweet birch (*Betula lenta*), gray birch (*Betula populifolia*) and red maple (*Acer rubrum*). The dominant tree species in forested wetland areas along the route is red maple.

5.3.11.2 Impacts and Mitigation

The impacts and mitigation for tree clearing of the Preferred Northern Route and the Noticed-Alternative Southern Route are summarized below.

5.3.11.2.1 Preferred Northern Route and Related Facilities

Along certain segments of the Preferred Northern Route, the existing ROW will have to be expanded to accommodate the new 345-kV lines and the associated 115-kV line reconstruction. In these areas, portions of the existing ROW easement will have to be widened by an additional 10 to 35 feet. The total area of widening is approximately 9.76 acres, and of this, only 3.8 acres is predominantly forested (2.3 acres of upland forests and 1.5 acres of wetland forests).

5.3.11.2.2 Noticed-Alternative Southern Route

ROW expansion or tree clearing for the Noticed-Alternative Southern Route would occur for the portion common to both routes, between the Agawam Substation and the Connecticut/Massachusetts border. For the Noticed-Alternative Southern Route, no widening of the Preferred Northern Route would be needed north of the Agawam Substation for the upgrading of the 115-kV lines. However, in addition to the ROW widening for the identical facilities between the border and the South Agawam Substation, a much wider area of approximately 65 feet would need to be cleared for the half mile between Silver Street and a point about 300 feet west of Tennis Road. From that point to the Agawam Substation, an area of 15 feet would need to be cleared for an additional 1.9 miles. The total area requiring widening for the Noticed-Alternative Southern Route would be 10.8 acres.

5.3.11.2.3 Comparison of Tree Clearing Impacts

Approximately 3.8 acres of tree clearing will occur along the Preferred Northern Route in order to expand the ROW. A larger area of tree clearing is proposed to occur along the Noticed-Alternative Southern Route for the new 345-kV lines; approximately one acre more of ROW expansion is needed for the Noticed-Alternative Southern Route than for the Preferred Northern Route. Therefore, impacts would be greater along the Noticed-Alternative Southern Route.

5.3.11.2.4 Mitigation Measures

Because virtually all of the 345-kV facilities would be aligned along existing ROWs that are currently maintained to allow safe overhead transmission line operation, adverse impacts to vegetative communities are generally expected to be incremental. In some areas, new ROW will be required to widen the route to accommodate new poles, and in other areas, additional vegetation will have to be removed within existing ROWs. However, the vegetation types found along these ROWs are common in the region. In some ways, the creation of additional scrub-shrub land habitat along the edge of maintained ROW would have a long-term positive effect because shrub land habitat (like other early successional habitats) is otherwise declining in New England as a result of urban/suburban development, ecological succession, and absence of fire. In Massachusetts, transmission line ROWs are considered a vitally important source of shrub land habitat, especially for certain rare songbird species.

Vegetation on the existing ROWs along which most of the overhead 345-kV lines will be located is managed in accordance with NUSCO's *Overhead Transmission Line Standards -OTRM 30*. Under this program, trees that could interfere with the operation of the existing lines are eliminated from within the

cleared portion of the ROW and trees along the edges are periodically trimmed or removed. The proposed vegetation removal would modify, but would not eliminate, vegetation and wildlife habitat.

After the completion of construction, desirable native plant species can be expected to regenerate naturally and the new transmission facilities would be as compatible with natural systems within the Project area as the existing transmission facilities. WMECO would promote the establishment of desirable low-growing plant species by selective applications of herbicide to control tree sapling and undesirable invasive species, thereby enabling native plants to dominate within the ROW. Invasive or potentially invasive shrub species that are controlled under the current vegetation management program typically include multiflora rose, autumn olive, black locust, buckthorn, tree-of-heaven, and honeysuckle.

5.3.12 Historic and Archaeological Resources

The existing environment and impacts and mitigation measures for cultural resources of the Preferred Northern Route and the Noticed-Alternative Southern Route are provided in the following subsections.

WMECO's consultant, University of Massachusetts (UMass) Archaeological Services, completed predictive model studies for the GSRP. In southern New England, a variety of environmental factors (e.g., topography, soil type, proximity to water) have been shown to correlate to ancient Native American settlement locations. Historical maps and other documents illustrate where historic Euro-American settlement took place. The following is a list of factors used during the Phase 1A investigation to assess the archaeological sensitivity within the Project area:

- The presence of known Native American or historic sites within or adjacent to the project area.
- Proximity to a National Register property.
- Proximity to a supply of fresh water.
- Proximity to seasonal or perennial subsistence resources.
- Soils characteristics such as drainage, texture, suitability for cultivation.
- Topographic features such as slope, aspect, elevation, and barriers to prevailing winds.
- Proximity to sources of raw materials.
- Proximity to topographic features conducive to industrial development such as hydrologic features.
- Proximity to areas known to have been early historic settlement clusters, or that may have been early settlement areas.
- Proximity to transportation routes.