WALDEN ENVIRONMENTAL ENGINEERING

Sent via Email to TRogers@syosset.k12.ny.us

August 30, 2018
SYOS0118

Dr. Thomas Rogers
Superintendent of Schools
Syosset Central School District
99 Pell Lane
Syosset, New York 11791

Re: Comments on Syosset Park
Draft Environmental Impact Statement

Dear Dr. Rogers:

Walden Environmental Engineering, PLLC (Walden) has completed its review of the Draft Environmental Impact Statement (DEIS, dated January 2017, revised December 2017 and accepted as complete by the Town of Oyster Bay on March 27, 2018) for the Proposed Syosset Park development. We have also reviewed available documentation related to historic operations, site investigations and remediation activities conducted at the former Cerro Wire and Conduit Company and Town of Oyster Bay Landfill properties which now comprise the proposed Syosset Park development Site. Based on the document review, Walden has prepared this summary of the existing Site conditions, significant concerns related to Syosset Park, and comments on the DEIS related to potential impacts on Syosset Central School District (District) facilities.

Overview of Historic Information

Cerro Wire Site

In the early 1950's, the Cerro Wire and Conduit Company (Cerro) developed approximately 39 acres spanning Nassau County Tax Lots 251 and 252 in the southern portion of what is now the Syosset Park Site. Cerro manufactured steel electrical conduit, copper rods and steel for use in construction. The primary manufacturing operations performed at the Cerro Site were steel wire drawing, caustic cleaning, acid pickling, zinc electroplating and rinsing. Wastewater treatment methods included alkaline chlorination and metals precipitation. Copper, lead, nickel and zinc were immobilized in a non-hazardous lime-based sludge which was pressed into a filter cake and then disposed of on-site or transported to an off-site disposal facility. The treated wastewater

effluent was discharged to three on-site recharge basins until 1982, when the Cerro Site connected to the Nassau County sewer system; at this point on-site discharge ceased. Cerro operated at the Site until November 1986.

The Cerro Site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites (State Superfund List) in 1983 due to environmental impacts caused by on-site manufacturing and waste disposal practices. Numerous investigations, including collection and analysis of hundreds of soil, groundwater and air samples have been completed since 1983 to document Site conditions, assess risks posed by contamination associated with the Site, and guide remedial efforts. Contaminated soils and wastes (including cyanide, lead, and plating solutions and sludge) were removed/remediated based on the Site characterization data, a Site-specific baseline risk assessment, and NYSDEC-approved work plans. NYSDEC removed the Cerro Site from the State Superfund list in February 1994, finding that the residual levels of the contaminants of concern (primarily copper, cyanide and zinc) in soil did not pose a significant public health risk based on the Site-Specific Cleanup Standards developed during the risk assessment performed for the Site. The Site-Specific Cleanup Standards assumed future Site use consistent with the industrial zoning at that time and did not contemplate the significant change in use as proposed by the Syosset Park development. NYSDEC imposed no additional restrictions on future Site use or development when the Cerro Site was delisted. Thus, the Town's zoning requirements may be the only mechanism in place to restrict Site development.

Additional environmental investigations were performed between 1997 and 2004 related to property transfers and Site clearing, resulting in excavation of contaminated soil, removal of underground fuel tanks, asbestos abatement and building demolition. Soil sampling following these removals determined that the concentrations of the contaminants of concern [primarily copper, cyanide and zinc, plus some semi-volatile organics (SVOCs) found beneath the buildings] remaining in soil were below the Site-Specific Cleanup Standards for future industrial land use (established to support the 1994 delisting) and applicable NYSDEC guidance at that time.

The current NYSDEC Part 375 Restricted Residential Soil Cleanup Objectives (RRSCOs) for the contaminants of concern are more stringent than the Site-Specific Cleanup Standards for future industrial land use applied when the Site was delisted by NYSDEC in 1994. Further soil and groundwater sampling were conducted in 2015-2016 on behalf of the current owner in its efforts to support Site development planning. The 2015 soil investigation found copper, cyanide and certain SVOCs at concentrations above the respective RRSCOs. The findings of the 2016 groundwater investigation were consistent with previous findings, which indicated that groundwater had not been impacted by historic use of the Cerro Site.

The Syosset Park owner/developer submitted a Brownfield Cleanup Program (BCP) application for the former Cerro Site (Lots 251 and 252) to NYSDEC and this Site was accepted into the BCP in 2016. Under the BCP, the developer is working with NYSDEC to conduct further investigation work pursuant to a NYSDEC-approved Remedial Investigation Work Plan to characterize current Site conditions. The investigation is focused on soil vapor sampling because soil vapor samples have not been collected at the former Cerro Site in the past. NYSDEC's March 2017 Fact Sheet about the draft Remedial Investigation Work Plan indicates that ten (10) soil vapor samples would be collected along the border between the former Cerro Site and the former Syosset Landfill to evaluate potential soil vapor intrusion concerns.

Based on a discussion with the NYSDEC BCP project manager, the remedial investigation soil vapor sample collection has been completed. Groundwater sampling has been delayed because attempts to collect groundwater from certain existing monitoring wells have found that the wells are dry due to decreasing water levels. Therefore, new monitoring wells will be installed and sampled. A final report is pending completion of the BCP remedial investigation. Once the report is approved by the State, the Owner will prepare a Remedial Work Plan for the Site, based on all of the environmental data collected at the Site (soil, groundwater and soil vapor). The proposed Remedial Work Plan will be reviewed by NYSDEC and made available for public review and comment. The remedial work detailed in the Remedial Work Plan (when approved by NYSDEC) will have to be completed as part of the Syosset Park development, either prior to or during construction, depending on the action.

Without a final report summarizing the results of the remedial investigation work being completed under the BCP, the DEIS is currently incomplete and does not support a complete evaluation of environmental impacts associated with the former Cerro Site. The final report should be included as a supplement to the DEIS so it can be addressed during the public comment period regarding independent environmental testing that is open through January 2019.

Syosset Landfill Site

The Syosset Landfill covers approximately 39 acres of the 53.8-acre Town of Oyster Bay DPW Site in the northern portion of what is now the Syosset Park Site. Mining activities performed at the site prior to 1933 created two areas approximately 60 and 90 feet deep; these areas were then used for waste disposal. The Landfill began accepting wastes for disposal in 1933, and there were no restrictions on disposal until circa 1967. Wastes disposed of in the Landfill reportedly included sludge and ash, as well as residential, commercial, industrial, demolition, and agricultural materials. Landfilled wastes contained hazardous substances including metals (such as arsenic, copper, zinc, cadmium, chromium and lead) and volatile organic compounds [such as 1,1-dichloroethylene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), trichloroethylene (TCE) and tetrachloroethylene (PCE)].

The Landfill was closed in January 1975 due to suspected groundwater contamination. The USEPA placed the Landfill on the National Priorities List (NPL, Federal Superfund Site) in September 1983 after determining that hazardous substances in groundwater beneath the Landfill posed a threat to the local drinking water source. A remedial investigation and feasibility study were then completed to determine the nature and extent of groundwater contamination attributable to the Landfill. In 1990, USEPA issued a Record of Decision (ROD) requiring the Landfill to be capped to prevent contact with the landfilled wastes and to prevent leachate generation/migration from the Landfill. The ROD also required the Town to perform long-term groundwater and air monitoring to identify any future impacts associated with the Landfill.

The ROD also called for a supplemental groundwater investigation to evaluate potential downgradient groundwater impacts due to contaminants leaching from the Landfill. The groundwater investigation found that there were no unacceptable risks to human health or the environment due to migration of contaminants from the Landfill. Therefore, no groundwater remediation was required.

Design and construction of the Landfill cap was completed from 1994 to 1997 by the Town with USEPA oversight. According to DEIS Figure 10, the Landfill cap was configured in three (3) different ways depending on the Town's planned use of each portion of the capped area. All configurations included a 12-inch gas venting layer on top of the existing Landfill cover and waste, and a 24-inch protective barrier above the gas venting layer. The general Landfill cap specifications are listed below, with the layers described from top to bottom of the cap:

- 24-inch barrier protection layer which is made up of either:
    - Cap with Asphalt Cover - Two (2) inches of asphalt top course, five (5) inches of asphalt base course, and seventeen (17) inches of clean fill
    - Cap with Recycled Concrete Cover – Six (6) inches of recycled concrete over eighteen (18) inches of clean fill
    - Cap with Vegetation Cover - Six (6) inches of vegetated topsoil over eighteen (18) inches of clean fill
- High density polyethylene (HDPE) geomembrane (60 mil) between the protective barrier and the gas venting layer
- Twelve (12) inch sand gas venting layer
- Geosynthetic filter fabric on top of existing Landfill cover
- The top of the Landfill cap was constructed with a minimum 2.35 percent slope
- Gas riser vents extending from within the refuse material to three (3) feet above the final ground surface elevation (minimum of one gas riser vent per acre) with crushed stone backfill around gas venting risers.

In addition, the ROD required the following post-closure actions by the Town to ensure the effectiveness of the selected remedy:

- Providing long-term operation and maintenance of the Landfill cap's vegetative/asphalt covers and drainage structures, including routine inspections and repair;
- Providing long-term air and groundwater quality monitoring in accordance with the New York State closure requirements;
- Long-term monitoring and maintaining the passive gas venting system installed under a previously implemented response action, including routine inspection and repair.
- Installing an additional passive gas venting system, constructed so that it can be easily converted to an active gas system, should conversion become a necessary part of the remedy in the future;
- Maintaining the existing boundary fence around the perimeter of the Landfill property to continue to restrict access to the Landfill; and
- Placing institutional controls on the Landfill property to restrict future use of the Landfill in order to ensure the integrity of the cap.

Drainage from the top of the Landfill is collected in riprap and asphalt lined drainage ditches along the perimeter which discharge to storm drains which flow into two Nassau County recharge basins (#571 and #284) bordering the Landfill to the north and northwest. The practice of discharging on-site storm water runoff to an off-site property is prohibited under the *Nassau County Department of Public Works Drainage Requirements.*

Per the ROD, the Town placed a restrictive covenant on the Landfill property binding all future owners of the property to the following restrictions:

- Any future use of the property must not breach the integrity of the Landfill cap, cover or any other components of the containment system; disturb or disrupt the function of the Site's monitoring systems; or otherwise increase the potential hazard to human health and the environment posed by Site;
- No wells may be installed on the Landfill; and
- No permanent structure or building of any type may be built on the Landfill or in the immediate vicinity of the Landfill perimeter without prior approval of EPA and the Town.

USEPA removed the Landfill from the NPL in April 2005. Five-Year Review Reports prepared by USEPA summarize the results of the on-going long-term groundwater and Landfill gas monitoring programs that continue to be implemented by the Town. These reports indicate that the Landfill cap and gas venting system remain protective of human health and the environment.

Walden has confirmed with the NYSDEC that it is finalizing plans to perform groundwater monitoring to evaluate the potential for radiological impacts attributable to the Landfill. The results of the radiological groundwater sampling should be included as a supplement to the DEIS so the data can be addressed during the public comment period regarding independent environmental testing that is open through January 2019.

In July 2016, the Syosset Park owner entered into an Administrative Settlement Agreement and Order on Consent with USEPA, whereby USEPA will oversee the proposed site development activities to ensure that the Landfill is not impacted by the project and to maintain the integrity of the Landfill cap system. As such, USEPA must be an active participant in the DEIS review process and throughout all phases of Site development and construction.

Comments Related to Syosset Park's Potential Environmental Impacts on Syosset CSD

The scope of the Syosset Park development is massive, considering most of the 92.8-acre has been vacant and unused for 30 years and the unprecedented density of the proposed mixed-use development. The comments included herein focus on information notably absent from the DEIS and the lack of specific detail which prevent a complete evaluation of the environmental impacts the project would have on District facilities, operations, and the health and safety of the students, staff and visitors at the South Grove School located adjacent to the Syosset Landfill site.

1. ***Significant Omissions from the DEIS***

   The DEIS omits certain plans and details which are required to adequately assess the impacts the proposed construction methods and overall development would have on the District. The DEIS presents great detail on how the Site would be developed, yet fails to provide the complete plans that are essential to control and minimize the project's environmental impacts on the District. Additional comments related to these plans are presented in the appropriate sections below.

   a. The DEIS does not contain a detailed site-specific Community Air Monitoring Plan (CAMP); the DEIS only includes the generic CAMP published by the New York State Department of Health.
      i. Preparation of a detailed site-specific CAMP cannot be delayed until construction is imminent as it directly impacts the evaluation of potential environmental impacts presented by the proposed development and how to prevent and manage these impacts. In the absence of details, we cannot comment fully on this item.

b. The DEIS does not include a Storm Water Pollution Prevention Plan (SWPPP) and asserts that the SWPPP cannot be prepared until the Site development plans are finalized.
    i. The SWPPP cannot be delayed as it directly impacts the evaluation of potential environmental impacts presented by the proposed development and how to prevent and manage these impacts. In the absence of a detailed SWPPP, we cannot comment fully on this item.

c. The DEIS does not include a detailed Erosion and Sediment Control Plan (E&SC Plan).
    i. Generic statements related to erosion and sediment control are included on a single drawing sheet in an appendix to the DEIS. Given the magnitude of the proposed development, this "E&SC Plan" is utterly inadequate. In the absence of a detailed E&SC Plan, we cannot comment fully on this item.

2. Key Contaminant Migration Concerns

The major release pathways for the contaminants of concern that pose a threat to South Grove School are migration from the Site in dust/air and storm water.

a. The primary health concern during construction relates to the transient air contaminants that would be released in the form of dust from the Syosset Park Site.

b. Because South Grove School borders the former Syosset Landfill site, the potential for exposure to contaminants and associated risk, while certainly present, is more limited when compared to the risk if the former Cerro Site was directly adjacent to the School.

c. The potential exists for contaminants to be released during construction activities at the former Cerro Site and subsequently migrate off-site to impact South Grove School.

3. Dust Concerns

Environmental concerns related to dust are driven by soil disturbance during excavation and earth moving at the Cerro Site, both during the Brownfields remedial action and future development of the Site. The risks depend on the concentrations of contaminants of concern to be determined following completion of the NYSDEC-managed

Brownfields investigation and any further site remediation activities deemed necessary by NYSDEC.

a. The DEIS does not present sufficient detail on the modeling conducted to evaluate dust impacts, therefore we cannot comment fully on the results.
    i. The air modeling results establish the basis for evaluating appropriate protective measures to prevent dust from migrating to District properties. Syosset CSD has five schools within a one-mile radius of Syosset Park which could be at risk for dust impacts depending on conditions.
    ii. The distance dust can travel depends on atmospheric conditions (including wind speed, prevailing wind direction, humidity, etc.) and the weight of the dust particles the contaminants are adhered to.
    iii. The DEIS dust modeling fails to accurately represent the anticipated conditions due to construction. The model results presented in the DEIS (Appendix P) predict the particulate matter (PM10 and PM2.5) levels during construction over a 24-hour period. This is not representative of the anticipated 8-hour daily construction period that would generate dust. Therefore, modeling dust levels over 24-hours "dilutes" the predicted actual impacts which would occur over 8 hours.

b. The DEIS does not provide sufficient detail on the air monitoring procedures that would be employed to track impacts during construction. The air monitoring program must be set forth in a site-specific CAMP developed in accordance with DER-10 (Technical Guidance for Site Investigation and Remediation, May 2010). Preparation of the CAMP cannot be delayed as it directly impacts the evaluation of potential environmental impacts presented by the proposed development and how to prevent and manage these impacts. In the absence of details, we cannot comment fully on this item and as such, the DEIS is deficient in this regard.
    i. CAMP air monitoring activities must be performed by an independent third-party for any and all construction involving excavation or grading, anywhere on the Site. Monitoring stations must be placed along the property line alongside the School property. This would help account for dust that becomes airborne and travels a distance before it settles, and for particles that are transported from the Cerro Site to the DPW/Landfill area during construction and then released into the air again when work takes place on the DPW/Landfill areas. The independent third-party air monitor must have the authority to immediately shut down the job and implement additional dust control measures as appropriate based on five-minute average concentrations, not 15-minute average concentrations as stated in the DEIS (p. 608).

ii. The CAMP must include a comprehensive program detailing the sequence of events and response times in the event air monitoring indicates action is needed. The CAMP must ensure there is no lapse in response that would allow contaminants to migrate off-site and put the School at risk.

iii. Water misting systems must be established during the construction period alongside the South Grove School property. Misting systems can more effectively prevent dust from leaving the construction area than a sprinkler system, since the water droplets are sized to attach to the dust and cause its settlement.

iv. On days where winds are forecast to be greater than 15 to 20 mph and blowing towards South Grove Elementary School, misters must be used during all excavation and earth moving activities to prevent dust from migrating off-site to avoid impacts on the School.

v. In addition to water misting to control dust, the most protective dust control procedures and construction practices must be implemented to minimize dust migration and protect South Grove School and all downwind receptors.

c. As part of its ongoing capital improvement work, Syosset CSD plans to install an enclosed walkway between the annex (K-1) and main (2-5) buildings at South Grove School next summer (2019) as part of District-wide security enhancement measures. Since this structure would be completed in advance of any construction at the Syosset Park Site, it could act as a limited barrier to mitigate potential dust impacts to some extent as the students and staff will not need to travel between the buildings located at South Grove School; however, it will not serve as a barrier to prevent the dust impacts to the South Grove property, and it is not being installed as a function of the proposed development. The Plans in DEIS Appendix O show 12-foot high perimeter walls to be installed along Miller Lane and the LIRR. A similar wall installed along the South Grove School property boundary adjacent to the Site would act as a dust barrier, however its effectiveness in preventing dust impacts on South Grove School would have to be evaluated further based on modeling.

4. Storm Water Management Concerns

Mobilization of contaminants from the Syosset Park Site via storm water runoff and subsequent transport onto the South Grove School property during construction and future Site use also poses a significant risk to the District. The storm water management plans presented in the DEIS fail to prevent runoff and associated impacts on the School.

a. The DEIS fails to adequately address controls to prevent storm water and sediment runoff from the Site and within the construction zone. Once sediment carried in storm water runoff dries, it could become airborne and migrate off-site, posing a risk to South Grove School and other properties in close proximity to the Syosset Park Site, which include multiple private residences.

b. The DEIS (Appendix B, Sheet C-600) includes a simple Erosion and Sediment Control (E&SC) Plan that would apply to Phase I construction and be the starting point for the storm water management program to be followed during the work. This E&SC Plan is presented as a drawing sheet and lacks detail. The E&SC Plan must be expanded as a written document specifying the required E&SC procedures to be implemented during all phases of the work. In the absence of details, we cannot comment fully on this item and as such, the DEIS is deficient in this regard. The E&SC Plan must establish a program which includes all the requirements specified in the New York State Standards and Specifications for Erosion and Sediment Control (2016 "Blue Book").

   The E&SC Plan cannot be delayed until construction is imminent as it directly impacts the evaluation of potential environmental impacts presented by the proposed development and how to prevent and manage these impacts.

c. A comprehensive Storm Water Pollution Prevention Plan (SWPPP) has not been developed for the Site. The DEIS (p. 123) indicates the developer's assertion that it would be premature to provide a detailed SWPPP at this time because the Site development plans have not been finalized. The DEIS states that a detailed SWPPP would be prepared for each portion of the project and submitted to the Town for approval, and then to NYSDEC, with no construction until all approvals are secured.

   The SWPPP cannot be delayed as it directly impacts the evaluation of potential environmental impacts presented by the proposed development and how to prevent and manage these impacts. In the absence of details, we cannot comment fully on this item and as such, the DEIS is deficient in this regard. The SWPPP must establish a program which includes all the requirements specified by NYSDEC General Permit No. GP-0-15-002 for Storm Water Discharges from Construction Activity.

d. The SWPPP would have to be strictly enforced during the entire construction period to ensure that storm water and sediment do not migrate and get tracked off-site via runoff and on vehicle tires leaving the Site.

e. DEIS Appendix B Landscape Plans - Sheet L-502, Section D: This cross-section shows the grade from the proposed Syosset Park development sloping downward directly towards South Grove School. This plan does not include any provisions for preventing storm water runoff onto the School property. This is absolutely unacceptable. Storm water runoff from the Syosset Park Site must not flow onto the School property under any circumstances.

f. DEIS Appendix B Landscape Plans - Sheet L-503, Section 2: This cross-section shows the proposed berm with trees planted along the Syosset Park boundary with South Grove School. No measures are indicated to prevent runoff from the Site. Again, this is unacceptable. Storm water runoff from the Syosset Park Site must not flow onto the School property under any circumstances.

g. The DEIS Landscape Plans do not provide sufficient detail on construction of the athletic fields to support a complete evaluation of the drainage concerns and protection of the Landfill cap during drainage system installation, and as such the DEIS is deficient in this regard.

h. The Syosset Park development would significantly increase the percentage of impervious lot coverage compared to the existing conditions where the property is mainly vegetated so most of the storm water can infiltrate into the ground. Thus, much more storm water would have to be managed by Site drainage. The DEIS does not include sufficient detail on how storm water from various portions of the Site would be managed and provide specifications for the drainage infrastructure to be installed to meet the *Nassau County Department of Public Works Drainage Requirements* for on-site storm water management.

i. The drainage plan presented in the DEIS (p. 151) would combine on-site storm water management via discharge to infiltration structures with storm water discharge to the off-site Nassau County Recharge Basins located directly west/northwest of South Grove School. The DEIS implies that the Landfill deed restrictions on-site storm water recharge through the cap justify the assumption that off-site storm water discharge to the County recharge basins would continue under the private development. The DEIS and the developer fail to acknowledge the *Nassau County Department of Public Works Drainage Requirements* which specify that all storm water must be managed on-site. Under no circumstances should off-site discharge be permitted.

j. The DEIS (p. 162 and p. 584) indicates that virtually all storm water runoff from the Site would be contained and recharged, mimicking existing conditions. The DEIS proposes to accomplish storm water management for the overall site by on-site infiltration to varying degrees (primarily at the Cerro Site and non-Landfill portion of the Town DPW site), by maintaining flows to two existing off-site County recharge basins located north of the Landfill site, and by maintaining existing discharges to the closed pipe drainage system in Miller Place for the Landfill cap areas. The Miller Place drainage system conveys storm water to an off-site County recharge basin located southwest of the project. The storm drainage systems and Miller Place drainage connections would be installed in the early stages of construction in each phase, making the drainage system available to store runoff from construction activities. The proposed project's on-site storm water management infrastructure would also include pretreatment of storm water runoff through a closed pipe system.

k. The DEIS does not adequately address the potential for contaminants of concern at the former Cerro Site to migrate in air as dust, settle on the ground surface in other areas of the Syosset Park Site near South Grove School, and then be carried off-site by storm water runoff onto the School property and by drainage into the Nassau County recharge basin adjacent to the School. These conditions would serve to concentrate the contaminants of concern and represent a significant risk to the School. The DEIS states that drainage from the Landfill Site would continue to be discharged to the off-site recharge basins during construction, further increasing this risk.

l. The DEIS does not indicate that Nassau County has granted approval for off-site storm water discharge from Syosset Park, nor has NCDPW verified that the County drainage system and recharge basins have the capacity to handle storm water from the Site as well as other existing sources of discharge to the basin. The Site owner must be held financially responsible (by bonding) for maintenance of any Nassau County recharge basins that receive storm water from the Site. Old recharge basins get clogged by silt and need to cleaned out on a regular basis to maintain effective recharge via infiltration. An appropriate maintenance schedule must be established considering the increase in storm water volume to be discharged under the proposed development plan.

m. The DEIS does not propose to sample the off-site Nassau County recharge basin adjacent to South Grove School to evaluate existing conditions prior to construction. Drainage from the Syosset Landfill Site discharges to this recharge

basin so it is possible that contaminants of concern may have accumulated in the sediment at the bottom of the basin. The DEIS is deficient in its failure to provide for the off-site recharge basins to be sampled and cleaned out.

n. The DEIS (p.162) states that the construction contractor would be responsible for maintaining the SWPPP documents, including the E&SC plans. Regular inspections of erosion control measures would be completed by an independent third-party throughout the duration of the construction period in accordance with the E&SC Plan. The weekly E&SC inspection frequency proposed in the DEIS (p. 579) is not consistent with NYSDEC requirements. For sites greater than five (5) acres, bi-weekly inspections by a certified inspector are required. Daily inspections would be more appropriate considering the magnitude of the proposed project and its proximity to South Grove School.

o. The DEIS fails to specify that contractors would not be permitted to perform truck washing on-site in order to minimize the volume of water to be managed on-site and the potential for runoff/erosion and resultant impacts on South Grove School.

p. The DEIS does not indicate that storm water control treatment or storage facilities must not be constructed near the vicinity of South Grove School during construction.

q. The DEIS does not adequately detail the extent of project oversight that would be required under the Town's Municipal Separate Storm Sewer System (MS4) program. Given the scope of the Syosset Park project, frequent MS4 inspections would have to be conducted by the Town and an independent third-party to track compliance with MS4 plans. The Town must use its authority to order work stoppages as warranted if MS4 violations are observed.

5. Landfill Cap Integrity Concerns

The deed restrictions in place for the Landfill prohibit disturbance of the Landfill cap and buried waste during construction or future Site use under any development scenario. Thus, any contamination associated with the Landfill is to remain contained and monitored in accordance with the long-term monitoring and reporting requirements established by USEPA. Prevention of contaminant releases from the Landfill depends on adherence to these restrictions at all times, as well as diligent oversight by USEPA and the Town of Oyster Bay.

a. The DEIS does not include complete copies of the final deed restrictions filed with respect to the Landfill. References to these deed restrictions are included on the survey maps.
   i. For the Landfill, the Land Title Survey maps in DEIS Appendix B note "Lots 243, 244, 247 and 248 are property of the former Syosset Landfill and are subject to 'Notice of Federal Consent Decree, as recorded in Liber 10124 page 736', and subject to 'Restrictive covenants for the former Syosset Landfill site', as recorded in Liber 11776 page 661."
   ii. For Cerro site (Lots 251 & 252), the survey maps note "'Declaration of restrictive covenant' Liber 7614 page 187 and Liber 9604 page 500 are not survey related."

   Without this documentation, there is insufficient information to support a complete evaluation of the land use restrictions. As lead agency, the Town must consult with USEPA to verify that establishing the Great Park for active recreation is consistent with the intent of the deed restriction(s).

b. The DEIS references the deed restrictions, property sale agreement with the Town and the 2016 Administrative Agreement with USEPA when discussing future management/monitoring of the Landfill and continued oversight by USEPA. However, the DEIS does not clearly specify whether the Town or the Site Owner would be responsible for implementing the long-term monitoring program for the Landfill Site (groundwater monitoring, gas monitoring and inspections of the Landfill cap and gas venting system) and as such, the DEIS is deficient in this regard.

c. During any installation of drainage piping and infiltration structures at the Site and in the vicinity of the Landfill, care must be taken to ensure that the Landfill cover is not disturbed or breached.

d. Notably absent from the DEIS is the distance between the Landfill and the outer edge of the excavation areas closest to the Landfill. This omission has a significant impact on the potential for disturbing the wastes in the Landfill and violating the restriction on development in the area of the Landfill. In the absence of details, we cannot comment fully on this issue and as such, the DEIS is deficient in this regard. USEPA must be involved in evaluating Site development plans with respect to impacts on the Landfill.

e. The landfill deed restrictions prohibit the construction of permanent buildings on top of Landfill cap. The DEIS indicates that the Great Park would allow the

installation of temporary structures that would not jeopardize the integrity of the Landfill cover. However, the DEIS fails to provide specific details on what constitutes an acceptable temporary structure. In the absence of such specifications, it is entirely possible that an unacceptable structure which is more like a permanent building would be installed at some point in the future and impact the Landfill cap. Such omissions are contrary to the deed restrictions on the Landfill which must be enforced by USEPA and the Town.

f. The DEIS does not acknowledge that construction of the Great Park on top of the Landfill could be considered a permanent installation which would prevent inspection of the cap and the weight of the overlying material used to construct the Great Park would impact the integrity of the cap. As such, the DEIS is deficient in this regard.

g. The DEIS does not specify that a New York State Licensed landscape architect with knowledge of Long Island plant species must select all plantings for the Site. Plantings at Syosset Park must be selected carefully to ensure that the root systems do not penetrate the landfill cover, per the deed restrictions in place for the former Syosset Landfill site.

h. The DEIS (p. 576-577) indicates that existing asphalt and concrete paved areas located above the Landfill cap would be demolished and recycled on-site during construction. This activity poses a significant threat to the integrity of the Landfill cap. The DEIS does not provide details on how the Landfill cap would be protected during surface demolition and as such, the DEIS is deficient in this regard.

i. The Town may have placed asphalt or concrete over the Landfill cover in step with Town operations conducted since the cap was installed. The DEIS does not address the methods to be used to distinguish between the various Landfill cover types (i.e., asphalt, recycled concrete or vegetated topsoil) installed over the Landfill and to assess the current condition of the cap beyond visual observation of the surface. The DEIS does not propose additional investigation prior to construction in order to determine the current thickness of the Landfill cap and how it has changed through settlement over the years, nor does it address how vibration during construction would impact the cap. The DEIS does not provide adequate measures to prevent penetration of the cap to ensure its integrity as required by the deed restrictions and as such, the DEIS is deficient in this regard.

j. The DEIS (p. 629) indicates that inspections of the Landfill cap would continue, however it does not address how this would be possible once the Great Park is constructed over the Landfill cap and as such, the DEIS is deficient in this regard.

k. The most recent USEPA Five-Year Review report (2017) for the Syosset Landfill summarizes the findings of cap inspections conducted by the Town. Some areas of the Landfill cap were determined to have cracks and water ponding which calls into question the integrity of the cover system. The DEIS does not address measures to ensure that the Landfill cap is intact before the Great Park is constructed and as such, the DEIS is deficient in this regard.

l. The 2017 USEPA Five-Year Review report for the Syosset Landfill approved reducing the frequency of required monitoring and inspections as follows: groundwater monitoring schedule changed from annually (every four quarters) to every fifth quarter and landfill cap, vent system and drainage system inspections from quarterly to semi-annual. Given the proposed Syosset Park development, at a minimum, the Landfill monitoring and inspection program should be restored to the original frequencies USEPA required for the Landfill immediately after the cap was installed to allow timely response to any impacts associated with the development and change in site use.

6. Excavation and Soil Handling Concerns

The primary contaminants of concern are copper, cyanide and several SVOCs based on the results of recent sampling performed at the former Cerro Site as compared to the NYSDEC RRSCOs. Information on health risks posed by the contaminants of concern is available from USEPA, the Agency for Toxic Substances and Disease Registry (ATSDR), and other sources of risk-based information. Copies of health-based fact sheets for the primary contaminants of concern identified at the Cerro Site (copper and cyanide) are attached. The Town of Oyster Bay must consider current risk-based information when evaluating the proposed Syosset Park development plans and DEIS, particularly in regards to the potential impacts to a vulnerable population of school children.

a. The DEIS (p. xviii) indicates that most recent 2015 soil investigation conducted at the former Cerro Site found copper, lead and zinc in soil samples at concentrations exceeding the respective Restricted Residential Soil Cleanup Objectives (RRSCOs) set forth in NYSDEC Part 375. The BCP Remedial Work Plan to be developed for the Cerro Site must compare the available soil data to the more stringent Residential SCOs and Unrestricted Use SCOs for these

contaminants (except cyanide, which has the same SCO for all three categories) given the proposed Site use.

b. Roux's 2015 Soil Investigation report (p. 6) states that the developer intends to reuse as much soil excavated during the work as possible to minimize the amount of soil that would be brought on or off the Site. The report references DER-10 soil reuse sampling parameters and sampling frequency. The DEIS fails to recognize that all soil related to the Site construction must comply with NYSDEC's updated Part 360 solid waste regulations. Any soil excavated on-site must be characterized and evaluated in accordance with the new NYSDEC Part 360 solid waste regulations to determine which soil (if any) can be reused on-site. Future soil analytical data would also provide additional information to evaluate impacts associated with contaminant migration in dust and storm water.

c. The DEIS does not provide for a full assessment of the fill material to be placed on top of the capped Landfill for the Great Park. This fill material must be characterized in accordance with the Part 360 sampling frequency and chemical composition requirements which dictate standards for limited use and restricted use fill.

d. The DEIS does not provide detail on the proposed excavation procedures that would be used at the property where widespread residual soil contamination remains. An Excavated Materials Disposal Plan must be developed to detail characterization and appropriate handling of excavated soils (based on recent NYSDEC Part 360 solid waste regulations), including re-use as on-site fill and off-site disposal.

7. General Construction Concerns

Construction impacts on South Grove School would be inevitable during the anticipated five-year build out of the Syosset Park Site if the proposed development moves ahead. K-5 students are a vulnerable population and their health, safety, and learning would be significantly impacted by the development of the Syosset Park Site. The School must be protected using the best available methods during construction to ensure that the well-being of the students, staff and visitors at South Grove School and throughout the District is not jeopardized.

a. The DEIS does not address establishing an adequate buffer between the construction areas adjacent to South Grove School and the School itself to minimize disturbance to the learning environment and K-5 students.

b. The DEIS does not establish a construction schedule that would not interrupt the outdoor recreation time (recess, physical education and other outdoor activities) which is vital to the students at South Grove School.

c. The DEIS proposes weekday construction from 7:00 AM to 3:00 PM, which spans the entire school day. The DEIS fails to acknowledge the possibility of scheduling construction after school hours, especially those activities which generate the most disturbance (i.e., dust, noise, vibration), while considering other community concerns.

d. The DEIS indicates that construction of the Great Park depends on when the Town of Oyster Bay vacates its existing on-site operations. The Construction Schedule presented in DEIS Appendix B does not specify the timeframe or duration of the Great Park construction activity. Given the lack of detail related to the Great Park construction schedule, we cannot comment fully on the potential impacts to the District and as such, the DEIS is deficient in this regard.

e. The DEIS does not address how the existing Landfill groundwater monitoring wells and gas vent wells would be integrated with the landscape of the Great Park while remaining accessible for long-term inspections and monitoring. The gas vent wells are currently protected by concrete dry well rings; this configuration would obviously be altered. By failing to provide details on these monitoring items, the DEIS is deficient in this regard.

8. Noise and Vibration Concerns

The DEIS does not provide sufficient detail on the noise and vibration impacts that would occur during the prolonged construction period, or the measures proposed to mitigate these impacts and as such, the DEIS is deficient in this regard.

a. The DEIS does not sufficiently detail restricting work hours at the primary means of noise mitigation.
    i. Construction that produces excessive noise and/or vibration (acceptable levels would obviously be disputed by the involved and affected parties) must not be performed during black-out days and hours. An acceptable construction calendar would have to be developed with agreement by all parties, including the District.

b. The Plans in DEIS Appendix O show 12-foot high perimeter walls to be installed along Miller Lane and the LIRR. The DEIS fails to consider a noise mitigation barrier adjacent to the School. A similar wall (like the noise walls along the LIE) installed along the South Grove School property boundary adjacent to the Site would act as a noise barrier, however its effectiveness in reducing noise impacts on the School would have to be evaluated further based on modeling.

c. Pile driving noise limits must be established and a third-party independent engineer with authority to shut down the work must be on-site during pile driving activities.

d. In order to help mitigate noise from the project area, tall evergreen trees must be planted prior to construction in the Great Park along the fence that abuts the School property.

e. The DEIS does not indicate that sheet pile driving would be restricted to periods when school is not in session. This would be required to reduce the impact noise generated during the pile driving activities, which has a greater impact on student learning capabilities than other elevated noise levels.

f. The DEIS fails to acknowledge that all noise assessments would also include the American National Standard Institute (ANSI) standard for classroom noise, as indicated at: https://www.asha.org/public/hearing/American-National-Standard-on-Classroom-Acoustics/. Noise measurements inside classrooms must be periodically scheduled during the construction phase to ensure compliance with the ANSI standards.

g. The DEIS does not detail a noise monitoring program for the construction phase and as such is deficient in this regard.

9. Traffic Concerns

The Syosset Park development would result in increased traffic during construction and due to the future mixed residential/commercial Site use. The traffic controls presented in the DEIS do not adequately address the traffic impacts on the District Schools.

a. The only traffic-related measure proposed in the vicinity of Robbins Lane School is the installation of new sidewalks on both sides of Robbins Lane from Aerial Way to Jericho Turnpike (DEIS p. xi). The DEIS fails to provide for additional upgrades to enhance safety (i.e., supplement with additional traffic controls, speed

humps, traffic calming, dedicated left turn lane into entrance, add a traffic signal at the entrance driveway) in order to protect students, teachers, staff and visitors to Robbins Lane School given the increased traffic associated with Syosset Park.

b. The DEIS indicates that truck traffic along Robbins Lane would be the main route for access to the Site (materials, equipment, workers), increasing the potential for accidents during hours when students are being dropped off and picked up from Robbins Lane School.
    i. Truck traffic for construction at Syosset Park must be restricted from the north via Jericho Turnpike/Robbins Lane. All construction vehicles and material deliveries must be required to come off the LIE and access the Site via Miller Place or the south Robbins Lane entrance; such truck traffic must not be allowed to travel north of the LIRR crossing.

10. Air Quality Concerns

The proposed Syosset Park Site development would impact air quality due to construction activity and as well as vehicle use associated with the mixed residential/commercial Site use. Gas emissions from the Landfill also factor into the air quality evaluation.

a. Radon and methane monitoring must be performed during construction and over the long-term along the perimeter of the former Landfill where it runs along the boundary between Syosset Park and South Grove School to identify any radon or methane impacts due to the Syosset Park development. This monitoring would indicate if remedial measures are needed using health-based action levels established by regulatory agencies for radon and methane.

b. Vehicles for any Site construction must be clean diesel or low emissions vehicles to minimize air pollution/ozone depletion during the anticipated five-year construction period.

c. The DEIS air modeling spreadsheets included in Appendix P and discussed on DEIS p. 601 fail to provide a complete air modeling report that supports a comprehensive review of the calculations/assumptions and interpretation of the results. The DEIS model results for construction are not representative of the anticipated exposure periods (8-hour daily construction period). Modeling exposure levels over 24-hours "dilutes" the predicted actual impacts which would occur over 8 hours.

d. The DEIS indicates that asphalt recycling would be performed at the Site during construction. While the DEIS (p. 577) indicates that asphalt recycling operation would be located in a designated area "away from the school", in the absence of sufficient details, we cannot comment fully on the air quality impacts associated with this item.

e. The DEIS Appendix P Air modeling sheets mention "Phase 1 – Brownfield remediation at Cerro, remove landfill debris and spoil pile from DPW/Landfill", however, no further information is provided on what the various tasks entail. The tasks are not described in detail and there appears to be very limited information related to the Great Park construction and schedule for work. Given the lack of detail, we cannot comment fully on this item.

11. Concerns Related to Monitoring and Inspections During Construction at Syosset Park

Given the scope of the proposed Site development plan, all aspects of construction must be managed, monitored and inspected by an independent third-party team whose members are licensed and qualified to perform the required tasks, understand the potential impacts, and are not affiliated with any of the involved parties.

a. The DEIS (p. xiii) states, "The Applicant is proposing to hire a Construction Manager to coordinate all construction activities." The DEIS does not acknowledge that anyone involved in monitoring or inspecting the work must be an independent third-party to avoid potential conflicts of interest. The Construction Manager must be a licensed New York State Professional Engineer with the authority to immediately stop work and order changes in work practices as necessary. The Construction Manager must provide daily reports and updates (when problems occur) to the Town and District.

b. The 2016 Administrative Settlement Agreement between USEPA and the Site Owner designates a "Respondent's approved Project Coordinator" to oversee any actions that may impact the Landfill during the redevelopment project. This Agreement designates Charles McGuckin of Roux Associates, Inc. (Roux) as the Project Coordinator for the Site Owner. Roux was on the team involved in preparing the DEIS and has also performed investigation activities at the Site on behalf of the Site Owner.

c. The DEIS does not indicate that an independent inspection team must be on-site at all times during construction to ensure that the Landfill cap is not breached or impacted in any way. These inspectors must supplement the team of qualified air

monitors, E&SC inspectors, etc. to fully cover all construction work at the Site. The number of inspectors may vary depending on the scope of the construction activities at any time. The number of inspectors must always be sufficient to monitor the construction in progress.

d. The independent on-site monitoring/inspection team must be independent, qualified professionals with experience and certifications as needed to perform the assigned tasks. The team would be led by a licensed New York State Professional Engineer at the Site during all construction. This team cannot be not retained by the construction contractors or developer. It can be a collaboration between Town, County, NYSDEC and USEPA, assembled by interested parties, or a firm that has no ties to the developer, contractors or other parties with an interest in the Site or community. The most important thing is to ensure there is no conflict of interest which could sway the monitoring/inspection program one way or the other. The monitoring/inspection program would be funded by monies set aside by the developer and would report to the Town and District.

e. The air monitors and construction inspectors must have the authority to immediately shut down construction based on monitoring results or any observed improper construction activities.

12. Soil Vapor Intrusion Concerns

Soil vapor sampling has been performed at the Cerro Wire site per the Brownfields RIWP. There are no Federal or New York State standards for acceptable soil gas concentrations. Volatile organic contaminants in soil vapor are a concern with respect to soil vapor intrusion and impacts on indoor air quality in buildings. The BCP investigation results must be evaluated and supplemented with additional soil vapor sampling along the perimeter of the Landfill adjacent to South Grove School to adequately assess potential impacts.

a. The DEIS does not address the potential need for soil vapor barriers in new buildings at the Site.

b. If soil vapor sampling results indicate there is a risk of soil vapor intrusion at the Syosset Park Site and neighboring properties, vapor barriers must be incorporated into the Site development plans. In addition, sub-slab depressurization systems must be designed and installed to protect South Grove School and other properties as needed to prevent soil vapor intrusion and associated indoor air impacts.

13. School Security Concerns

Due to factors such as the multitude of on-site personnel that would be working on the Site every day, frequent deliveries made by various individuals that are typical for construction projects, and the increase of pedestrian traffic that the development would allow, the proximity of the Project, including the Great Park, to South Grove School presents a security risk to the District.

a. The DEIS indicates that there would be pedestrian access to the Great Park at the end of Gordon Drive. The DEIS does not provide adequate details on the barrier proposed to prevent access to South Grove School from the Great Park, so we cannot comment fully on this item.
    i. A secure barrier fence must be installed between the Site and South Grove School for security, to maintain a buffer, and to establish a visual screen from the construction site. Refer to the possibility of installing a 12-foot high wall as discussed previously.

Miscellaneous Comments on DEIS

While Walden's review has focused on potential environmental impacts on Syosset CSD facilities, as part of our review of the DEIS, we have identified a number of other issues as noted below.

1. The DEIS Appendix D Conceptual Master Plan does not clearly identify the adjacent South Grove School property; the text label is blurred and should be sharpened.

2. Available parking at South Grove School (for teachers, staff and parents) is near capacity under current enrollment and would only be exacerbated the expansion of school facilities and teachers/staff required to accommodate the projected increase in students due to the Syosset Park development plans.

3. Development at the Site would displace rodents/vectors which currently occupy the overgrown vacant portions of the Site. The DEIS does not provide any details on proposed rodent/vector control, therefore, we cannot comment fully on how the project would prevent rodents/vectors from expanding their territory into the surrounding community, including Syosset CSD facilities.

4. The DPW Site is the Town's primary base for DPW and Highway operations. When the Town has to hand over the site for the Syosset Park development, where does the Town

plan to relocate the essential operations currently managed from the Site and how does it plan to maintain the level of service currently provided from this central location? How would this impact the snow removal, trash collection and other services provided by the Town which impact District operations?

5. The DEIS indicates that the Great Park would be managed by the Town. Some concerns related to the Great Park involve controlling public access, security, hours of use, etc. Does the Town have the resources to manage an additional park? Would the Town ensure that the developer offsets any Town costs related to the Great Park? How will the Town adjust Park Districts and assign costs associated with managing the Great Park to the taxpayers/residents within the Park District?

6. The density of development of Syosset Park outside the proposed 30-acre Great Park is much greater than the development allowed by zoning in other communities throughout the Town. Is the Town willing to approve the proposed zoning change, thereby setting a precedent for allowing such density in other areas of the Town?

7. The DEIS claims that the project would "reduce energy consumption and combustion of fossil fuels" (p. xii), failing to recognize the overall increase in vehicles that would result from residents, workers, shoppers, etc. that would live and visit the Site which is now vacant (aside from the Town operations) and does not consume energy and fossil fuels. While the concept of a walkable community is commendable, the development's net impact on energy consumption and fossil fuel combustion would be significant compared to current conditions.

8. Landscape Drawing L-501 in Appendix B: Section 1 shows Townhomes built above retaining walls 5 ft high and 11.5 ft high on either side of the road. It looks as if the road is in a valley. How does the plan propose to manage storm water in this area and similarly constructed parts of the development?

9. Walden has reached out to the NYSDEC and USEPA project managers for the Cerro and Syosset Landfill Sites on behalf of the District to establish a dialogue regarding concerns related to proposed development of these Sites.

10. The Town of Oyster Bay is arranging to conduct independent testing of the proposed development Site to investigate any residual contamination. This scope of this work should include samples along the perimeter of the Site in the vicinity of South Grove Elementary to confirm if a potential impact to the health and safety of the students and staff of the school, as well as to the adjacent residential properties exists. If requested, Walden would be happy to consult with Syosset Central School District to develop

recommendations for an appropriate and comprehensive scope of sampling to ensure the students and staff of the Syosset Central School District are protected.

The independent third-party testing should be conducted by independent, qualified professionals with the experience and certifications needed to perform the assigned tasks. The team would be led by a licensed New York State Professional Engineer at the Site during all construction. This team cannot be not retained by the developer or have any conflicts including having performed previous work at the property. The most important thing is to ensure there is no conflict of interest which could sway the investigation one way or the other.

Walden is available to discuss these comments at your convenience. Please call if you have any questions.

Very truly yours,
Walden Environmental Engineering, PLLC

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)

HEALTH-BASED FACT SHEETS FOR COPPER AND CYANIDE

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

COPPER
CAS # 7440-50-8

Division of Toxicology ToxFAQs™ **September 2004**

This fact sheet answers the most frequently asked health questions (FAQs) about copper. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Copper is a metal that occurs naturally in the environment, and also in plants and animals. Low levels of copper are essential for maintaining good health. High levels can cause harmful effects such as irritation of the nose, mouth and eyes, vomiting, diarrhea, stomach cramps, nausea, and even death. Copper has been found in at least 906 of the 1,647 National Priority Sites identified by the Environmental Protection Agency (EPA).

What is copper?

Copper is a metal that occurs naturally throughout the environment, in rocks, soil, water, and air. Copper is an essential element in plants and animals (including humans), which means it is necessary for us to live. Therefore, plants and animals must absorb some copper from eating, drinking, and breathing.

Copper is used to make many different kinds of products like wire, plumbing pipes, and sheet metal. U.S. pennies made before 1982 are made of copper, while those made after 1982 are only coated with copper. Copper is also combined with other metals to make brass and bronze pipes and faucets.

Copper compounds are commonly used in agriculture to treat plant diseases like mildew, for water treatment and, as preservatives for wood, leather, and fabrics.

What happens to copper when it enters the environment?

❏ Copper is released into the environment by mining, farming, and manufacturing operations and through waste water releases into rivers and lakes. Copper is also released from natural sources, like volcanoes, windblown dusts, decaying vegetation, and forest fires.

❏ Copper released into the environment usually attaches to particles made of organic matter, clay, soil, or sand.

❏ Copper does not break down in the environment. Copper compounds can break down and release free copper into the air, water, and foods.

How might I be exposed to copper?

❏ You may be exposed to copper from breathing air, drinking water, eating foods, or having skin contact with copper, particulates attached to copper, or copper-containing compounds.

❏ Drinking water may have high levels of copper if your house has copper pipes and acidic water.

❏ Lakes and rivers that have been treated with copper compounds to control algae, or that receive cooling water from power plants, can have high levels of copper. Soils can also contain high levels of copper, especially if they are near copper smelting plants.

❏ You may be exposed to copper by ingesting copper-containing fungicides, or if you live near a copper mine or where copper is processed into bronze or brass.

❏ You may be exposed to copper if you work in copper mines or if you grind metals containing copper.

How can copper affect my health?

Everyone must absorb small amounts of copper every day because copper is essential for good health. High levels of copper can be harmful. Breathing high levels of copper can cause irritation of your nose and throat. Ingesting high levels of copper can cause nausea, vomiting, and diarrhea. Very-high doses of copper can cause damage to your liver and kidneys, and can even cause death.

How likely is copper to cause cancer?

We do not know whether copper can cause cancer in humans. The EPA has determined that copper is not classifiable as to human carcinogenicity.

How can copper affect children?

Exposure to high levels of copper will result in the same type of effects in children and adults. We do not know if these effects would occur at the same dose level in children and adults. Studies in animals suggest that the young children may have more severe effects than adults, but we don't know if this would also be true in humans. There is a very small percentage of infants and children who are unusually sensitive to copper.

We do not know if copper can cause birth defects or other developmental effects in humans. Studies in animals suggest that high levels of copper may cause a decrease in fetal growth.

How can families reduce the risk of exposure to copper?

The most likely place to be exposed to copper is through drinking water, especially if your water is corrosive and you have copper pipes in your house. The best way to lower the level of copper in your drinking water is to let the water run for at least 15 seconds first thing in the morning before drinking or using it. This reduces the levels of copper in tap water dramatically.

If you work with copper, wear the necessary protective clothing and equipment, and always follow safety procedures. Shower and change your clothes before going home each day.

Is there a medical test to show whether I've been exposed to copper?

Copper is found throughout the body; in hair, nails, blood, urine, and other tissues. High levels of copper in these samples can show that you have been exposed to higher-than normal levels of copper. These tests cannot tell whether you will experience harmful effects. Tests to measure copper levels in the body are not usually available at a doctor's office because they require special equipment, but the doctor can send samples to a specialty laboratory.

Has the federal government made recommendations to protect human health?

The EPA requires that levels of copper in drinking water be less than 1.3 mg of copper per one liter of drinking water (1.3 mg/L).

The U.S. Department of Agriculture has set the recommended daily allowance for copper at 900 micrograms of copper per day (µg/day) for people older than eight years old.

The Occupational Safety and Health Administration (OSHA) requires that levels of copper in the air in workplaces not exceed 0.1 mg of copper fumes per cubic meter of air ($0.1\ mg/m^3$) and $1.0\ mg/m^3$ for copper dusts.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. Toxicological Profile for Copper. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CYANIDE

CAS# 74-90-8, 143-33-9, 151-50-8, 592-01-8, 544-92-3, 506-61-6, 460-19-5, 506-77-4

Division of Toxicology and Environmental Medicine ToxFAQs™ **July 2006**

This fact sheet answers the most frequently asked health questions (FAQs) about cyanide. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to high levels of cyanide harms the brain and heart, and may cause coma and death. Exposure to lower levels may result in breathing difficulties, heart pains, vomiting, blood changes, headaches, and enlargement of the thyroid gland. Cyanide has been found in at least 471 of the 1,662 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is cyanide?

Cyanide is usually found joined with other chemicals to form compounds. Examples of simple cyanide compounds are hydrogen cyanide, sodium cyanide and potassium cyanide. Certain bacteria, fungi, and algae can produce cyanide, and cyanide is found in a number of foods and plants. In certain plant foods, including almonds, millet sprouts, lima beans, soy, spinach, bamboo shoots, and cassava roots (which are a major source of food in tropical countries), cyanides occur naturally as part of sugars or other naturally-occurring compounds. However, the edible parts of plants that are eaten in the United States, including tapioca which is made from cassava roots, contain relatively low amounts of cyanide.

Hydrogen cyanide is a colorless gas with a faint, bitter, almond-like odor. Sodium cyanide and potassium cyanide are both white solids with a bitter, almond-like odor in damp air. Cyanide and hydrogen cyanide are used in electroplating, metallurgy, organic chemicals production, photographic developing, manufacture of plastics, fumigation of ships, and some mining processes.

What happens to cyanide when it enters the environment?

❑ Cyanide enters air, water, and soil from both natural processes and industrial activities.

❑ In air, cyanide is mainly found as gaseous hydrogen cyanide; a small amount is present as fine dust particles.

❑ The half-life (the time needed for half of the material to be removed) of hydrogen cyanide in the atmosphere is about 1–3 years.

❑ Most cyanide in surface water will form hydrogen cyanide and evaporate.

❑ Cyanide in water does not build up in the bodies of fish.

❑ Cyanides are fairly mobile in soil. Once in soil, cyanide can be removed through several processes. Some cyanide compounds in soil can form hydrogen cyanide and evaporate, whereas some cyanide compounds will be transformed into other chemical forms by microorganisms in soil. At the high concentrations, cyanide becomes toxic to soil microorganisms. Because these microorganisms can no longer change cyanide to other chemical forms, cyanide is able to passes through soil into underground water.

How might I be exposed to cyanide?

❑ Breathing air, drinking water, touching soil, or eating foods that contain cyanide.

❑ Smoking cigarettes and breathing smoke-filled air during fires are major sources of cyanide exposure.

❑ Breathing air near a hazardous waste site containing cyanide.

❑ Eating foods naturally containing cyanide compounds, such as tapioca (made from cassava roots), lima beans, and almonds. However, the portions of these plants that are eaten in the United States contain relatively low amounts of cyanide.

How can cyanide affect my health?

You are not likely to be exposed to large enough amounts of cyanide in the environment to cause adverse health effects. The severity of the harmful effects following cyanide exposure

depends in part on the form of cyanide, such as hydrogen cyanide gas or cyanide salts. Exposure to high levels of cyanide for a short time harms the brain and heart and can even cause coma and death. Workers who inhaled low levels of hydrogen cyanide over a period of years had breathing difficulties, chest pain, vomiting, blood changes, headaches, and enlargement of the thyroid gland.

Some of the first indications of cyanide poisoning are rapid, deep breathing and shortness of breath, followed by convulsions (seizures) and loss of consciousness. These symptoms can occur rapidly, depending on the amount eaten. The health effects of large amounts of cyanide are similar, whether you eat, drink, or breathe it; cyanide uptake into the body through the skin is slower than these other means of exposure. Skin contact with hydrogen cyanide or cyanide salts can irritate and produce sores.

How likely is cyanide to cause cancer?

There are no reports that cyanide can cause cancer in people or animals. EPA has determined that cyanide is not classifiable as to its human carcinogenicity.

How can cyanide affect children?

Effects reported in exposed children are like those seen in exposed adults. Children who ate large quantities of apricot pits, which naturally contain cyanide as part of complex sugars, had rapid breathing, low blood pressure, headaches, and coma, and some died. Cyanide has not been reported to directly cause birth defects in people. However, among people in the tropics who eat cassava root, children have been born with thyroid disease because of the mothers' exposure to cyanide and thiocyanate during pregnancy. Birth defects occurred in rats that ate cassava root diets, and harmful effects on the reproductive system occurred in rats and mice that drank water containing sodium cyanide.

How can families reduce the risk of exposure to cyanide?

Families can reduce their exposure to cyanide by not breathing in tobacco smoke, which is the most common source of cyanide exposure for the general population. In the event of a building fire, families should evacuate the building immediately, because smoke from burning plastics contains cyanide (and carbon monoxide). Breathing this smoke can lead to unconsciousness or death. Cyanide in smoke can arise from the combustion of certain plastics (e.g., polyacrylamines, polyacrylics, polyurethane, etc.).

Compounds that release cyanide are naturally present in plants. The amounts are usually low in the edible portion but are higher in cassava. Pits and seeds of common fruits, such as apricots, apples, and peaches, may have substantial amounts of cyanide-releasing chemicals, so people should avoid eating these pits and seeds to prevent accidental cyanide poisoning.

Is there a medical test to show whether I've been exposed to cyanide?

There are medical tests to measure blood and urine levels of cyanide; however, small amounts of cyanide are always detectable in blood and urine. Tissue levels of cyanide can be measured if cyanide poisoning is suspected, but cyanide is rapidly cleared from the body, so the tests must be done soon after the exposure. An almond-like odor in the breath may alert a physician that a person was exposed to cyanide.

Has the federal government made recommendations to protect human health?

EPA regulates the levels of cyanide that are allowable in drinking water. The highest level of cyanide allowed in drinking water is 0.2 parts cyanide per 1 million parts of water (0.2 ppm).

The Occupational Safety and Health Administration (OSHA) has set a limit for hydrogen cyanide and most cyanide salts of 10 parts cyanide per 1 million parts of air (10 ppm) in the workplace.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for Cyanide (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.