1.0 Introduction

1.1 Background

In public briefings conducted prior to the construction of the Montgomery County Municipal Waste Resource Recovery Facility (RRF), the county made commitments to the community to conduct ambient monitoring programs and health risk assessments for the RRF and other facilities in the Dickerson area. Accordingly, the County retained Roy F. Weston in 1989 to conduct ambient monitoring programs and a multiple pathway health-risk assessment (Weston 1989) for the proposed facility. In addition, the Maryland Department of Natural Resources (MDNR) independently conducted a multiple pathway health risk assessment in 1989 to assess the cumulative effects of air emissions from the proposed RRF and Dickerson generating station of the Potomac Electric Power Company (PEPCO) (The Dickerson Generating Station, now owned by Mirant Corporation, is within 1 km of the RRF site; see Figure 1-1). The 1997 Dickerson Facilities Master Plan for the Solid Waste Operations incorporated the County's commitments in its recommendations. The plan also recommended that the deposition zones and the health risk assessments be updated periodically.

In 1999 ENSR Corporation was retained by the County to update the health risk assessment for the RRF and update the cumulative health risk assessment conducted by MDNR. ENSR recently completed the updated multiple pathway health risk assessment for the RRF (ENSR, 2004) which was conducted in accordance with the most recent guidance from U.S. EPA (see Section 1.2).

The cumulative risk assessment conducted by MDNR in 1989 evaluated air emissions associated with the PEPCO (now Mirant) three coal-fired units; the then proposed Element II of PEPCO's Station H (combined cycle combustion turbine units fueled with oil); and the then proposed RRF. The 1989 study used measured emissions data for the coal-fired units and best estimates based on literature values for similar sources for the then proposed Station H and RRF. The study incorporated one year (1986) of meteorological data (including wind speed, wind direction, and temperature) collected at the Dickerson generating station. In general, the study focused on the same pollutants assessed in the health risk assessments conducted for the RRF emissions alone (see Section 3 for further discussion) and used established procedures that were accepted by the U.S. EPA and many state agencies at that time.

Since 1989, there is more up-to-date information available for the RRF (i.e., as built engineering parameters and actual emissions data from numerous stack tests) and the Mirant facility expansion (involving the existing and proposed new combustion turbines). In addition, there have been numerous updates of accepted risk assessment procedures. Specifically, in 1998 and 1999 the U.S. Environmental Protection Agency (EPA) published updated guidance for performing combustor risk assessments (U.S. EPA 1998, and a 1999 Errata document; U.S. EPA 1999). These guidance documents update and replace earlier draft guidance published by U.S. EPA in 1990 and 1994 (U.S. EPA, 1990 and 1994a).

Based on input from the community, in addition to the RRF and Mirant facility sources (coal boilers and combustion turbines), various other sources in the area were considered for inclusion in the updated cumulative risk assessment. These sources include, the County's Yard Trim Composting Facility, the proposed Site 2 Landfill, National Institutes of Health Animal Center (NIH) boilers (used for heating and cooling needs of the facility), the County's Police Firing Range and the Neutron Products facility. As further discussed in Section 2, of these additional facilities only the NIH boilers were included in the air emissions modeling and risk assessment calculations. The other facilities were not explicitly included in the risk assessment based on consideration of current and future operational status and their limited potential impact (cumulative or individually) compared to the combustion sources. However, the potential impacts associated with the sources not explicitly included in the risk calculations are discussed in Section 2.

This updated cumulative risk assessment combines risk estimates for the RRF (ENSR, 2004) with estimated risks from other air emissions generated by combustion sources in the area, and addresses the question of whether the combined emissions from the sources could result in estimated risks above U.S. EPA's acceptable threshold levels.

1.2 Risk assessment approach

The purpose of conducting this updated cumulative health risk assessment is to provide an estimate of the cumulative potential risk to human health presented by the currently operating RRF as well as other area combustion sources based on currently approved EPA methodology. The study utilizes the best information available (source and emissions data) for all of the facilities and incorporates numerous updates of accepted risk assessment procedures compared to the 1989 study conducted by DNR. As used for the RRF health risk assessment update (ENSR, 2004), this study utilizes the latest U.S. Environmental Protection Agency (U.S. EPA) guidance for performing combustor risk assessments provided in the Human Health Risk Assessment Protocol ("HHRAP"; U.S. EPA 1998, and a 1999 Errata document; U.S. EPA 1999).

The updated 1998 and 1999 guidance documents can be found on the Internet at http://www.epa.gov/epaoswer/hazwaste/combust/risk.htm.

A multiple pathway health risk assessment evaluates both direct and indirect exposure pathways. An example of a direct exposure pathway is inhalation of chemicals in the air. Indirect exposure pathways include exposures to chemicals deposited from air emissions onto soil, plants or waterbodies, followed by possible bioaccumulation in plant or animal tissues. The risk assessment process uses mathematical models to calculate potential effects from atmospheric transport and dispersion, as well as chemical fate and transport in the aquatic or soil environment. These models predict concentrations of source-related compounds in environmental media (e.g., air, soil, surface water, plants, and agricultural products) at a specified set of geographical locations. In the case of a multiple source analysis, the models are used to predict the cumulative concentrations in air and environmental media resulting from the air emissions of all sources.

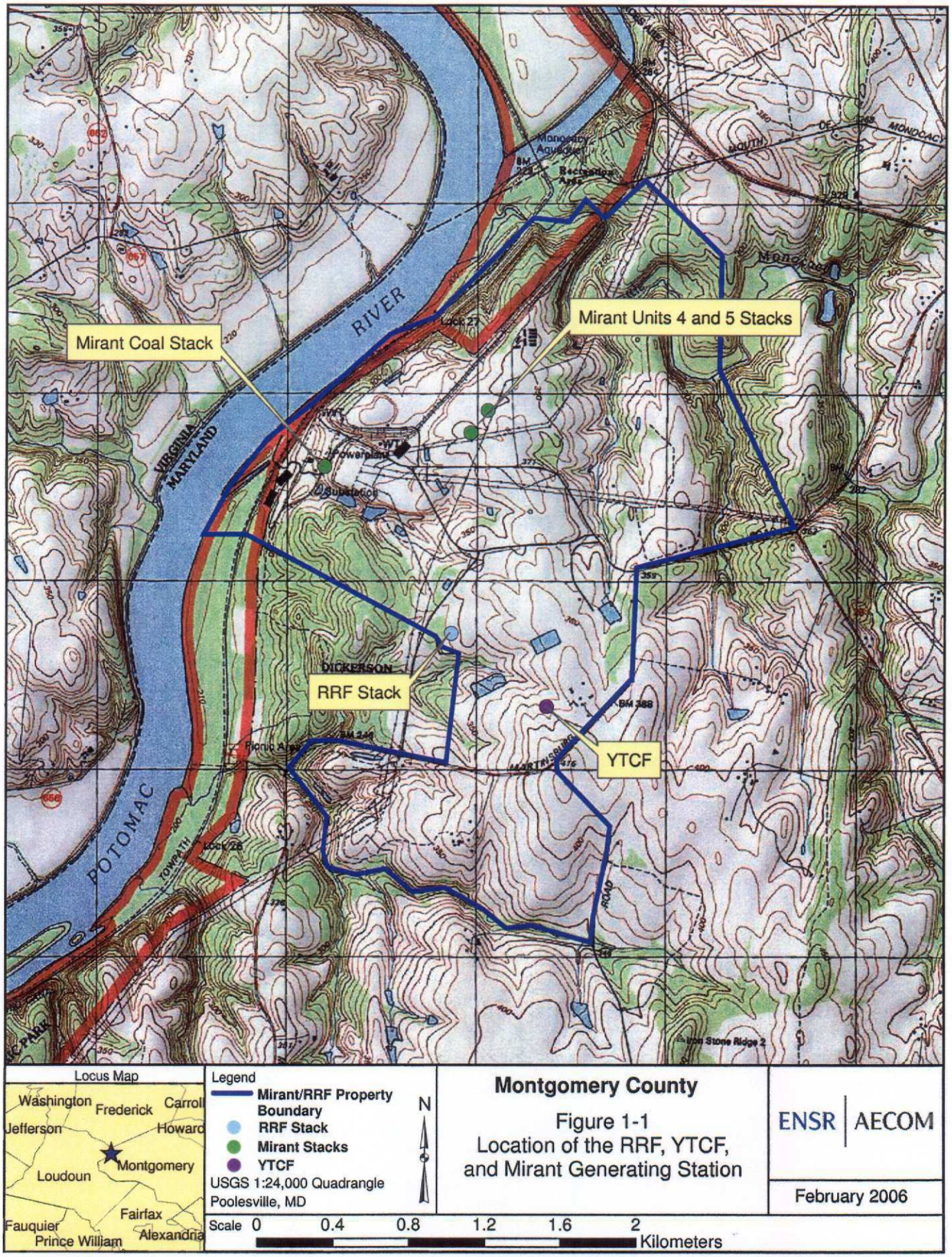
The risk assessment evaluates potential risks to hypothetical receptors, which are human populations living in specific locations and engaged in specific activities. Initially, air dispersion modeling is used to identify geographical locations where air concentrations and deposition rates of facility related compounds are predicted to be maximal. These locations are compared with land use patterns and human activity patterns. Risk assessments typically evaluate residential receptors as well as receptors engaged in some activity that could increase their exposure to facility-related emissions, such as farming or fishing.

Software by Lakes-Environmental, IRAP-h View ("IRAP"), which implements U.S. EPA combustion risk assessment guidance in the HHRAP, was used to conduct the cumulative health risk analysis. Modeled air concentrations and deposition rates for all sources were input to IRAP which implements the U.S. EPA fate and transport modeling algorithms and assumptions provided in the HHRAP. IRAP computes Excess Lifetime Cancer Risk and Non-carcinogenic Hazard Index for each of the exposure/receptor scenarios evaluated based on the emissions and modeled impacts of all facilities combined.

This health risk assessment has been organized into the following steps:

- Identification of Study Area and Sources (Section 2.0)
- Hazard identification (Section 3.0)
- Air dispersion and deposition modeling (Section 4.0)
- Toxicity assessment (Section 5.0)
- Exposure assessment (Section 6.0)
- Risk characterization (Section 7.0)

- Uncertainty Analysis (Section 8.0)
- Summary and Conclusions (Section 9.0)
- References (Section 10.0).



Montgomery County

Figure 1-1
Location of the RRF, YTCF, and Mirant Generating Station

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