

5.0 CONCLUSIONS

This section presents the conclusions with regard to the nature and extent of chemical constituents and other MGP residuals identified in on-site and off-site areas based on the results of the supplemental field program. Where appropriate, data from the initial field program, as well as historical data has been used in conjunction with data from the supplemental field program to develop the conclusions presented in this section. This section also presents the conclusions of the private well and basement survey, Qualitative Human Exposure Assessment (QHEA) and the Fish and Wildlife Resources Impact Analysis (FWRIA). **Appendix E** presents the detailed findings of the QHEA, FWRIA, and the private well and basement survey.

5.1 On-Site

Remedial Investigation

Surface Soil

- On-site surface soil samples were not collected in support of the supplemental field program. However, based on the findings of the initial field program, total PAH concentrations ranged from less than 1 mg/kg to 951 mg/kg in the 13 surface soil samples collected from the site. Metals were generally not detected above typical background concentrations for soil in the eastern United States, with the exception of mercury (which was detected above the typical background concentrations in 11 of the 13 samples) and lead (which was detected at 3,390 mg/kg in sample SHSS-07). Total cyanide was not detected above a concentration of 12.6 mg/kg. The entire Sag Harbor site is covered with 6 to 8 inches of crushed stone, limiting direct contact with surface soil.

Subsurface Soil

- Areas of subsurface soil, primarily in close proximity to the former MGP structures located in the eastern and central portions of the site, exhibited evidence of NAPL. Evidence of NAPL did not extend beyond a depth of 12 feet bgs at the majority of the completed soil borings and probes, indicating that the underlying peat/silt/clay unit limits the vertical migration of NAPL. However, in a localized area in the vicinity of the former Tar Separating Tank, where the peat/silt/clay unit appears to be relatively thin or absent, evidence of NAPL was found to extend to a depth of 90 feet bgs.

- BTEX and PAH concentrations in subsurface soil appear to decrease rapidly below the peat/silt/clay unit, even in areas exhibiting evidence of NAPL.
- Based on the BTEX/PAH soil data, evidence of NAPL in recovered soil samples, and the direction of groundwater flow, source areas of BTEX and PAH compounds appear to exist at the following former MGP structure locations:
 - Tar Separating Tank
 - Generator Room/Crude Oil Tank
 - Gas Holder No. 2
 - Gas Holder No. 3
 - Gas Oil Tank
 - Oil Tanks
- Metals detected in subsurface soil samples were found to be generally within or below typical background concentration ranges.

Groundwater

- Depth to groundwater at the site ranges from approximately 0.5 to 1.6 feet bgs and is tidally influenced. On-site groundwater predominantly flows in a northwest direction towards Sag Harbor Cove. However, in the southern portions of the site there also appears to be groundwater flow towards the west and south. There is also an easterly component of flow within the intermediate zone in the extreme eastern portion of the site.
- Although a number of samples collected from groundwater probes exhibited evidence of NAPL, on-site monitoring wells exhibited little evidence of any measurable separate-phase NAPL. The only exceptions to this was less than 0.1-foot of LNAPL, observed during the December 18, 2000 round of water level measurements in shallow groundwater monitoring well MW-05 (located in the northeastern portion of the site) and less than 0.2-foot of DNAPL observed during the April 2002 sample round in shallow groundwater monitoring well MW-02. Note that MW-02 does not have a sump for DNAPL collection.
- The highest concentrations of BTEX and PAH compounds were generally detected in shallow groundwater (i.e., above the peat/silt/clay unit) in the eastern and central portions of the site. However, BTEX and PAHs, as well as NAPL, have migrated to deeper intervals in the northeastern portion of the site below the peat/silt/clay unit. This is apparently due to the absence and/or thin nature of the peat unit in the eastern portions of the site. However, groundwater samples collected from these locations (i.e., SHGP-02 and SHGP-05) indicate that BTEX and PAH concentrations rapidly decrease at depths greater than 34 feet bgs in these areas of the site.
- Analysis of groundwater collected from on-site monitoring wells indicates metal concentrations to be generally within concentration ranges typical of ambient

groundwater quality. Total cyanide concentrations were generally below the CRDL of 20 ug/l.

Qualitative Human Exposure Assessment

- Under current and future site use conditions, the potentially exposed populations (i.e., potential receptors) are those that might come into contact with the site-related chemicals of potential concern (COPCs). A summary of the potential exposure pathways, by receptor and medium, is presented in **Table 2-2** of **Appendix E** (see **Appendix E** for the complete qualitative human exposure assessment). **Table 2-3** (**Appendix E**) provides context, in qualitative terms, of the potential for the exposures discussed above to actually occur. For example, the potential for on-site trespasser exposure to site-related chemicals in surface soil at the site is considered minimal because access to the site is restricted by a gated fence that is maintained closed and locked.

Current Use

- Current human populations considered in the exposure assessment include on-site trespassers and adult on-site KeySpan workers. On-site trespassers were included in the exposure assessment since the possibility exists that these individuals could gain access to the site via breaches in the fencing that surrounds it. On-site exposure for trespassers is limited to surface soil via the ingestion (oral), dermal, and inhalation routes. Current on-site KeySpan workers are those individuals currently engaged in activities required for the function and maintenance of those portions of the site devoted to KeySpan operations (i.e., compressor station maintenance). These individuals may spend time both outdoors and indoors and, consequently, may potentially be exposed to chemicals in surface soil and subsurface soil via ingestion, dermal contact and inhalation during outdoor activities and also to COPCs in indoor air (via inhalation during indoor activities). Potential exposure to surface soil is unlikely under current site conditions given that the site is covered with crushed stone.

Future Use

- Future human populations considered in this exposure assessment include construction workers, commercial workers, and adult and child visitors to commercial establishments, if the site were converted to commercial use. The construction worker is considered since virtually any site redevelopment would involve construction activity in some form. Potential on-site exposure media for the construction worker include surface and subsurface soil (via ingestion and dermal

contact), inhalation of soil particulates, dermal contact with groundwater, and volatilization of chemicals from soil and groundwater into ambient air during construction trenching activities.

- The possibility exists that the site may be used in the future for commercial purposes. Thus, absent remedial measures, potential exposures for adult commercial workers and adult and child visitors to future commercial establishments may exist. These individuals may be exposed to chemicals in indoor air that have volatilized out of the groundwater and subsurface soil underneath the commercial structure. It is expected that future on-site land use may be deed restricted to prevent residential development; however, because deed restrictions are not yet in place, a future on-site residential scenario is included here. Potential on-site exposure media for these future on-site residents includes surface and subsurface soil via ingestion and dermal contact, groundwater via dermal contact, ingestion and inhalation of volatiles while showering if an on-site well was installed for domestic use, and ambient and indoor air. It is likely; however, that if the site were converted to residential use, part of the redevelopment plans would include connection to the municipal water supply. Additionally, available data suggests that this would not likely be an exposure pathway of concern.

Fish and Wildlife Resources Impact Analysis

- Following Appendix 1C Decision Key in the NYSDEC's FWRIA guidance, a FWRIA was deemed required. Although this analysis indicated that several COPECs were detected at concentrations greater than the toxicological benchmark values, which may suggest a risk of impact to wildlife, the potential for an impact from MGP-related COPECs is minimal for several reasons. The low exposure frequency, low chemical concentrations (especially within six inches of the ground surface), indirect mechanism of exposure, and low duration of exposure suggests that the risk to wildlife is low. The site has minimal habitat areas in the form of "weedy" patches that would not support a wildlife population. Because only transient species and a few individual animals would use this area, the frequency and duration of exposure is limited. The future use of the site is expected to be of a type that will not provide a significant wildlife habitat. Thus, the observed MGP-related chemicals do not pose a current impact, nor is any expected in the future.

5.2 Off-Site

Remedial Investigation

Surface Soil

- Total BTEX concentrations in the five surface soil samples ranged from non-detect to a maximum of 0.004 mg/kg, with xylene being the only BTEX compound detected above method detection limits. SHSS-17 (0-2”) exhibited the highest concentration of total BTEX, which is likely attributable to storm water runoff from adjacent roadways. This sample was collected adjacent to the intersection of Spring Street and Bridge Street, approximately 700 feet south of the former MGP site.
- Total PAH concentrations ranged from non-detect up to a maximum of 3.271 mg/kg in samples collected from the 0 to 2-inch interval below the soil surface in the five off-site surface soil sample locations. The 0 to 6-inch interval was also analyzed for PAHs from the sample collected immediately adjacent to the southwestern corner of the site (SHSS-14). This sample exhibited a concentration of 24.04 mg/kg of total PAHs. It is worthy to note that PAHs in the 0 to 2-inch interval below the soil surface in this location were non-detect. Since there is an extremely shallow depth to groundwater in this area, this indicates that the source of the PAHs at this location could be associated with groundwater conditions as opposed to storm water runoff from the site. **Table 4-4** summarizes the range of PAH concentrations associated with surface soil samples collected from off-site locations along with the location of the maximum detected concentration.
- As indicated above, the majority of the highest concentrations of metals were found in SHSS-17, which was located adjacent to the intersection of Spring Street and Bridge Street, approximately 700 feet south of the former MGP site. However, all results were within or below background concentrations for soil in the eastern United States, as presented on **Table 4-1**.

Subsurface Soil

- The highest off-site BTEX and PAH concentrations were observed between 2 and 10 feet bgs (i.e., above the peat/silt/clay unit), primarily to the south of the site. Southern off-site migration of BTEX appears to be attributable to a southern component of groundwater flow in the extreme southeastern portion of the site, as well as the downward gradient that appears to exist along the top of the peat layer that extends to the south of the site.
- Off-site migration of BTEX and PAHs in subsurface soil above the peat/silt/clay unit is also occurring to a lesser degree to the north, northwest and west.

- Relatively low concentrations of total BTEX exist in off-site locations at deeper intervals (i.e., concentrations do not exceed 0.186 mg/kg in any sample analyzed from a depth of 18 feet bgs or greater). However, migration of PAHs to the north, off the northeastern portion of the site, appears to have occurred at deeper intervals. This appears to be attributable to the relative absence or thin nature of the peat layer in the eastern portion of the former MGP site, and the northern component of groundwater flow from this portion of the site.
- BTEX and PAH concentrations generally tend to rapidly decrease with depth at the Sag Harbor site, with the exception of PAHs to the north of the northeastern portion of the site.
- RCRA metals were generally found to be within or below typical background concentrations for the eastern United States. Total cyanide was generally either not found at levels above method detection limits or was found at relatively low concentrations.

Groundwater

- Although evidence of NAPL was observed in several off-site subsurface soil samples, off-site monitoring wells did not exhibit any measurable separate-phase NAPL. This indicates that while NAPL is present in subsurface soil, it appears to be currently in a relatively immobile residual saturation state, trapped within subsurface soil. As a result, additional off-site migration of NAPL is unlikely. However, intrusive groundwork or other activities, which create heavy ground vibrations could potentially mobilize DNAPLs in the subsurface.
- Both the shallow groundwater (i.e., above the peat/silt/clay unit) and intermediate groundwater zones (i.e., below the peat/silt/clay unit) flow in multiple directions off-site, with the predominant flow being to the northwest.
- Based on the analytical data obtained in support of the remedial investigations, BTEX and PAHs have been shown to extend a limited distance beyond the site boundaries, with off-site migration primarily occurring to the northwest and west, towards Sag Harbor Cove. The majority of off-site migration of BTEX and PAHs appears to be occurring in the shallow groundwater zone. This is likely due to the semi-confining nature of the peat/silt/clay unit as well as due to the upward or groundwater discharging conditions observed in the intermediate and deep groundwater zones.
- Groundwater containing relatively low levels of BTEX and PAHs appear to be discharging to a relatively narrow zone of Sag Harbor Cove. However, surface water and pore water sampling conducted in the suspected discharge area found only trace concentrations of total BTEX in surface water (i.e., not exceeding 1 ug/l) and only trace concentrations of total PAHs in pore water (i.e., not exceeding 4 ug/l).

- Metal concentrations in groundwater samples collected from off-site monitoring wells are generally within typical background levels defined for the eastern United States. The majority of groundwater samples exhibited total cyanide concentrations below the CRDL of 20 ug/l, with a maximum total cyanide concentration of 103 ug/l observed at SHMW-07S, located approximately 40 feet south of the site. Free cyanide was not found above the CRDL of 20 ug/l.

Groundwater Seep

- Volatile organic compounds (VOCs) were not detected above method detection limits with the exception of acetone, which was detected at a relatively low concentration of 7 ug/l. This compound is a common laboratory contaminant.
- Semivolatile organic compounds (SVOCs) were not detected above method detection limits.

Sag Harbor Cove (Sediment, Pore Water and Surface Water Sampling)

- Although sediment samples were found to contain total PAHs at concentrations up to 46.76 mg/kg, this may be attributable to the extensive use of the cove by motorized watercraft and/or from storm water runoff from surrounding streets and parking lots discharged to this surface water body. Two sediment samples collected from Sag Harbor Cove to assess background conditions exhibited total PAH concentrations of 2.22 mg/kg and 4.04 mg/kg. Furthermore, surface water and pore water samples collected from the cove exhibited only trace concentrations of BTEX and PAH compounds. In surface water samples, total BTEX concentrations did not exceed 1 ug/l, and PAHs were not detected at concentrations above method detection limits. In pore water samples, BTEX compounds were not detected at concentrations above method detection limits, and total PAHs did not exceed 4 ug/l.

Private Water Supply Wells

- Based on the findings of a private water supply well survey, one inactive and two active private water supply wells were identified within the study area. Tap water samples collected from the two active wells showed no detectable concentrations of SVOCs. VOCs, RCRA metals and cyanide were also not detected with the exception of chloroform, barium and lead, which were all detected at concentrations that achieve New York State Department of Health (NYSDOH) standards/action levels. Additional information concerning the private well survey and sampling activities is provided below (Qualitative Human Exposure Assessment Findings).

Indoor Air

- Indoor air sampling for volatile organic compounds and naphthalene was conducted within several structures located adjacent to the site, where access was granted by property owners/occupants. Results of this sampling indicate that the majority of volatile organic compounds were reported as non-detect, and the compounds that were detected were either detected within the range of background concentrations as reported by the NYSDOH, were orders of magnitude below occupational standards, and/or were generally those not typically associated with MGP impacts. Additional information concerning the indoor air sampling activities is provided below (Qualitative Human Exposure Assessment Findings).

Qualitative Human Exposure Assessment

- Under current and future site use conditions, the potentially exposed populations (i.e., potential receptors) are those that might come into contact with the COPCs. A summary of the potential exposure pathways, by population and medium, is presented in **Table 2-2** of **Appendix E** (see **Appendix E** for the complete qualitative exposure assessment). **Table 2-3** (**Appendix E**) provides context, in qualitative terms, of the potential for the exposures discussed above to actually occur.

Current Scenarios

- Current off-site human populations considered in the exposure assessment include adult commercial workers; adult and child visitors to those commercial establishments; adult and child residents of the Harbor Close Condominium complex located to the southwest of the site; and commercial workers, visitors and adult and child residents of properties located to the north of the site. Indoor air exposure to chemicals volatilizing from groundwater and subsurface soil underneath structures was assumed to occur for these receptor populations. Potential exposure to chemicals in surface soil may be possible for these off-site residents. Additionally, potential inhalation exposure to wind-borne particulates from excavations is possible for off-site human populations; however, it is anticipated that this potential exposure would be short-term and if warranted, controlling measures would be used to further reduce potential exposure. Inhalation of site-related wind-borne particulates also is possible for these off-site populations; however, the potential for this exposure is considered limited given that the site is currently covered with bluestone, thereby reducing the potential for exposure. Additionally, given the high water table at Sag Harbor, direct contact with groundwater as well as subsurface soil by off-site residents is possible if they were to access the subsurface in their yards.

Future Scenarios

- Future human off-site populations considered in this exposure assessment include construction workers and utility workers. Off-site construction worker exposure to areas surrounding the site is possible in the event of future off-site redevelopment. Chemical exposures for nearby, off-site utility workers could be expected because of the presence of subsurface utility lines in areas adjacent to the site. Like the on-site construction worker, potential exposure pathways for off-site construction and utility workers include ingestion of and dermal contact with surface and subsurface soil, inhalation of soil particulates, dermal contact with groundwater, and volatilization of chemicals from soil and groundwater into ambient air during construction trenching activities.
- As mentioned above, persons residing or working in the vicinity of the site may be exposed to chemicals originating from subsurface soil or groundwater via inhalation of vapors in indoor air. Indoor air sampling has been performed at several properties in the vicinity of the site. Results of this sampling indicate that while the majority of volatile organic compounds were reported as non-detect, the compounds that were detected were either detected within the range of background concentrations as reported by the NYSDOH, are orders of magnitude below occupational standards, and/or are generally those not typically associated with MGP impacts.
- A basement survey was performed of properties in the vicinity of the site, as agreed upon by KeySpan and NYSDEC in April 2002. Results of the 39 questionnaires completed thus far indicate that an odor of potential concern, i.e., an odor that is characterized as “gasoline”, is present at one property when the basement is wet. Results of indoor air sampling conducted at this property when the basement was wet indicated the presence of four volatile organic compounds, none of which is associated with MGP impacts. In summary, results of the basement survey indicate that, at a very small number of properties, the potential for indoor air exposure exists. The owners of these properties were contacted and appropriate courses of action were taken. This survey information, coupled with results of the indoor air sampling performed to date, indicates that potential exposures to site-related chemicals via inhalation of indoor air in the vicinity of the site are minimal. Additional details concerning the results of the basement survey may be found in **Section 2.5 of Appendix E**.
- Three of the 39 survey respondents reported the presence of a groundwater well on their property. Sampling of two wells was performed. Results of the sampling indicated the presence of barium and lead in both wells and the presence of chloroform, a trihalomethane commonly detected in treated water, in one of the wells. All three chemicals were present at concentrations that achieve NYSDOH public water supply standards/action levels. According to the survey respondent, the groundwater well at the third property is not used. The information collected to date indicates that the potential for exposure to site-related chemicals in groundwater is

minimal. Additional details concerning the results of the private well survey may be found in **Section 2.5** of **Appendix E**.

Fish and Wildlife Resources Impact Analysis

- Wildlife resources in the commercial/residential areas surrounding the site are limited due to the lack of food and cover. Also, constant human disturbance limits the population to wildlife species more tolerant of human activity. Several state-listed endangered species are located within 2-miles of the site. In addition, state and federally regulated tidal wetlands are located in the Peconic Estuary. Wetlands are considered significant natural resources. However, these wetlands are currently too distant and/or up-gradient of the site for exposure to site-related chemicals. Also, most of the COPECs are PAHs and metals. The fate and transport mechanisms of these chemicals reduce the likelihood of future migration into these areas. Thus, the potential for exposure is limited to wildlife near, or immediately downgradient from the site. Because only transient species and a few individual animals would use this area, the frequency and duration of exposure is limited. Thus, the observed MGP-related chemicals do not pose a current impact, nor is any expected in the future.
- Several COPECs in Sag Harbor Cove sediment were detected at concentrations greater than the toxicological screening benchmark values. However, only one COPEC, phenanthrene, was detected in surface water above water quality criteria. These data suggest that while some COPECs may pose a risk to the aquatic environment, the potential effects are considered to have minimal ecological significance. Furthermore, these COPECs may be also attributable to the extensive use of the cove by motorized watercraft and/or from storm water runoff from surrounding streets, and parking lots that discharge to this surface water body. Based on these results, the Peconic Estuary and Sag Harbor Cove are not currently impacted by site-related constituents.