

**Sustainable
Management
LLC**

**Environmental Analysis
Transportation
Planning
Development Consulting
Real Estate Analysis
and
HazMat Investigation**

**Environmental Assessment Statement
Parts I and II**



Maimonides Modification

**901-915 49th Street
902-916 48th Street
Brooklyn, NY 11220
CEQR No. 14DCP109K
ULURP No. M 030252 (A) ZAK**

**Sustainable Management LLC
1370 Broadway
5th Floor
New York, NY 10018
(646) 380-1940
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March 24, 2014



City Environmental Quality Review

ENVIRONMENTAL ASSESSMENT STATEMENT (EAS) FULL FORM

Please fill out and submit to the appropriate agency ([see instructions](#))**Part I: GENERAL INFORMATION****PROJECT NAME** Maimonides Modification**1. Reference Numbers**CEQR REFERENCE NUMBER (to be assigned by lead agency)
14DCP109KBSA REFERENCE NUMBER (if applicable)
N/AULURP REFERENCE NUMBER (if applicable)
M 030252 (A) ZAKOTHER REFERENCE NUMBER(S) (if applicable)
(e.g., legislative intro, CAPA) N/A**2a. Lead Agency Information**NAME OF LEAD AGENCY
New York City Planning CommissionNAME OF LEAD AGENCY CONTACT PERSON
Robert Dobruskin

ADDRESS 22 Reade Street, Room 4E

CITY New York

STATE NY

ZIP 10007

TELEPHONE 212-720-3423

EMAIL

rdobrus@planning.nyc.gov

2b. Applicant InformationNAME OF APPLICANT
Maimonides Medical CenterNAME OF APPLICANT'S REPRESENTATIVE OR CONTACT PERSON
Sustainable Management LLC., Chunyuan Li

ADDRESS 1370 Broadway, 5th Floor

CITY New York

STATE NY

ZIP 10018

TELEPHONE 646-380-1939

EMAIL eceali@aol.com

3. Action Classification and Type**SEQRA Classification** UNLISTED TYPE I: Specify Category (see 6 NYCRR 617.4 and NYC Executive Order 91 of 1977, as amended): Section 6-15(a)(1)(iii) of Executive Order No. 91**Action Type** (refer to [Chapter 2](#), "Establishing the Analysis Framework" for guidance) LOCALIZED ACTION, SITE SPECIFIC LOCALIZED ACTION, SMALL AREA GENERIC ACTION**4. Project Description**

A minor modification of the approved site plan for an existing Large Scale Community Facility Development Plan to include a proposed 7-story plus mechanical penthouse building Use Group 4 ambulatory diagnostic and treatment health care uses.

Project Location

BOROUGH Brooklyn

COMMUNITY DISTRICT(S) 12

STREET ADDRESS 901-913 49th St & 902-916 48th St

TAX BLOCK(S) AND LOT(S) Blk 5631 Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77 & 78. The Proposed Action includes incorporation of Tax Lots 71 and 73 and 65, 69, and p/o 38.

ZIP CODE 11220

DESCRIPTION OF PROPERTY BY BOUNDING OR CROSS STREETS The project site is bordered by 10th Ave., 49th Street, 9th Ave. & 48th Street

EXISTING ZONING DISTRICT, INCLUDING SPECIAL ZONING DISTRICT DESIGNATION, IF ANY R6

ZONING SECTIONAL MAP NUMBER 22c

5. Required Actions or Approvals (check all that apply)**City Planning Commission:** YES NO UNIFORM LAND USE REVIEW PROCEDURE (ULURP) CITY MAP AMENDMENT ZONING CERTIFICATION CONCESSION ZONING MAP AMENDMENT ZONING AUTHORIZATION UDAAP ZONING TEXT AMENDMENT ACQUISITION—REAL PROPERTY REVOCABLE CONSENT SITE SELECTION—PUBLIC FACILITY DISPOSITION—REAL PROPERTY FRANCHISE HOUSING PLAN & PROJECT OTHER, explain: Modification of authorization SPECIAL PERMIT (if appropriate, specify type: modification; renewal; other); EXPIRATION DATE:

SPECIFY AFFECTED SECTIONS OF THE ZONING RESOLUTION

Board of Standards and Appeals: YES NO VARIANCE (use) VARIANCE (bulk) SPECIAL PERMIT (if appropriate, specify type: modification; renewal; other); EXPIRATION DATE:

SPECIFY AFFECTED SECTIONS OF THE ZONING RESOLUTION N/A	
Department of Environmental Protection: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If "yes," specify: Remedial Action Plan and Construction Health and Safety Plan	
Other City Approvals Subject to CEQR (check all that apply)	
<input type="checkbox"/> LEGISLATION	<input type="checkbox"/> FUNDING OF CONSTRUCTION, specify:
<input type="checkbox"/> RULEMAKING	<input type="checkbox"/> POLICY OR PLAN, specify:
<input type="checkbox"/> CONSTRUCTION OF PUBLIC FACILITIES	<input type="checkbox"/> FUNDING OF PROGRAMS, specify:
<input type="checkbox"/> 384(b)(4) APPROVAL	<input checked="" type="checkbox"/> PERMITS, specify: Modification of LSCFD
<input type="checkbox"/> OTHER, explain:	
Other City Approvals Not Subject to CEQR (check all that apply)	
<input type="checkbox"/> PERMITS FROM DOT'S OFFICE OF CONSTRUCTION MITIGATION AND COORDINATION (OCMC)	<input type="checkbox"/> LANDMARKS PRESERVATION COMMISSION APPROVAL
<input type="checkbox"/> OTHER, explain:	
State or Federal Actions/Approvals/Funding: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If "yes," specify:	
6. Site Description: <i>The directly affected area consists of the project site and the area subject to any change in regulatory controls. Except where otherwise indicated, provide the following information with regard to the directly affected area.</i>	
Graphics: <i>The following graphics must be attached and each box must be checked off before the EAS is complete. Each map must clearly depict the boundaries of the directly affected area or areas and indicate a 400-foot radius drawn from the outer boundaries of the project site. Maps may not exceed 11 x 17 inches in size and, for paper filings, must be folded to 8.5 x 11 inches.</i>	
<input checked="" type="checkbox"/> SITE LOCATION MAP	<input checked="" type="checkbox"/> ZONING MAP
<input checked="" type="checkbox"/> TAX MAP	<input type="checkbox"/> FOR LARGE AREAS OR MULTIPLE SITES, A GIS SHAPE FILE THAT DEFINES THE PROJECT SITE(S)
<input checked="" type="checkbox"/> PHOTOGRAPHS OF THE PROJECT SITE TAKEN WITHIN 6 MONTHS OF EAS SUBMISSION AND KEYED TO THE SITE LOCATION MAP	<input checked="" type="checkbox"/> SANBORN OR OTHER LAND USE MAP
Physical Setting (both developed and undeveloped areas)	
Total directly affected area (sq. ft.): 29,152.4	Waterbody area (sq. ft.) and type: 0
Roads, buildings, and other paved surfaces (sq. ft.): 29,152.4	Other, describe (sq. ft.):
7. Physical Dimensions and Scale of Project (if the project affects multiple sites, provide the total development facilitated by the action)	
SIZE OF PROJECT TO BE DEVELOPED (gross square feet): 201,563	
NUMBER OF BUILDINGS: 1	GROSS FLOOR AREA OF EACH BUILDING (sq. ft.): 201,563
HEIGHT OF EACH BUILDING (ft.): 116	NUMBER OF STORIES OF EACH BUILDING: 7
Does the proposed project involve changes in zoning on one or more sites? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify: The total square feet owned or controlled by the applicant:	
The total square feet not owned or controlled by the applicant:	
Does the proposed project involve in-ground excavation or subsurface disturbance, including, but not limited to foundation work, pilings, utility lines, or grading? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
If "yes," indicate the estimated area and volume dimensions of subsurface disturbance (if known):	
AREA OF TEMPORARY DISTURBANCE: 29,152.4 sq. ft. (width x length)	VOLUME OF DISTURBANCE: 845,328 cubic ft. (width x length x depth)
AREA OF PERMANENT DISTURBANCE: 29,152.4 sq. ft. (width x length)	
8. Analysis Year CEQR Technical Manual Chapter 2	
ANTICIPATED BUILD YEAR (date the project would be completed and operational): 2016	
ANTICIPATED PERIOD OF CONSTRUCTION IN MONTHS: 18-24	
WOULD THE PROJECT BE IMPLEMENTED IN A SINGLE PHASE? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF MULTIPLE PHASES, HOW MANY?	
BRIEFLY DESCRIBE PHASES AND CONSTRUCTION SCHEDULE: Project is an 18-24-month single phase duration.	
9. Predominant Land Use in the Vicinity of the Project (check all that apply)	
<input checked="" type="checkbox"/> RESIDENTIAL	<input type="checkbox"/> MANUFACTURING
<input type="checkbox"/> COMMERCIAL	<input type="checkbox"/> PARK/FOREST/OPEN SPACE
<input checked="" type="checkbox"/> OTHER, specify: Community facility	

DESCRIPTION OF EXISTING AND PROPOSED CONDITIONS

The information requested in this table applies to the directly affected area. The directly affected area consists of the project site and the area subject to any change in regulatory control. The increment is the difference between the No-Action and the With-Action conditions.

	EXISTING CONDITION	NO-ACTION CONDITION	WITH-ACTION CONDITION	INCREMENT
LAND USE				
Residential	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify the following:				
Describe type of residential structures				
No. of dwelling units				
No. of low- to moderate-income units				
Gross floor area (sq. ft.)				
Commercial	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify the following:				
Describe type (retail, office, other)				
Gross floor area (sq. ft.)				
Manufacturing/Industrial	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify the following:				
Type of use				
Gross floor area (sq. ft.)				
Open storage area (sq. ft.)				
If any unenclosed activities, specify:				
Community Facility	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If "yes," specify the following:				
Type	UG 4 health care uses	UG 4 health care uses	UG 4 health care uses	UG 4 health care uses
Gross floor area (sq. ft.)	53,992 gsf	185,278 gsf	209,519	24,241 gsf
Vacant Land	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," describe:				
Publicly Accessible Open Space	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify type (mapped City, State, or Federal parkland, wetland—mapped or otherwise known, other):				
Other Land Uses	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," describe:				
PARKING				
Garages	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
If "yes," specify the following:				
No. of public spaces				
No. of accessory spaces		150 spaces	263	113 spaces
Operating hours				
Attended or non-attended		Attended	Attended	
Lots	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If "yes," specify the following:				
No. of public spaces				
No. of accessory spaces	81 spaces	35 spaces	46 spaces	11 spaces
Operating hours				
Other (includes street parking)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," describe:				
POPULATION				
Residents	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify number:				
Briefly explain how the number of residents was calculated:				

	EXISTING CONDITION	NO-ACTION CONDITION	WITH-ACTION CONDITION	INCREMENT
Businesses	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If "yes," specify the following:				
No. and type				
No. and type of workers by business				
No. and type of non-residents who are not workers				
Briefly explain how the number of businesses was calculated:				
Other (students, visitors, concert-goers, etc.)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
If any, specify type and number:				
Briefly explain how the number was calculated:				
ZONING				
Zoning classification	R6; Large Scale Community Facility Development	R6; Large Scale Community Facility Development	R6; Large Scale Community Facility Development	R6; Large Scale Community Facility Development
Maximum amount of floor area that can be developed	Varied (See Project Description)	Varied (See Project Description)	Varied (See Project Description)	Varied (See Project Description)
Predominant land use and zoning classifications within land use study area(s) or a 400 ft. radius of proposed project	Varied (See Project Description)	Varied (See Project Description)	Varied (See Project Description)	Varied (See Project Description)
Attach any additional information that may be needed to describe the project.				
If your project involves changes that affect one or more sites not associated with a specific development, it is generally appropriate to include total development projections in the above table and attach separate tables outlining the reasonable development scenarios for each site.				

Part II: TECHNICAL ANALYSIS

INSTRUCTIONS: For each of the analysis categories listed in this section, assess the proposed project’s impacts based on the thresholds and criteria presented in the CEQR Technical Manual. Check each box that applies.

- If the proposed project can be demonstrated not to meet or exceed the threshold, check the “no” box.
- If the proposed project will meet or exceed the threshold, or if this cannot be determined, check the “yes” box.
- For each “yes” response, provide additional analyses (and, if needed, attach supporting information) based on guidance in the CEQR Technical Manual to determine whether the potential for significant impacts exists. Please note that a “yes” answer does not mean that an EIS must be prepared—it means that more information may be required for the lead agency to make a determination of significance.
- The lead agency, upon reviewing Part II, may require an applicant to provide additional information to support the Full EAS Form. For example, if a question is answered “no,” an agency may request a short explanation for this response.

	YES	NO
1. LAND USE, ZONING, AND PUBLIC POLICY: CEQR Technical Manual Chapter 4		
(a) Would the proposed project result in a change in land use different from surrounding land uses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Would the proposed project result in a change in zoning different from surrounding zoning?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) Is there the potential to affect an applicable public policy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) If “yes,” to (a), (b), and/or (c), complete a preliminary assessment and attach.		
(e) Is the project a large, publicly sponsored project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes,” complete a PlaNYC assessment and attach.		
(f) Is any part of the directly affected area within the City’s Waterfront Revitalization Program boundaries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes,” complete the Consistency Assessment Form .		
2. SOCIOECONOMIC CONDITIONS: CEQR Technical Manual Chapter 5		
(a) Would the proposed project:		
o Generate a net increase of more than 200 residential units or 200,000 square feet of commercial space?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
▪ If “yes,” answer both questions 2(b)(ii) and 2(b)(iv) below.		
o Directly displace 500 or more residents?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
▪ If “yes,” answer questions 2(b)(i), 2(b)(ii), and 2(b)(iv) below.		
o Directly displace more than 100 employees?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
▪ If “yes,” answer questions under 2(b)(iii) and 2(b)(iv) below.		
o Affect conditions in a specific industry?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
▪ If “yes,” answer question 2(b)(v) below.		
(b) If “yes” to any of the above, attach supporting information to answer the relevant questions below. If “no” was checked for each category above, the remaining questions in this technical area do not need to be answered.		
i. Direct Residential Displacement		
o If more than 500 residents would be displaced, would these residents represent more than 5% of the primary study area population?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes,” is the average income of the directly displaced population markedly lower than the average income of the rest of the study area population?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii. Indirect Residential Displacement		
o Would expected average incomes of the new population exceed the average incomes of study area populations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes:”		
▪ Would the population of the primary study area increase by more than 10 percent?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
▪ Would the population of the primary study area increase by more than 5 percent in an area where there is the potential to accelerate trends toward increasing rents?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes” to either of the preceding questions, would more than 5 percent of all housing units be renter-occupied and unprotected?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii. Direct Business Displacement		
o Do any of the displaced businesses provide goods or services that otherwise would not be found within the trade area, either under existing conditions or in the future with the proposed project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Is any category of business to be displaced the subject of other regulations or publicly adopted plans to preserve,	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	YES	NO
enhance, or otherwise protect it?	<input type="checkbox"/>	<input type="checkbox"/>
iv. Indirect Business Displacement		
o Would the project potentially introduce trends that make it difficult for businesses to remain in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Would the project capture retail sales in a particular category of goods to the extent that the market for such goods would become saturated, potentially resulting in vacancies and disinvestment on neighborhood commercial streets?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v. Effects on Industry		
o Would the project significantly affect business conditions in any industry or any category of businesses within or outside the study area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Would the project indirectly substantially reduce employment or impair the economic viability in the industry or category of businesses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. COMMUNITY FACILITIES: CEQR Technical Manual Chapter 6		
(a) Direct Effects		
o Would the project directly eliminate, displace, or alter public or publicly funded community facilities such as educational facilities, libraries, health care facilities, day care centers, police stations, or fire stations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Indirect Effects		
i. Child Care Centers		
o Would the project result in 20 or more eligible children under age 6, based on the number of low or low/moderate income residential units? (See Table 6-1 in Chapter 6)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project result in a collective utilization rate of the group child care/Head Start centers in the study area that is greater than 100 percent?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project increase the collective utilization rate by 5 percent or more from the No-Action scenario?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii. Libraries		
o Would the project result in a 5 percent or more increase in the ratio of residential units to library branches? (See Table 6-1 in Chapter 6)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project increase the study area population by 5 percent or more from the No-Action levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the additional population impair the delivery of library services in the study area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii. Public Schools		
o Would the project result in 50 or more elementary or middle school students, or 150 or more high school students based on number of residential units? (See Table 6-1 in Chapter 6)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project result in a collective utilization rate of the elementary and/or intermediate schools in the study area that is equal to or greater than 100 percent?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project increase this collective utilization rate by 5 percent or more from the No-Action scenario?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv. Health Care Facilities		
o Would the project result in the introduction of a sizeable new neighborhood?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project affect the operation of health care facilities in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v. Fire and Police Protection		
o Would the project result in the introduction of a sizeable new neighborhood?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project affect the operation of fire or police protection in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. OPEN SPACE: CEQR Technical Manual Chapter 7		
(a) Would the project change or eliminate existing open space?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Is the project located within an under-served area in the Bronx , Brooklyn , Manhattan , Queens , or Staten Island ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) If "yes," would the project generate more than 50 additional residents or 125 additional employees?	<input type="checkbox"/>	<input type="checkbox"/>
(d) Is the project located within a well-served area in the Bronx , Brooklyn , Manhattan , Queens , or Staten Island ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(e) If "yes," would the project generate more than 350 additional residents or 750 additional employees?	<input type="checkbox"/>	<input type="checkbox"/>
(f) If the project is located in an area that is neither under-served nor well-served, would it generate more than 200 additional residents or 500 additional employees?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(g) If "yes" to questions (c), (e), or (f) above, attach supporting information to answer the following:		
o If in an under-served area, would the project result in a decrease in the open space ratio by more than 1 percent?	<input type="checkbox"/>	<input type="checkbox"/>
o If in an area that is not under-served, would the project result in a decrease in the open space ratio by more than 5	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO
percent?		
<ul style="list-style-type: none"> o If “yes,” are there qualitative considerations, such as the quality of open space, that need to be considered? Please specify: 	<input type="checkbox"/>	<input type="checkbox"/>
5. SHADOWS: CEQR Technical Manual Chapter 8		
(a) Would the proposed project result in a net height increase of any structure of 50 feet or more?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(b) Would the proposed project result in any increase in structure height and be located adjacent to or across the street from a sunlight-sensitive resource?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) If “yes” to either of the above questions, attach supporting information explaining whether the project’s shadow would reach any sunlight-sensitive resource at any time of the year. See Shadows Analysis		
6. HISTORIC AND CULTURAL RESOURCES: CEQR Technical Manual Chapter 9		
(a) Does the proposed project site or an adjacent site contain any architectural and/or archaeological resource that is eligible for or has been designated (or is calendared for consideration) as a New York City Landmark, Interior Landmark or Scenic Landmark; that is listed or eligible for listing on the New York State or National Register of Historic Places; or that is within a designated or eligible New York City, New York State or National Register Historic District? (See the GIS System for Archaeology and National Register to confirm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Would the proposed project involve construction resulting in in-ground disturbance to an area not previously excavated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(c) If “yes” to either of the above, list any identified architectural and/or archaeological resources and attach supporting information on whether the proposed project would potentially affect any architectural or archeological resources. See LPC Correspondence		
7. URBAN DESIGN AND VISUAL RESOURCES: CEQR Technical Manual Chapter 10		
(a) Would the proposed project introduce a new building, a new building height, or result in any substantial physical alteration to the streetscape or public space in the vicinity of the proposed project that is not currently allowed by existing zoning?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(b) Would the proposed project result in obstruction of publicly accessible views to visual resources not currently allowed by existing zoning?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) If “yes” to either of the above, please provide the information requested in Chapter 10 .		
8. NATURAL RESOURCES: CEQR Technical Manual Chapter 11		
(a) Does the proposed project site or a site adjacent to the project contain natural resources as defined in Section 100 of Chapter 11 ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes,” list the resources and attach supporting information on whether the project would affect any of these resources.		
(b) Is any part of the directly affected area within the Jamaica Bay Watershed ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If “yes,” complete the Jamaica Bay Watershed Form and submit according to its instructions .		
9. HAZARDOUS MATERIALS: CEQR Technical Manual Chapter 12		
(a) Would the proposed project allow commercial or residential uses in an area that is currently, or was historically, a manufacturing area that involved hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Does the proposed project site have existing institutional controls (e.g., (E) designation or Restrictive Declaration) relating to hazardous materials that preclude the potential for significant adverse impacts?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) Would the project require soil disturbance in a manufacturing area or any development on or near a manufacturing area or existing/historic facilities listed in Appendix 1 (including nonconforming uses)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Would the project result in the development of a site where there is reason to suspect the presence of hazardous materials, contamination, illegal dumping or fill, or fill material of unknown origin?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(e) Would the project result in development on or near a site that has or had underground and/or aboveground storage tanks (e.g., gas stations, oil storage facilities, heating oil storage)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(f) Would the project result in renovation of interior existing space on a site with the potential for compromised air quality; vapor intrusion from either on-site or off-site sources; or the presence of asbestos, PCBs, mercury or lead-based paint?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(g) Would the project result in development on or near a site with potential hazardous materials issues such as government-listed voluntary cleanup/brownfield site, current or former power generation/transmission facilities, coal gasification or gas storage sites, railroad tracks or rights-of-way, or municipal incinerators?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(h) Has a Phase I Environmental Site Assessment been performed for the site?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
o If “yes,” were Recognized Environmental Conditions (RECs) identified? Briefly identify: Multiple 275-gallon ASTs and an unidentified container.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(i) Based on the Phase I Assessment, is a Phase II Investigation needed? See HazMat Analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. WATER AND SEWER INFRASTRUCTURE: CEQR Technical Manual Chapter 13		
(a) Would the project result in water demand of more than one million gallons per day?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) If the proposed project located in a combined sewer area, would it result in at least 1,000 residential units or 250,000 square feet or more of commercial space in Manhattan, or at least 400 residential units or 150,000 square feet or more of commercial space in the Bronx, Brooklyn, Staten Island, or Queens?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	YES	NO
(c) If the proposed project located in a separately sewerred area , would it result in the same or greater development than that listed in Table 13-1 in Chapter 13 ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Would the project involve development on a site that is 5 acres or larger where the amount of impervious surface would increase?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(e) If the project is located within the Jamaica Bay Watershed or in certain specific drainage areas , including Bronx River, Coney Island Creek, Flushing Bay and Creek, Gowanus Canal, Hutchinson River, Newtown Creek, or Westchester Creek, would it involve development on a site that is 1 acre or larger where the amount of impervious surface would increase?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(f) Would the proposed project be located in an area that is partially sewerred or currently unsewerred?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(g) Is the project proposing an industrial facility or activity that would contribute industrial discharges to a Wastewater Treatment Plant and/or contribute contaminated stormwater to a separate storm sewer system?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(h) Would the project involve construction of a new stormwater outfall that requires federal and/or state permits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(i) If "yes" to any of the above, conduct the appropriate preliminary analyses and attach supporting documentation.		
11. SOLID WASTE AND SANITATION SERVICES: CEQR Technical Manual Chapter 14		
(a) Using Table 14-1 in Chapter 14 , the project's projected operational solid waste generation is estimated to be (pounds per week): 6,260		
o Would the proposed project have the potential to generate 100,000 pounds (50 tons) or more of solid waste per week?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Would the proposed project involve a reduction in capacity at a solid waste management facility used for refuse or recyclables generated within the City?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the proposed project comply with the City's Solid Waste Management Plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. ENERGY: CEQR Technical Manual Chapter 15		
(a) Using energy modeling or Table 15-1 in Chapter 15 , the project's projected energy use is estimated to be (annual BTUs):		
(b) Would the proposed project affect the transmission or generation of energy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13. TRANSPORTATION: CEQR Technical Manual Chapter 16		
(a) Would the proposed project exceed any threshold identified in Table 16-1 in Chapter 16 ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) If "yes," conduct the appropriate screening analyses, attach back up data as needed for each stage, and answer the following questions:		
o Would the proposed project result in 50 or more Passenger Car Equivalents (PCEs) per project peak hour?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the proposed project result in 50 or more vehicle trips per project peak hour at any given intersection? <i>**It should be noted that the lead agency may require further analysis of intersections of concern even when a project generates fewer than 50 vehicles in the peak hour. See Subsection 313 of Chapter 16 for more information.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Would the proposed project result in more than 200 subway/rail or bus trips per project peak hour?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the proposed project result, per project peak hour, in 50 or more bus trips on a single line (in one direction) or 200 subway/rail trips per station or line?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Would the proposed project result in more than 200 pedestrian trips per project peak hour?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the proposed project result in more than 200 pedestrian trips per project peak hour to any given pedestrian or transit element, crosswalk, subway stair, or bus stop?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14. AIR QUALITY: CEQR Technical Manual Chapter 17		
(a) <i>Mobile Sources:</i> Would the proposed project result in the conditions outlined in Section 210 in Chapter 17 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(b) <i>Stationary Sources:</i> Would the proposed project result in the conditions outlined in Section 220 in Chapter 17 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
o If "yes," would the proposed project exceed the thresholds in Figure 17-3, Stationary Source Screen Graph in Chapter 17 ? (Attach graph as needed)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) Does the proposed project involve multiple buildings on the project site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Does the proposed project require federal approvals, support, licensing, or permits subject to conformity requirements?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(e) Does the proposed project site have existing institutional controls (e.g., (E) designation or Restrictive Declaration) relating to air quality that preclude the potential for significant adverse impacts?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(f) If "yes" to any of the above, conduct the appropriate analyses and attach any supporting documentation.		
15. GREENHOUSE GAS EMISSIONS: CEQR Technical Manual Chapter 18		
(a) Is the proposed project a city capital project or a power generation plant?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Would the proposed project fundamentally change the City's solid waste management system?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) Would the proposed project result in the development of 350,000 square feet or more?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) If "yes" to any of the above, would the project require a GHG emissions assessment based on guidance in Chapter 18 ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o If "yes," would the project result in inconsistencies with the City's GHG reduction goal? (See Local Law 22 of 2008 ; § 24-	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	YES	NO
803 of the Administrative Code of the City of New York). Please attach supporting documentation.		
16. NOISE: CEQR Technical Manual Chapter 19		
(a) Would the proposed project generate or reroute vehicular traffic?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(b) Would the proposed project introduce new or additional receptors (see Section 124 in Chapter 19) near heavily trafficked roadways, within one horizontal mile of an existing or proposed flight path, or within 1,500 feet of an existing or proposed rail line with a direct line of site to that rail line?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) Would the proposed project cause a stationary noise source to operate within 1,500 feet of a receptor with a direct line of sight to that receptor or introduce receptors into an area with high ambient stationary noise?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Does the proposed project site have existing institutional controls (e.g., (E) designation or Restrictive Declaration) relating to noise that preclude the potential for significant adverse impacts?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(e) If "yes" to any of the above, conduct the appropriate analyses and attach any supporting documentation.		
17. PUBLIC HEALTH: CEQR Technical Manual Chapter 20		
(a) Based upon the analyses conducted, do any of the following technical areas require a detailed analysis: Air Quality; Hazardous Materials; Noise?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) If "yes," explain why an assessment of public health is or is not warranted based on the guidance in Chapter 20 , "Public Health." Attach a preliminary analysis, if necessary.		
18. NEIGHBORHOOD CHARACTER: CEQR Technical Manual Chapter 21		
(a) Based upon the analyses conducted, do any of the following technical areas require a detailed analysis: Land Use, Zoning, and Public Policy; Socioeconomic Conditions; Open Space; Historic and Cultural Resources; Urban Design and Visual Resources; Shadows; Transportation; Noise?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) If "yes," explain why an assessment of neighborhood character is or is not warranted based on the guidance in Chapter 21 , "Neighborhood Character." Attach a preliminary analysis, if necessary.		
19. CONSTRUCTION: CEQR Technical Manual Chapter 22		
(a) Would the project's construction activities involve:		
o Construction activities lasting longer than two years?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Construction activities within a Central Business District or along an arterial highway or major thoroughfare?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Closing, narrowing, or otherwise impeding traffic, transit, or pedestrian elements (roadways, parking spaces, bicycle routes, sidewalks, crosswalks, corners, etc.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
o Construction of multiple buildings where there is a potential for on-site receptors on buildings completed before the final build-out?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o The operation of several pieces of diesel equipment in a single location at peak construction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
o Closure of a community facility or disruption in its services?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Activities within 400 feet of a historic or cultural resource?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Disturbance of a site containing or adjacent to a site containing natural resources?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o Construction on multiple development sites in the same geographic area, such that there is the potential for several construction timelines to overlap or last for more than two years overall?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) If any boxes are checked "yes," explain why a preliminary construction assessment is or is not warranted based on the guidance in Chapter 22 , "Construction." It should be noted that the nature and extent of any commitment to use the Best Available Technology for construction equipment or Best Management Practices for construction activities should be considered when making this determination. Although the proposed project may require closing or narrowing the sidewalks along 48th Street, 49th Street and 9 th Avenue, such pedestrian impediments would be temporary and would be implemented in accordance with New York City requirements and regulations. All equipment operation will follow the City code so that no significant adverse noise or air quality impacts are anticipated.		
20. APPLICANT'S CERTIFICATION		
I swear or affirm under oath and subject to the penalties for perjury that the information provided in this Environmental Assessment Statement (EAS) is true and accurate to the best of my knowledge and belief, based upon my personal knowledge and familiarity with the information described herein and after examination of the pertinent books and records and/or after inquiry of persons who have personal knowledge of such information or who have examined pertinent books and records.		
Still under oath, I further swear or affirm that I make this statement in my capacity as the applicant or representative of the entity that seeks the permits, approvals, funding, or other governmental action(s) described in this EAS.		
APPLICANT/REPRESENTATIVE NAME Chunyuan Li	SIGNATURE 	DATE 3-24-2014

Part III: DETERMINATION OF SIGNIFICANCE (To Be Completed by Lead Agency)

INSTRUCTIONS: In completing Part III, the lead agency should consult 6 NYCRR 617.7 and 43 RCNY § 6-06 (Executive Order 91 or 1977, as amended), which contain the State and City criteria for determining significance.

1. For each of the impact categories listed below, consider whether the project may have a significant adverse effect on the environment, taking into account its (a) location; (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude.

IMPACT CATEGORY	Potentially Significant Adverse Impact	
	YES	NO
Land Use, Zoning, and Public Policy	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Socioeconomic Conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Community Facilities and Services	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Open Space	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shadows	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Historic and Cultural Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Urban Design/Visual Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Natural Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hazardous Materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water and Sewer Infrastructure	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Solid Waste and Sanitation Services	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Energy	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Transportation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Air Quality	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Greenhouse Gas Emissions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Noise	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Public Health	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Neighborhood Character	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Construction	<input type="checkbox"/>	<input checked="" type="checkbox"/>

2. Are there any aspects of the project relevant to the determination of whether the project may have a significant impact on the environment, such as combined or cumulative impacts, that were not fully covered by other responses and supporting materials?

If there are such impacts, attach an explanation stating whether, as a result of them, the project may have a significant impact on the environment.

3. Check determination to be issued by the lead agency:

Positive Declaration: If the lead agency has determined that the project may have a significant impact on the environment, and if a Conditional Negative Declaration is not appropriate, then the lead agency issues a *Positive Declaration* and prepares a draft Scope of Work for the Environmental Impact Statement (EIS).

Conditional Negative Declaration: A *Conditional Negative Declaration* (CND) may be appropriate if there is a private applicant for an Unlisted action AND when conditions imposed by the lead agency will modify the proposed project so that no significant adverse environmental impacts would result. The CND is prepared as a separate document and is subject to the requirements of 6 NYCRR Part 617.

Negative Declaration: If the lead agency has determined that the project would not result in potentially significant adverse environmental impacts, then the lead agency issues a *Negative Declaration*. The *Negative Declaration* may be prepared as a separate document (see [template](#)) or using the embedded *Negative Declaration* on the next page.

4. LEAD AGENCY'S CERTIFICATION

TITLE Director, Environmental Review and Assessment Division	LEAD AGENCY NYC Department of City Planning
NAME Robert Dobruskin	DATE 3/24/14
SIGNATURE <i>Robert Dobruskin</i>	

Proposed Action

Maimonides Medical Center (“MMC” or the “Applicant”) is seeking a minor modification to the previously approved site plan (the “Approved Site Plan”) for a large-scale community facility development (“LSCFD”) for the MMC. A copy of the Approved Site Plan (Drawing Z-1E) is attached. The proposed minor modification would allow the following changes to the Approved Site Plan (collectively, the “Proposed Modifications”):

- (i) expansion of the boundaries of the LSCFD to incorporate three out parcels, comprising approximately 7,513.5 square feet (“sf”) of lot area, on Parcels E and M on Block 5631 (Lots 9, 71 and 73) that were not previously included on the Approved Site Plan;
- (ii) development of a new 7-story building (the “New Building”) containing Use Group 4 ambulatory diagnostic and treatment health care facilities and/or hospital related facilities, accessory off-street parking and related accessory uses on a zoning lot consisting of Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77 and 78 on Block 5631 (the “Development Site” or “Parcel E”) on the western edge of the LSCFD fronting 9th Avenue between 48th and 49th Streets;
- (iii) removal from the Approved Site Plan of a previously approved (but unbuilt) 10-story building containing Use Group 4 ambulatory diagnostic and treatment health care facilities, hospital related facilities, accessory off-street parking and related accessory uses (the “Previously Approved Building”) that was proposed to be developed on Lots 65, 69 and part of Lot 38 on Block 5631 (the “PAB Site”) and elimination of height and setback and rear yard waivers for the Previously Approved Building; and
- (iv) change in the approved uses of the PAB Site to allow the existing attended accessory off-street parking and Use Group 4 ambulatory diagnostic and treatment health care uses to remain.

Purpose and Need of the Proposed Action

The Development Site and the PAB Site are part of the LSCFD that was established in 1967 by the Commission pursuant to then ZR Sections 78-31 and 78-41 (current ZR Sections 79-21 and 79-31). New developments or enlargements of existing buildings, not shown on the Approved Site Plan require Commission approval, even if the new or enlarged buildings would otherwise be permitted as-of-right. Since 1967, the Commission has approved seven applications for additional authorizations, special permits and modifications to the LSCFD boundaries, two applications for minor modifications and five applications for the grant, renewal and modification of revocable consents for pedestrian and service tunnels and bridges across 10th Avenue and 48th Street (collectively, the “Prior Approvals”). The Proposed Modifications would not require any new authorizations or special permits to be granted or any relief granted

under the Prior Approvals to be increased. The New Building has been designed to comply with all applicable zoning requirements, including requirements governing floor area, lot coverage, height and setback, and off-street accessory loading and parking. Removal of the Previously Approved Building from the Approved Site Plan would eliminate the need for the height and setback and rear yard relief for the Previously Approved Building (the “PAB Waivers”) originally granted by the Commission in 1989 pursuant to an authorization under ZR Section 79-21 (N880525 ZAK). As discussed below, the proposed modifications could result in a net incremental increase in the With-Action scenario of 16,817 sf of additional diagnostic and treatment health care facilities over the No-Action\ scenario.

The buildings on the Development Site are currently occupied by various administrative and support departments of MMC, including Patient Representatives, Academic Affairs, Security, Planning, Design and Construction, Psychiatry Residency as well as a variety of out-patient treatment facilities and physician offices including Vascular Surgery, Pediatric Urology and Plastic Surgery. During construction of the New Building, these uses will be relocated to other existing facilities within the LSCFD.

The MMC’s existing treatment and diagnostic facilities, administrative offices and accessory parking facilities operate at or beyond capacity. The New Building will provide much needed space for state-of-the-art facilities serving a variety of medical, surgical and pediatric subspecialties, including the practices noted above as well as other existing practices currently located in other buildings in the LSCFD. Because the New Building has been designed specifically to house Use Group 4 ambulatory diagnostic and treatment health care uses, as compared to the existing buildings on the Development Site, which were designed for residential uses, it will allow for significantly greater efficiency in operations, staffing and patient services. The proposed 263-space off-street parking facility will help alleviate demand for parking in the existing parking garage on Parcel B. Larger, more efficient floor plates with modern electrical, plumbing, HVAC and communications systems will be able to house diagnostic and other equipment that cannot be accommodated in the existing buildings.

Likewise, the New Building would provide a superior alternative to the Previously Approved Building that was previously proposed and approved. The New Building allows for significantly larger floor plates than the Previously Approved Building (approximately 19,700 gsf versus 10,550 to 14,140 gsf). The larger floor plates allow the New Building to be only 7 stories instead of 10 stories for the previously approved building, which reduces height as well as construction and operating costs and increases efficiency and flexibility for programming of uses. The corner location of the New Building is also superior to the mid-block location of the Previously Approved Building. It provides excellent light and air on 3 sides of the building and allows for traffic circulation to be significantly dispersed. For the PAB Site, all vehicle trips (inbound, outbound and drop-offs) would travel along 49th Street. For the New Building, drop-offs can be made along 9th Avenue, while in-bound and out-bound trips would be split between 48th and 49th Streets. The Previously Approved Building would partially fulfill the programmatic and parking needs of the MMC, which would be fully addressed by the New Building.

Background

The LSCFD spreads over five blocks that are generally bounded by 47th Street to the north, Fort Hamilton Parkway to the east, 49th Street to the south and 9th Avenue to the west. The following table identifies the parcels comprising the LSCFD site by tax block and lot (the LSCFD Site), including the project site for the proposed Medical Office Building (Parcel E). Lots marked with an asterisk would be incorporated into the LSCFD as part of the proposed modifications. The site plan (Drawing Z-1) in Attachment 5 depicts the location of the parcels.

Parcel	Block	Lots
A	5625	27, 44, 47, 48, 49, 50, 51, 52
B	5626	1
E (Project Site)	5631	1, 6, 9*, 10, 11, 12, 13, 74, 75, 76, 77, 78
F	5631	38, 55, 65, 69, 70
G	5632	1, 19, 27
H	5638	19
L	5631	14
M	5631	71*, 72, 73*

The LSCFD Site has an aggregate lot area of 298,206 sf and is located entirely within an R6 residential district, which would permit a maximum of 1,431,388.7 sf (4.8 FAR) of community facility uses in the aggregate. A C1-3 commercial overlay is mapped along the west side of Fort Hamilton Parkway, to a depth of 100 feet, covering a portion of Parcel G.

The project site (Parcel E) consists of multiple tax lots that will be merged into a single zoning lot with an aggregate lot area of 29,152.4 sf. The Project Site, which lies within the R6 district, generates a maximum base community facility floor area of up to 139,931.4 sf. The project site is currently improved with 12 2-story semi-detached buildings, originally constructed for residential uses but now used for ambulatory diagnostic and treatment health care facilities and related uses, containing an aggregate of approximately 45,966 gross square feet (gsf) of floor area.

Project Description

The proposed modifications would allow for the demolition of existing improvements on the project site and replacement with a new 7-story plus mechanical penthouse medical office building (the New Building) containing approximately 201,563 gsf of floor area for Use Group 4A ambulatory diagnostic or treatment health care facilities and related accessory uses, which is approximately 1,940 zsf less than the maximum 139,931.4 zsf of community facility floor area permitted on the site.

The height of the proposed building, including the penthouse, would be 116 feet above ground level and would have two below ground parking levels with off-street accessory parking. The

parking facility will provide up to approximately 263 attended parking spaces. Vehicles would enter the parking facility from 48th Street via a 16-foot curb cut. Vehicles would exit the facility via a 19.4 foot curb cut on 49th Street. One off-street loading berth will be accessible from 49th Street.

Under ZR Section 25-18, the maximum number of parking spaces permitted for community facility uses in R6 zoning districts is 1 space per 400 sf of lot area, or 73 spaces for the Project Site. The number of spaces may be increased under ZR Section 25-19 by demonstrating to the DOB that the additional spaces are needed for visitors and employees of the proposed development and that the parking facility is designed to minimize traffic on residential streets. DOB has indicated that the 263 space facility proposed for the New Building meets these conditions and that it will approve the request for the additional spaces when an application is made to the DOB for a new building permit for the New Building.

The previously approved site plan for the LSCFD included a proposed 10-story building containing approximately 104,421 sf of Use Group 4A ambulatory diagnostic or treatment health care facilities and related accessory uses (the Previously Approved Building) to be developed on the north side of 49th Street to the east of the Project Site, on a portion of Parcel F (Block 5631, Lots 65, 69, 70 and part of Lot 38 (PAB Site)). The site currently contains an accessory off-street parking lot, containing spaces for approximately 46 vehicles, and three 2-story buildings containing approximately 7,965 sf of medical and administrative offices. Under the proposed modifications, the New Building would be constructed on the Project Site in lieu of the Previously Approved Building and the existing uses on the PAB Site would remain.

Although the Project Site allows for a more efficient floor plate, lower building height and better parking layout in the New Building than the PAB Site permits for the Previously Approved Building, it is reasonable to assume that Maimonides would move forward with construction of the Previously Approved Building in the absence of the Proposed Modifications, given its need to consolidate and upgrade existing uses that are currently scattered throughout the LSCFD Site.

Under the previously approved site plan, the LSCFD was permitted to contain an aggregate of 1,009,655 sf of floor area, including the floor area allocated for the Previously Approved Building. Under the proposed modifications, the LSCFD would be permitted to contain an aggregate of 1,025,842 sf of floor area, a net increase of only 16,187 sf. Accordingly, the proposed modifications would be expected to generate only a de minimis number of additional employees visitors and vehicle trips under the future build condition as compared to the future no-build condition.

Analysis Framework

According to the CEQR Chapter 2-320 “Discretionary actions sometimes permit a range of project characteristics, or development scenarios to occur, even though the action may be sought in order to facilitate a specific development. From the range of possible scenarios that are considered reasonable and likely, the scenario with the worst environmental consequences is chosen for analysis. This is considered to be the RWCDs, the use of which ensures that,

regardless of which scenario actually occurs, its impacts would be no worse than those considered in the environmental review.”

In accordance with the CEQR Chapter 2-320, the following analyses will be made for the project site area by comparing a Reasonable Worst Case Development Scenario (RWCDS) of the future without the project in place (No-Action scenario) with a RWCDS with the project in operation (With-Action scenario). Potential impacts will be determined based on the incremental differences between the two scenarios. The existing condition, No-Action, With-Action scenarios and the incremental differences between the No-Action and With-Action Scenarios are presented below.

Existing Condition

Development Site

The development site consists of twelve (12) 2-story existing buildings and outdoor uses, comprising approximately 45,966 gross square feet (gsf) of Use Group 4 ambulatory diagnostic and treatment health care uses and off-street accessory parking (35 spaces) in the aggregate.

PAB Site

The existing buildings and outdoor uses on Lots 65 and 69 consists of an aggregate of 7,956 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses and 46 off-street accessory parking spaces on part of Lot 38.

RWCDS No-Action Scenario

Development Site

On the Development Site, the existing buildings and outdoor uses, comprising approximately 45,966 gsf (30,644 sf of floor area (“zsf”)) of Use Group 4 ambulatory diagnostic and treatment health care uses and off-street accessory parking in the aggregate, would remain.

PAB Site

On the PAB Site, the Applicant would construct the Previously Approved Building within the same footprint and maximum permitted building envelope for the Previously Approved Building depicted on the Approved Site Plan. In doing so, the Applicant would rely on the PAB Waivers, which waive the requirement under ZR Section 24-382 to provide a 60-foot deep rear yard equivalent on the PAB Site and which allow the 6th through 10th Stories and mechanical penthouse of the Previously Approved Building to penetrate the sky exposure plane beginning at a height of 60 feet above curb level set by ZR Section 24-522. The Previously Approved Building would contain approximately 139,312 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses and 150 attended off-street accessory parking spaces, which would be consistent with the Approved Site Plan. Since the Previously Approved Building would comply with the Approved Site Plan and PAB Waivers, the Applicant could construct the Previously Approved Building without the need for any discretionary approval by the Commission or other City agency.

Accordingly, under the No-Action Scenario, the Development Site and the PAB Site would contain 185,278 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses and 185 off-street accessory spaces.

RWCDS With-Action Scenario

Development Site

The twelve (12) existing buildings would be demolished and replaced with the New Building, containing approximately 201,563 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses, including 263 off-street accessory parking spaces in the cellars.

PAB Site

The existing buildings and outdoor uses on Lots 65 and 69 would remain, as would the existing accessory off-street parking lot on part of Lot 38, comprising an aggregate of 7,956 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses and 46 off-street accessory parking spaces.

Accordingly, under the With-Action Scenario, the Development Site and the PAB Site would contain 209,519 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses and 309 off-street accessory parking spaces.

Incremental Difference between the No-Action and With-Action Scenarios

The incremental differences between the RWCDS No-Action and RWCDS With-Action Scenarios would be an additional 24,241 gsf and 124 off-street accessory parking spaces.

The incremental difference of square footage is below the CEQR threshold for trip generation screen.

Shadows

A. INTRODUCTION

The RWCDS No-Action scenario (the twelve 2-story buildings at the development site and the 10-story building at the PAB site) would not result in a significant shadow impact (see Attachment 9).

The RWCDS With-Action building would reach approximately 116 feet in height. The shadow study examines whether the RWCDS With-Action building would cast shadows on any publicly accessible sunlight-sensitive resources. Sunlight-sensitive resources can include parks, playgrounds, gardens, and other publicly accessible open spaces; sunlight dependent architectural features of historic resources; and important natural features such as water bodies. As described under “Project Description”, this analysis has been prepared using the RWCDS With-Action Scenario. The analysis provides a conceptual analysis of the potential impacts of the proposed the RWCDS With-Action Scenario. The detailed analysis concluded that the proposed project would not result in any shadows on sunlight-sensitive resources, at any time of year.

B. DEFINITIONS AND METHODOLOGY

Incremental shadow is the additional, or new, shadow that a structure resulting from a proposed action would cast on a sunlight-sensitive resource.

Sunlight-sensitive resources are those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. Such resources generally include:

- *Public open space* (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources.
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include: design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a historic landmark.
- *Natural resources* where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include surface water bodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

Non-sunlight-sensitive resources include, for the purposes of CEQR:

- *City streets and sidewalks* (except Greenstreets);
- *Private open space* (e.g., front and back yards, stoops, vacant lots, and any private, non-publicly accessible open space);
- *Project-generated open space* cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist. However, a qualitative discussion of shadows on the project-generated open space should be included in the analysis.

A significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow and an analysis of the resource's sensitivity to reduced sunlight.

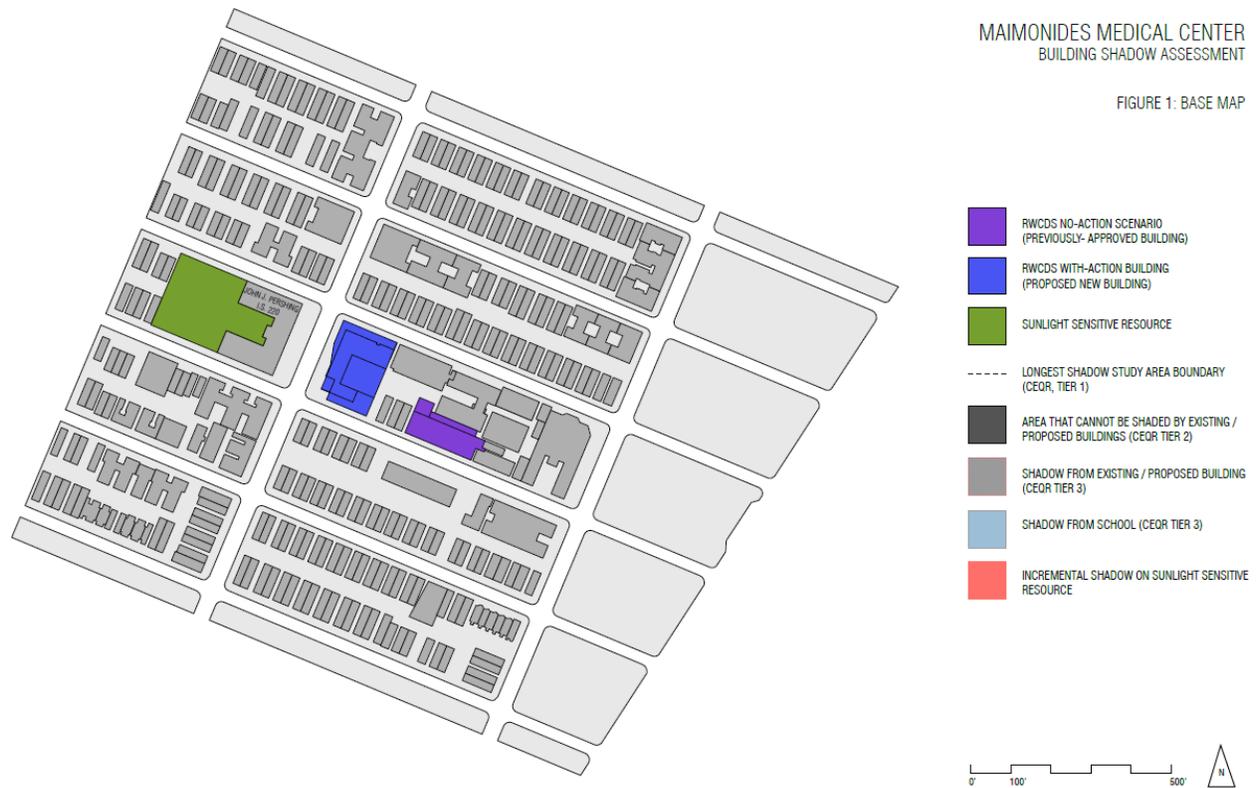
METHODOLOGY

First, a preliminary screening assessment must be conducted to ascertain whether a project's shadow could reach any sunlight-sensitive resources at any time of year. The preliminary screening assessment consists of three tiers of analysis. The first tier determines a simple radius around the proposed building representing the longest shadow that could be cast. If there are sunlight-sensitive resources within this radius, the analysis proceeds to the second tier, which reduces the area that could be affected by project shadow by accounting for the fact that shadows can never be cast between a certain range of angles south of the project site due to the path of the sun through the sky at the latitude of New York City. In New York City, this area lies between -108 and +108 degrees from true north. If the second tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by project shadow by looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day. If the third tier of analysis does not eliminate the possibility of new shadows on sunlight sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow resulting from the project. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadows on the sunlight-sensitive resources are described, and their degree of significance is considered. The results of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text.

C. PRELIMINARY SCREENING ASSESSMENT

A base map was developed (see Figure 1) showing the location of the proposed project and the surrounding street layout. In coordination with the land use and historic resources sections of this EAS, potentially sunlight-sensitive resources were identified and shown on the map.

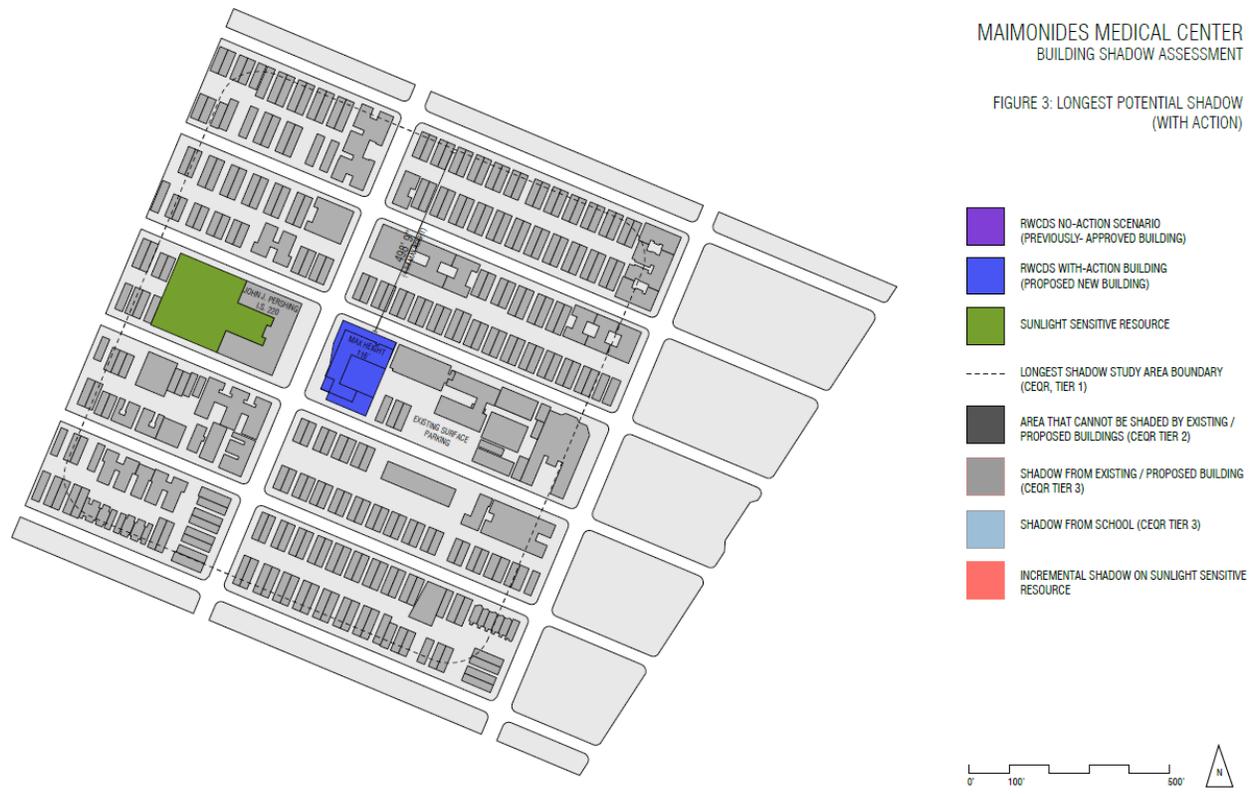
Figure 1 Project Site and Playground



TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that the proposed structure could cast is calculated, and, using this length as the radius, a perimeter is drawn around the project site. Anything outside this perimeter representing the longest possible shadow could never be affected by project generated shadow, while anything inside the perimeter needs additional assessment. According to the *CEQR Technical Manual*, the longest shadow that a structure can cast at the latitude of New York City occurs on December 21, the winter solstice, at the start of the analysis day at 8:51 AM, and is equal to 4.3 times the height of the structure. Therefore, at a maximum height of 116 feet above curb level, the proposed building could cast a shadow up to 498.9 feet in length (116 x 4.3). Using this length as the radius, a perimeter was drawn around the project site (see Figure 2). Since a playground lies within the perimeter or longest shadow study area, the next tier of screening assessment was conducted.

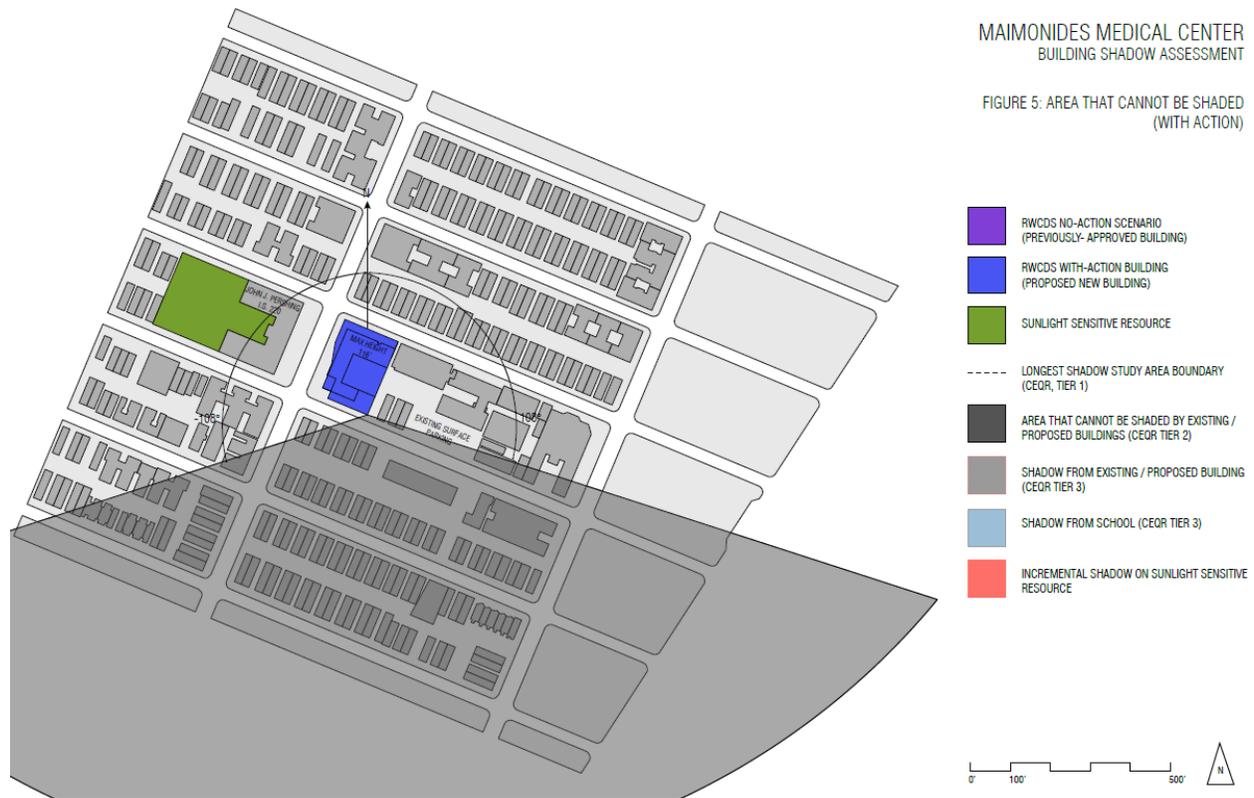
Figure 2 Tier I Screening



TIER 2 SCREENING ASSESSMENT

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given project site. In New York City this area lies between -108 and +108 degrees from true north. Figure 3 illustrates this triangular area south of the project site. The complementing area to the north within the longest shadow study area represents the remaining area that could potentially experience new project generated shadow. A number of sun-sensitive resources are located in the remaining shadow study area, and therefore the next tier of screening assessment was performed.

Figure 3 Area That Cannot Be Shaded By The Proposed Action



TIER 3 SCREENING ASSESSMENT

The third tier of assessment uses three-dimensional computer modeling software to more accurately refine the area that could be reached by project shadow by looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day. The direction and length of shadows vary throughout the course of the day and also differ depending on the season. In order to determine whether project generated shadow could fall on a sunlight-sensitive resource, three-dimensional computer mapping software is used in the Tier 3 assessment to calculate and display the proposed action’s shadows on individual representative days of the year. A three-dimensional representation of the proposed building was developed based on plans and elevations provided by the applicant.

REPRESENTATIVE DAYS FOR ANALYSIS

Shadows on the summer solstice (June 21), winter solstice (December 21) and spring and fall equinoxes (March 21 and September 21), which are approximately the same in terms of shadow

patterns) are modeled, to represent the range of shadows over the course of the year. An additional representative day during the growing season is also modeled, generally the day halfway between the summer solstice and the equinoxes, i.e. May 6 or August 6, which have approximately the same shadow patterns

TIMEFRAME WINDOW OF ANALYSIS

The shadow assessment considers shadows occurring between one and a half hours after sunrise and one and a half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is down near the horizon and the sun's rays reach the Earth at very tangential angles, diminishing the amount of solar energy and producing shadows that are very long, move fast, and generally blend with shadows from existing structures until the sun reaches the horizon and sets. Consequently, shadows occurring outside the timeframe window of analysis are not considered significant under *CEQR*, and their assessment is not required.

TIER 3 SCREENING ASSESSMENT RESULTS

Figure 2 illustrates the range of shadows that would occur, in the absence of intervening buildings, from the proposed building on the four representative days for analysis. For informational purposes the boundaries of the analysis area are shown on Figure 2. As they move east and clockwise over the landscape, the shadows are shown occurring from the start of the analysis day (one and a half hours after sunrise) to the end of the analysis day (one and a half hours before sunset). On the March 21/September 21 and December 21 analysis days, the RWCDS With-Action's shadow would be long enough to reach the playground if there was no 5-story school building blocking the angle of the shadow. The shadow study is presented in Attachment 9. Project-generated shadows would not reach the playground on the May 6 and June 21 analysis days. The Tier 3 screening assessment concluded that shadows from the RWCDS With-action building would reach the playground on the March 21/September 21 and December 21 analysis days. Therefore, a detailed analysis was conducted for those analysis days.

D. DETAILED SHADOW ANALYSIS

For the detailed analysis, the computer model used in the Tier 3 assessment was further developed with three-dimensional representations of the RWCDS With-Action building and the John J Pershing School IS 220 building in the study area to determine the shadows that would result with the proposed action. Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment. Shadows are in constant movement. The computer simulation software produces an animation showing the movement of shadows over the course of each analysis period. The analysis is with the animation of the RWCDS With-Action condition to determine the time when the shadow would enter a sun-sensitive resource, and the time it would exit.

- March 21/September 21: The shadow from the proposed 7-story building could reach the playground from 6:30 AM to 9:30 AM. However, the existing 5-story school building located between the proposed building and the playground would block all of the shadows from the proposed 7-story building. Therefore, the shadow would not be cast on the playground.

- December 21: The shadow from the proposed 7-story building could reach the playground from 8:51 AM to 9:21 AM. However, the existing 5-story school building located between the proposed building and the playground would block all of the shadows from the proposed 7-story building. Therefore, the shadow would not be cast on the playground (see Attachment 9).

CONCLUSIONS

The proposed building would not cast any shadows on the playground. Therefore, given all these factors, the playground would not be significantly impacted by project-generated shadows. There would be no significant incremental difference between the RWCDs No-Action and RWCDs With-Action Scenarios.

Urban Design and Visual Resources

METHODOLOGY

Based on the *CEQR Technical Manual*, a preliminary assessment of urban design and visual resources is appropriate when there is the potential for a pedestrian to observe, from the street level, a physical alteration beyond that allowed by existing zoning. Examples include projects that permit the modification of yard, height, and setback requirements, and projects that result in an increase in built floor area beyond what would be allowed “as-of-right” or in the future without the proposed project. The Proposed Development (RWCDs With-Action) would result in physical alterations to the proposed development site observable by pedestrians.

According to the *CEQR Technical Manual*, the study area for urban design is the area where the project may influence land use patterns and the built environment, and is generally consistent with that used for land use analysis. For visual resources, the view corridors within the study area from which such resources are publicly viewable should be identified. A view corridor is defined as a connection from the public realm to significant natural or built features, including views of the waterfront, public parks, landmark structures or districts, otherwise distinct buildings or groups of buildings, or other natural features. The land use study area may serve as the initial basis for analysis; however, in cases where significant visual resources exist, it may be appropriate to look beyond the land use study area, to encompass views outside the area, as is the case with waterfront sites or sites within or near historic districts. Views to the Proposed Development site are limited to the immediately surrounding streets. Therefore the study area focuses on a 400-foot area study area, consistent with the land use study area.

The *CEQR Technical Manual* recommends an analysis of pedestrian wind conditions for projects that would result in the construction of large buildings at locations that experience high wind conditions (such as along the waterfront, or other locations where winds from the waterfront are not attenuated by buildings or other natural features), which may result in an exacerbation of wind conditions due to “channelization” or “downwash” effects that may affect pedestrian

safety. As the Proposed Development would not result in a large building in a location that experiences high wind conditions, a pedestrian wind conditions analysis is not required.

PRELIMINARY ASSESSMENT

Existing Conditions

PROPOSED DEVELOPMENT SITE

The subject site for the proposed development consists of twelve (12) 2-story red brick residential buildings and outdoor uses, comprising approximately 45,966 gross square feet (gsf) of Use Group 4 ambulatory diagnostic and treatment health care uses and off-street accessory parking (35 spaces) in the aggregate.

The proposed project site is generally bounded by the 48th Street to the north, 10th Avenue to the east, 49th Avenue to the south and fronts on 9th Avenue to the west. The study area is defined as being within a 400-foot radius of the project site and is presented in the following figure. The proposed development site and 400 foot study area are located in a typical mixed-use residential and community facility neighborhood in the Borough Park neighborhood in Brooklyn, with a mix of building types, styles, and uses. Within the 400-foot radius study area the predominant building types include, between 48th and 49th streets and 9th and 10th avenues: a 6-story public school located on the west side of 9th Avenue across from the proposed project development site and some 2-story brick residential buildings behind it. On the East side of 9th Avenue there are various buildings in the Maimonides Medical Center LSCD plan area, including the 6-story building at 920 East 48th Street (adjacent to the proposed development site), and adjacent to the East of that the 4/5-story Elson Research Center on 48th Street, two 2-story red brick residential buildings, a parking lot enclosed with a metal fence on 49th street that was the site scheduled for the previously approved building (PAB) site, and a portion of an existing 6-story MMC building located immediately to the East. Opposite the subject block on the south side of 49th street is 950 East 49th Street, a 10-story apartment building. The other structures on the south side of 49th street are predominately 2-story red brick residential structures. The remaining buildings within the study area are 2-, 3- and 4-story red brick residential buildings, some of which are in institutional use.

Figure 4 Existing Condition Study Area



No visual corridors are affected in the study area.

As described below, the community facility expansion resulting from the proposed action would be consistent with the predominant uses in the study area, and not result in significant adverse impacts related to Urban Design and Visual Resources.

FUTURE NO-ACTION SCENARIO

Under the future No-Action Scenario, the proposed development site would remain in use with twelve 2-story red brick residential style buildings in use by the medical center for ambulatory care and offices (see photos below). The previously approved project (PAB) site which is currently a parking lot on 49th Street located to the east of the proposed development site, and backing on the 4/5-story Elson Research Center on 48th Street would be developed with the previously approved 10-story building (158 feet high).

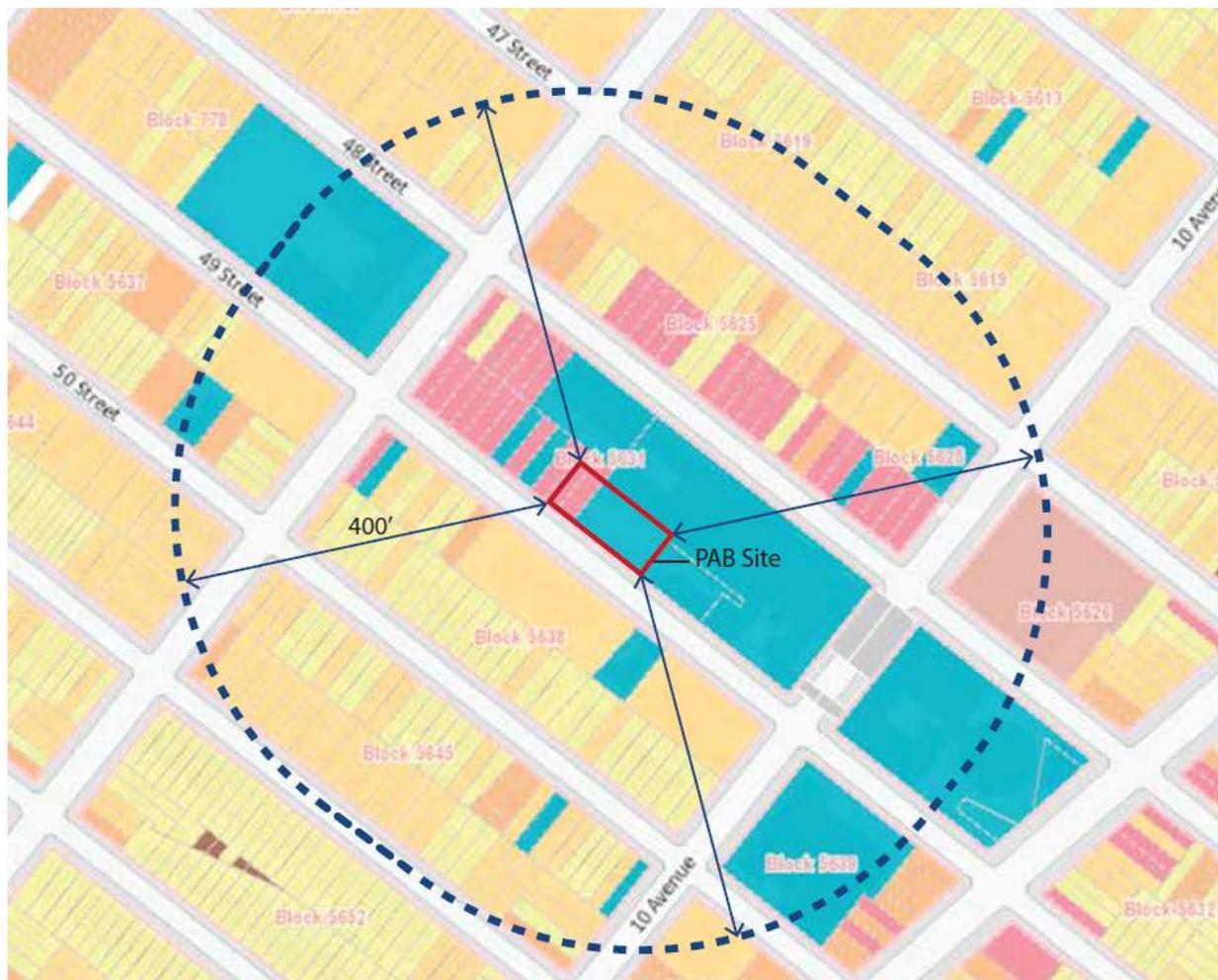
PAB STUDY AREA

Within the 400-foot study area for the PAB site the urban landscape would include the 4/5-story Elson Research building, a 6-story MMC building at 920 East 48th Street adjacent to the proposed development site, a 6-story MMC building adjacent to the PAB site to the East and a 4-story apartment building on 10th Avenue. On the opposite side of 10th Avenue to the East are MMC institutional buildings ranging from 7- to 10-stories, a 5-story parking garage at 48/47 streets, a 4-story apartment building and a 4-story Yeshiva school located at 10th Avenue and 47th Street. There is a 5-story bridge over 10th Ave. between 48th and 49th streets connecting MMC buildings on either side of the avenue (see photo). The remainder of the PAB study area has 2-

story, mostly red brick, residential buildings and two 2-story commercial buildings on 10th avenue (see photos below).

There would be no effect on natural features that are enjoyed by the community or are designated as special resources in the Zoning Resolution. No significant effect on public open space, landmarks or landmark districts, or distinct buildings or groups of buildings would result from the action. The proposal would not have a significant effect on wind pressure or down-washed wind pressure or on sunlight. The pedestrian experience at street level would be similar to that on nearby streets as to street wall, building heights, regularity of street grid, site planning and configuration, parking and streetscape.

Figure 5 RWCDs No-Action PAB Site 400-foot Study Area



- Parks & Public Lands
- Forested Areas (NJ)
- Community Gardens
- School property with garden
- Playgrounds
- Green Spaces Along Streets
- Golf Courses
- Baseball/Soccer/Football Fields
- Tennis/Basketball/Handball Courts & Tracks
- Cemeteries

- 1 & 2 Family Residential
- Multi-family Residential
- Mixed Use
- Open space & outdoor recreation
- Commercial
- Institutions
- Industrial
- Parking
- Transportation / Utilities
- Vacant Lots

400-foot Radius Study Area

Figure 6 RWCDS No-Action Scenario Study Area

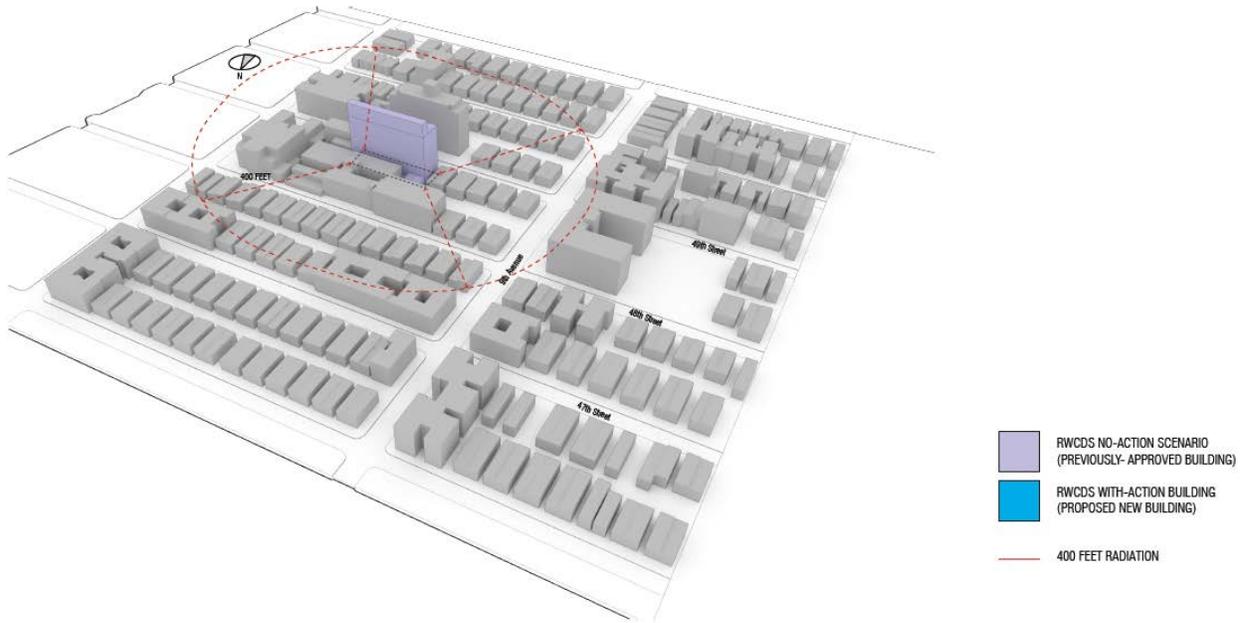


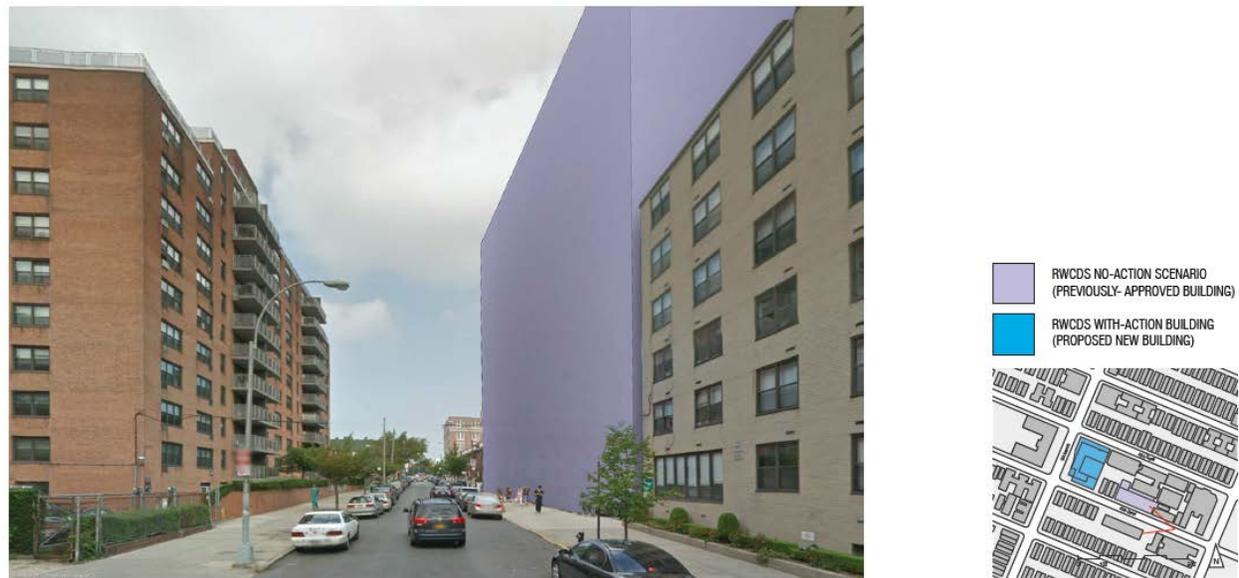
Figure 7 RWCDS No-Action Scenario Building



Figure 8 RWCDs No-Action Scenario Building



Figure 9 RWCDs No-Action Scenario Building



No visual corridors would be affected by the PAB within the PAB study area

The PAB would therefore not result in a significant impact related to Urban Design and Visual Resources and no further analysis is warranted.



Existing condition at the site of the previously approved building (PAB) on 49th Street



View of 950 East 49th Street between 9th and 10th avenues located within both the With-Action and Without- Action study areas.



Northwest view from 10th Avenue on 50th Street.



View looking Southwest from 50st Street on 10th Avenue.



View looking Northeast on 10th Avenue from 50th Street.



View looking Northwest on 51st Street from 10th Avenue.



View looking Southwest on 10th Avenue from 47th Street.



View looking Northwest on 47th Street from 10th Avenue.



View looking Northwest on 48th Street from 10th Avenue.



View looking Southwest on 10th Avenue from 49th Street.



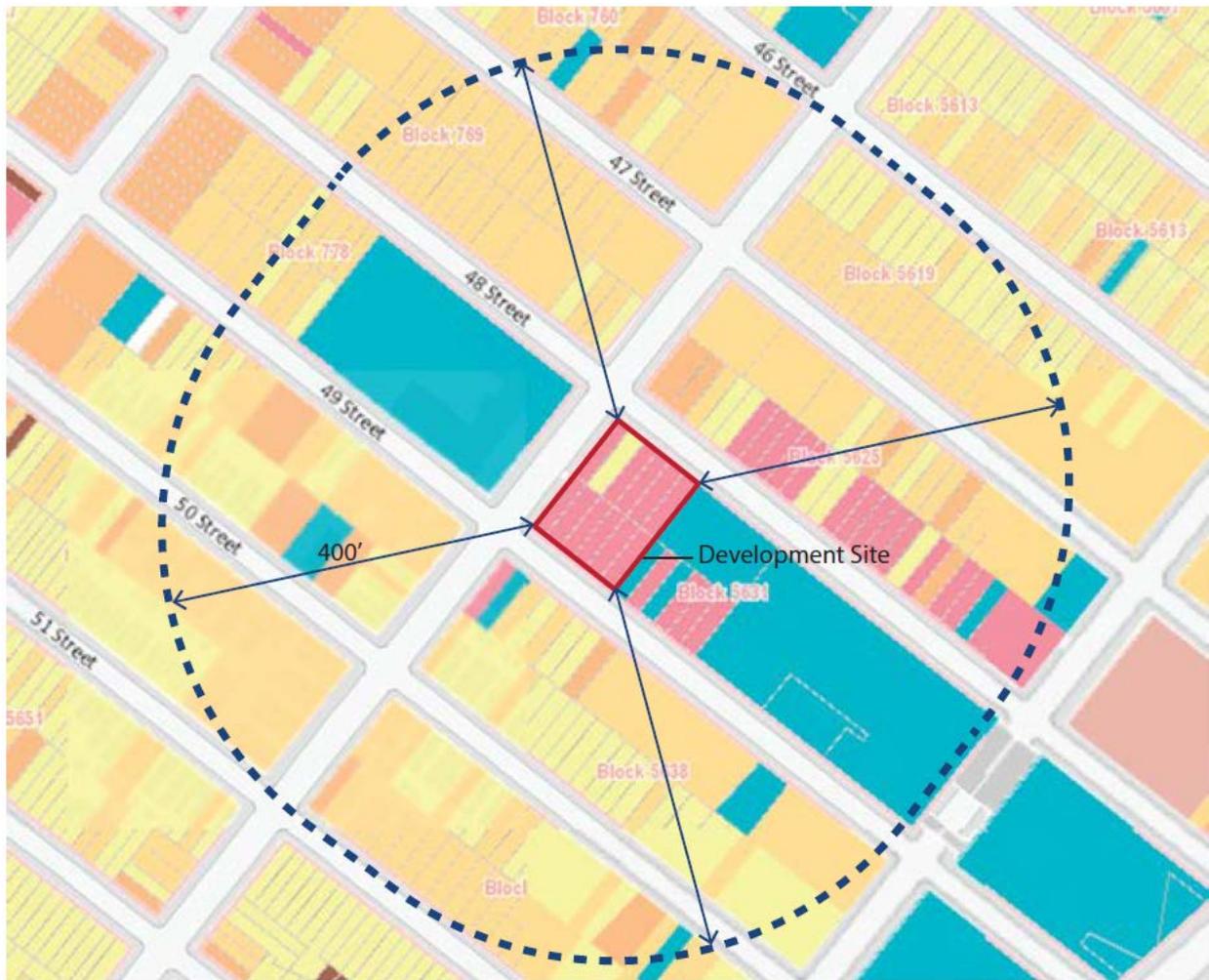
View looking Northwest on 49th Street from 10th Avenue.

FUTURE WITH-ACTION SCENARIO

The twelve (12) existing buildings on the development site would be demolished and replaced with the proposed 7-story building (116 feet high), containing approximately 201,563 gsf of Use Group 4 ambulatory diagnostic and treatment health care uses, including 263 off-street accessory parking spaces in the cellars.

Maimonides Medical Center (MMC) is seeking a minor modification to the previously approved site plan within the existing large-scale community facility development (LSCFD) for the MMC. The Proposed Building has been designed to comply with all applicable zoning requirements, including requirements governing floor area, lot coverage, height and setback, and off-street accessory loading and parking. The proposed project would increase the community facility floor area by approximately 24,241 gsf (the incremental difference between the RWCDS No-Action and With-Action scenarios). The proposed 7-story building (116 feet high) would have 3-stories less than the 10-story (158 feet high) previously approved building (PAB) that would have been located on 48th Street.

Figure 10 RWCDs With-Action Scenario 400-foot Study Area



- | | |
|--|---|
|  Parks & Public Lands |  1 & 2 Family Residential |
|  Forested Areas (NJ) |  Multi-family Residential |
|  Community Gardens |  Mixed Use |
|  School property with garden |  Open space & outdoor recreation |
|  Playgrounds |  Commercial |
|  Green Spaces Along Streets |  Institutions |
|  Golf Courses |  Industrial |
|  Baseball/Soccer/Football Fields |  Parking |
|  Tennis/Basketball/Handball Courts & Tracks |  Transportation / Utilities |
|  Cemeteries |  Vacant Lots |

The proposed development of a 7-story medical building fronting on 9th Avenue between 48th and 49th streets would be contextual or similar to other buildings in the study area, particularly the institutional 6-story medical building at 920 East 48th Street immediately adjacent to the subject site, the 4/5-story institutional Elson Research building adjacent to that on 48th Street, the 10-story apartment building at 950 East 49th Street and the institutional character of the public school located on the opposite side of 9th Avenue to the West of the subject site. The street wall will be generally consistent with the street walls on 48th and 49th Streets and on 9th Avenue. The building façade will be brick masonry and gray limestone with clear glazed windows and will have a first story base of gray quartz.

Figure 11 RWCDs With-Action Scenario Study Area



Figure 12 RWCDs With-Action Scenario Building



Figure 13 RWCDs With-Action Scenario Building

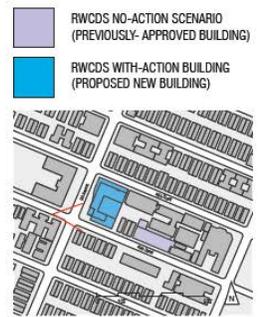


Figure 14 RWCDs With-Action Scenario Building



The remainder of the surrounding area within the 400-foot radius would be the same as in the existing condition.

No visual corridors would be affected within the study area.

There would be no effect on natural features that are enjoyed by the community or are designated as special resources in the Zoning Resolution. No significant effect on public open space, landmarks or landmark districts, or distinct buildings or groups of buildings would result from the action. The proposal would not have a significant effect on wind pressure or down-washed wind pressure or on sunlight. The pedestrian experience at street level would be similar to that on nearby streets as to street wall, building heights, regularity of street grid; site planning and configuration, parking and streetscape (see photos below).

The proposed project would therefore not result in a significant impact related to Urban Design and Visual Resources and no further analysis is warranted.

An aerial photograph of the project site is presented below.

Figure 15 Aerial photo of the development site



Figure 16 - ILLUSTRATIVE RENDERING



FOR ILLUSTRATIVE PURPOSES ONLY

MAIMONIDES - Brooklyn, NY
2014-02-13

February 13, 2014

Figure 17 - ZONING PLAN - ROOF



MAIMONIDES - Brooklyn, NY
2014-02-13

February 13, 2014



Looking at the site on 9th Avenue and 49th Street



Looking at the site on 48th Street from 9th Avenue.



Looking at the site from 49th Street

The No-Action and the With-Action Scenario development are presented below:



No-Action Scenario on 9th Avenue



With-Action Scenario on 9th Avenue

Neither the proposed project nor the PAB would result in significant changes to the urban landscape of the area. Buildings in a R6 zoning district allow a maximum allowable FAR of 4.8 for a typical height of 6-stories for community facility uses. The total allowable zoning floor area permitted on the proposed development site would amount to 139,931.42 zsf (29,152.38 zsf x 4.8 allowable FAR). The operational, legal and construction related limitations on the projected

development site would constrain the proposed development to approximately 137,991.98 zsf or 201,563 gsf. Therefore the proposed building is in compliance with the zoning regulations. The incremental differences between the previously approved RWCDs No-Action and the RWCDs With-Action scenarios would not be significant.

Further, the proposed building, which would be contextual with various institutional buildings in the surrounding area, would not negatively impact the built environment since it is similar to predominate building types in the area. The proposed building would not be significantly taller than the 6-story public school located opposite on 9th Avenue or the building immediately adjacent to the proposed building on 48th Street. Further, the previously approved (RWCDs No-Action) 10-story building would be 3-stories taller than the proposed building (RWCDs With-Action). The proposed building is also in keeping with other medical center buildings within the adjacent medical center LSCFD. The proposed action would not de-map an active street or map a new street. The action would result in no significant effect on street hierarchy. The action would not have a significant effect on view corridors or visual resources because the proposed building would not block any existing view corridors or visual resources as (see the above photo views). There would be no effect on natural features that are enjoyed by the community or are designated as special resources in the Zoning Resolution. No significant effect on public open space, landmarks or landmark districts, or distinct buildings or groups of buildings would result from the action. The proposal would not have a significant effect on wind pressure or down-washed wind pressure or on sunlight. The pedestrian experience at street level would be similar to that on nearby streets as to street wall, building heights, regularity of street grid, site planning and configuration, parking and streetscape.

The proposed action would therefore not result in a significant impact related to Urban Design and Visual Resources and no further analysis is warranted.

Hazardous Materials

Phase I Environmental Site Assessment (ESA) reports dated July 23, 2012 were prepared by Sustainable Management LLC in accordance with current ASTM standards for the subject property. The Phase I ESA found multiple 275-gallon aboveground oil tanks for boilers and an unidentified container. The Phase I ESA reports were submitted to the NYC DEP for review.

Based on the New York City Department of Environmental Protection (NYC DEP) comments on the Phase I ESA reports, a Phase II Subsurface Investigation was conducted for soil, groundwater and soil vapors. The Phase II Subsurface Investigation report had following conclusions:

The soil analysis results indicated that all soil sample results including Volatile Organics (VOCs), Semi-Volatile Organics (SVOCs), Pesticides, PCBs and Metals are below the New York State Department of Environmental Conservation (NYSDEC) Part 375-6.8(b) Restricted Residential Soil Cleanup Objectives (SCOs). The SVOCs, Pesticides and PCBs are all below the NYSDEC Part 375-6.8(a) Unrestricted Use SCOs. All VOCs results except for 1,4-Dioxane are below the NYSDEC Part 375-6.8(a) Unrestricted Use SCOs. All Metal results except for

Chromium/Hexavalent and Lead are below the NYSDEC Part 375-6.8(a) Unrestricted Use SCOs.

The analysis results indicated that the groundwater sample results did not detect VOCs, SVOCs, Pesticides or PCBs. All filtered sample results of Metals are below the DEC water quality standards except for Antimony and Sodium. All unfiltered sample results of Metals are below the DEC water quality standards except for Antimony, Iron and Sodium.

The soil vapor samples detected VOCs including tetrachloride, tetrachloroethene , 1,1,1-trichloroethane and trichloroethene.

According with the NYC DEP comments on the Phase II Subsurface Investigation report, a Remedial Work Plan (RAP) and Construction Health and Safety Plan (CHASP) were prepared and submitted to the NYC DEP for review and subsequently approved.

Soils will be excavated to a depth of approximately 28 feet at the proposed building footprint. The excavated contaminated soil will be mechanically screened to remove debris. Screened soil will be stockpiled within a bermed area covered by heavy layers of polyethylene sheeting. Soil samples will be collected from the stockpiles for laboratory analysis to determine characterization for disposal if the disposal facility requires additional analysis. It is anticipated that the soil will be analyzed for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), TAL metals, total petroleum hydrocarbons (TPH), Toxicity Characteristic Leaching Procedure (TCLP), RCRA characteristics, and other methods as required by the disposal facility. The stockpiles will be covered by layers of polyethylene sheeting that will be secured to the area outside the berm to prevent exposure of the soil to the elements and collection of runoff. Any runoff liquid generated during the remedial activities will be containerized, analyzed and properly disposed of. If use of in-place and stockpiled soil is planned, permission will be obtained from NYC DOHMH in accordance with NYCRR 360-1.15.

All known or found USTs and ASTs (including dispensers, piping, and fill-ports) will be properly removed/closed in accordance with all applicable NYSDEC regulations. If the NYSDEC requests any additional investigative/remedial measures, then all pertinent documentation will be forwarded to DEP for our files.

If any petroleum impacted soil (such display petroleum odors and/or staining) are encountered during the excavation/grading activities, the impacted soils will be removed and properly disposed of in accordance with all federal, state and local regulations.

If de-watering into NYC storm/sewer drains will occur during the proposed construction project, a NYCDEP Sewer Discharge Permit will be obtained prior to the start of any de-watering activities at the site. For the proposed project, groundwater sampling for NYCDEP Sewer Discharge Criteria will be completed in any areas where de-watering is expected. The NYSDEC will be notified of groundwater contamination. Any further requirements from the NYSDEC will be met.

Air monitoring will be conducted in accordance with the approved CHASP using dust monitors and a PID, and will take place in accordance with the New York State Department of Health guidance values. Monitoring for background levels will take place at the start of each work day. The monitors will then be moved to the downwind side of any ongoing work to monitor for excessive levels of dust or flammable gasses. Dust suppression will be maintained by the contractor during the excavating and grading activities at the site. The PID will be used to monitor for any potentially explosive vapors.

Upon receipt of the analytical data for soil characterization that satisfies the disposal facility requirements and facility acceptance, the soil will be loaded for transport to the disposal site. The actual volume of stockpiled soil may vary based upon actual field conditions encountered. In the event that certain contaminated soils are saturated and free draining, the use of roll-off containers with built-in sumps will be used to collect the liquid and will be utilized to transport the contaminated soils for treatment or disposal to an appropriately permitted facility. The disposal facility has not yet been determined as more than one type of facility may be required. Based on the known nature of the soil contamination, disposal facilities and options are readily available.

Any liquids (liquid drained from soils) generated in the course of the remediation may involve transport to an appropriate disposal facility. The final decision on a disposal facility has not been reached at this point in time.

The final disposition of contaminated materials will be in accordance with all applicable federal state and local statutes and regulations. Disposal facilities will be selected based on the results of laboratory analysis for disposal parameters, distances to facility and cost of disposal. The New York City Department of Environmental Protection (DEP) will be notified in writing (five days prior to the removal of any contaminated materials) with the names of the waste transporters and disposal facilities and their respective licenses and permits for review.

The excavation equipment will be visually brushed clean upon completing excavation of the contaminated area and handling of contaminated soils. This will be done to minimize the generation of wash water at the site that would need off-site disposal

The areas of the site that will be excavated for construction will be remedied. Upon completion of the contaminated soil excavation activities, all areas to be landscaped or unpaved areas will be covered by a two-foot thick cover of clean fill soil that is underlain by an indicator such as an orange plastic snow fence to delineate the cover soil from the subsurface soil. The two feet of clean fill/top soil will be imported from an approved facility/source and graded across all landscaped/grass covered areas of the site not capped with concrete or asphalt. The clean fill/top soil will be segregated at the source facility, have qualified environmental personnel collect representative samples at a frequency of one (1) sample for every 250 cubic yards, analyze the samples for Target Compound List (TCL) VOCs, SVOCs, Pesticides/PCBs and TAL Metals by a NYCDOH ELAP-certified laboratory, compare to the NYSDEC Part 375-6.8(a) Unrestricted Used Soil Cleanup Objectives, and receive DEP written approval to use the clean fill/top soil. Upon receipt of DEP's written approval, the clean fill/top soil will be transported to the site for grading. Dust suppression activities will be implemented if conditions indicate that dust may

become problematic during the grading activities at the site. The clean fill/top soil will not be comprised of any construction and demolition (C&D) debris. The source facility for the clean soil has not yet been determined but it is readily available. Non-vegetated area (buildings, roadways, parking lots, etc.) will be covered by a paving system or concrete at least six inches thick.

Should the remedy result in residual contaminated soil staying in place, a site management plan may be required. A site management plan addresses future disturbance or contact with contaminants remaining in soil following the remedial action. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with applicable regulations. Evaluation of the potential for vapor intrusion for any buildings developed on the site may be required, including the provision for mitigation of any impacts identified. The site management plan can also identify any use restrictions, and provide for the operation and maintenance of the components of the remedy. Imposition of an institutional control in the form of an environmental easement could be also required as part of the site management plan.

An appropriate vapor barrier system will be incorporated into the design plan for all structures during the proposed construction project. The conceptual design of the vapor barrier system to include manufacture specification and a sample will be submitted to the DEP for review and approval.

Upon completion of all DEP requested remedial requirements, a P.E. certified Remedial Closure Report will be submitted to the DEP. This report will demonstrate that all remedial activities have been implemented appropriately. At a minimum, the report will include all transportation manifests, soil disposal/recycling certificates, proof of importing and grading certified clean fill/top soil for all landscaped areas, all preapproved soil analytical testing results for the imported fill/top soil, proof of depressurization and vapor barrier system installation (including photographs) and any other supporting documentation necessary.

A copy of the CHASP (construction health and safety plan) is included in the appendices. Pursuant to 29 CFR 1910.120, each individual involved in field activities potentially exposing them to hazardous substances and/or situations have received 40-hours of OSHA HAZWOPER training as well as medical surveillance. The Health and Safety Manager and Site Health and Safety Officer shall be responsible for overall implementation and coordination of the Health and Safety Program for field personnel at the site. The Health and Safety Manager is Chunyuan Li (646-380-1939) of Sustainable Management LLC. The Site Health and Safety Officer (SHSO) is Chunyuan Li (646-380-1939) of Sustainable Management LLC. If the Site Health and Safety Officer must leave the project site, he may designate another qualified employee as an alternate Site Health and Safety Officer.

The anticipated duration of the work period will be established prior to daily activities. The work will only be performed during daylight hours. Ambient temperature and weather conditions should also be considered. When ambient temperatures rise or fall to a level which may hinder personnel performance or becomes a threat to personal safety, consideration should be given to stop work and recommence work when temperatures or conditions are less severe.

There will be no hazardous materials E-designation placed on the subject site since DEP will handle site closure and sign-off.

The DEP correspondence letters and incident log form are presented in Attachment 10.

With implementation of the RAP and CHASP the proposed action would not result in significant hazardous material impacts.

No incremental difference between the RWCDS No-Action and RWCDS With-Action scenarios would occur since either scenario would require a RAP and CHASP.

Transportation

TRAFFIC

The proposed modifications to the LSCFD would allow for the demolition of existing improvements on the project site and replacement with a new 7-story plus mechanical penthouse medical office building containing approximately 201,563 gsf of floor area for Use Group 4A ambulatory diagnostic or treatment health care facilities and related accessory uses. The proposed building would have two below ground parking levels with off-street accessory parking. The proposed parking garage will provide up to approximately 263 attended parking spaces. Vehicles would enter the parking facility from 48th Street via a 16-foot curb cut. Vehicles would exit the facility via a 19.4 foot curb cut on 49th Street. As shown in the section of Analysis Framework, the incremental difference between the RWCDS No-Action and With-Action scenarios would be 124 off-street accessory parking spaces. The following analysis is based on the incremental difference of 124 off-street accessory parking spaces.

Maimonides Medical Center (MMC) has an existing accessory parking garage with a licensed capacity of 538 spaces which is located at 4723 10th Avenue (between 47th and 48th Streets). The proposed accessory parking garage would have a total of 263 spaces. The proposed garage would be used for accessory parking for the MMC and is similar to the existing medical center garage. The garage survey at the existing garage with a capacity of 538 parking spaces was conducted from 7AM to 7 PM. The survey data is presented in attachment and is summarized in Table 1. The in and out vehicle trips for the proposed garage are calculated based on the survey at the existing garage with a capacity ratio of 0.4888 (263/538). The calculated in/out vehicle trips for the proposed garage are presented in Table 1.

Table 1 Existing Garage Survey and the Proposed Garage In/Out Trips

Time Period	1/20/2011 Survey		1/25/2011 Survey		Survey Average				Standardized at Existing Garage				Proposed Garage (263 Spaces)				Incremental (124 Spaces)			
	Hr In	Hr Out	Hr In	Hr Out	Hr In	Hr Out	Accu.	%	Hr In	Hr Out	Accu.	%	Hr In	Hr Out	Accu.	%	Hr In	Hr Out	Accu.	%
							422	78.4%			330	61.3%			161	61.3%			76	61.3%
7-8 AM	198	91	180	97	189	94	517	96.1%	148	73	404	75.1%	72	36	198	75.1%	34	17	93	75.1%
8-9 AM	172	31	158	48	165	40	643	119.4%	129	31	502	93.4%	63	15	246	93.4%	30	7	116	93.4%
9-10 AM	51	17	76	19	64	18	688	127.9%	50	14	538	100.0%	24	7	263	100.0%	11	3	124	100.0%
10-11 AM	13	19	23	18	18	19	688	127.8%	14	14	538	99.9%	7	7	263	99.9%	3	3	124	99.9%
11-12 PM	12	21	23	25	18	23	682	126.8%	14	18	533	99.1%	7	9	261	99.1%	3	4	123	99.1%
12-1 PM	9	17	17	21	13	19	676	125.7%	10	15	529	98.2%	5	7	258	98.2%	2	3	122	98.2%
1-2 PM	10	29	14	20	12	25	664	123.3%	9	19	519	96.4%	5	9	254	96.4%	2	4	120	96.4%
2-3 PM	8	61	14	51	11	56	619	115.0%	9	44	484	89.9%	4	21	236	89.9%	2	10	111	89.9%
3-4 PM	19	86	32	111	26	99	546	101.4%	20	77	427	79.3%	10	38	208	79.3%	5	18	98	79.3%
4-5 PM	26	162	31	109	29	136	439	81.5%	22	106	343	63.7%	11	52	168	63.7%	5	24	79	63.7%
5-6 PM	29	146	27	154	28	150	317	58.8%	22	117	247	46.0%	11	57	121	46.0%	5	27	57	46.0%
6-7 PM	105	82	101	86	103	84	336	62.4%	81	66	262	48.8%	39	32	128	48.8%	19	15	60	48.8%

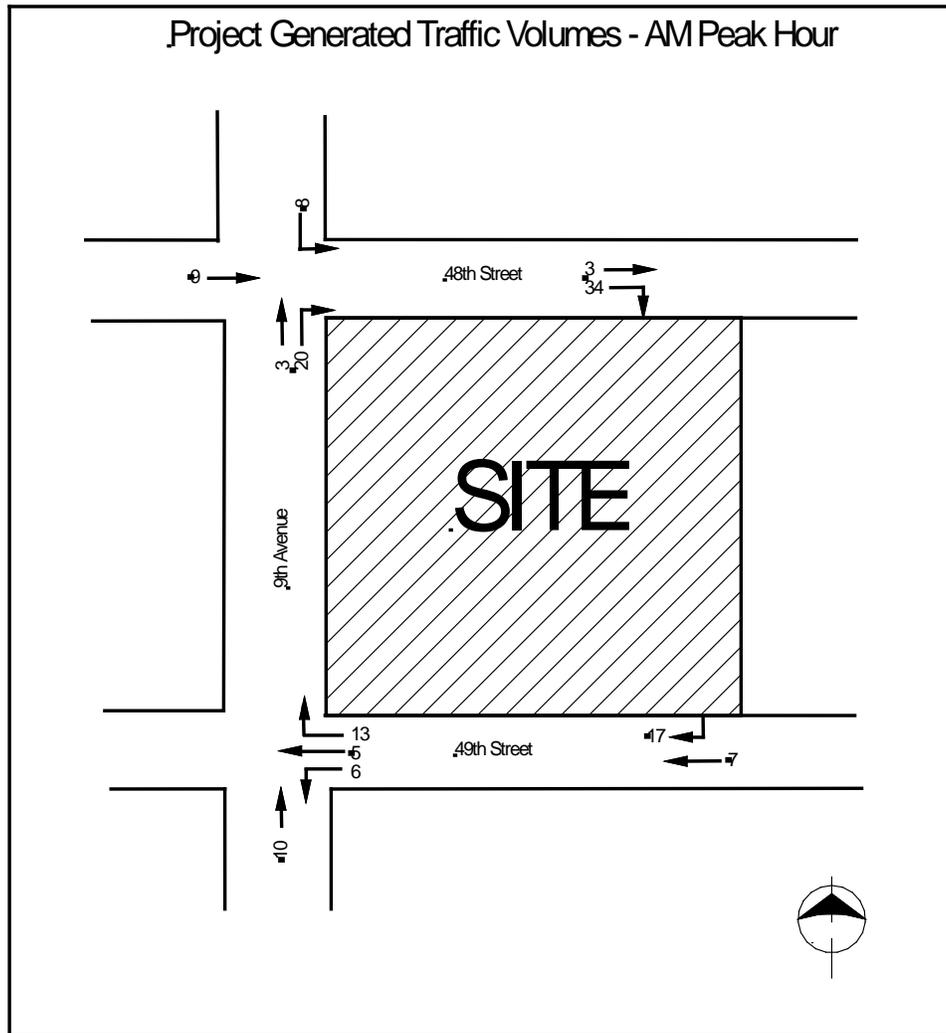
Note:

1. Existing garage capacity at 4723 10th Avenue is 538
2. Proposed garage capacity is 263 spaces.
3. Incremental difference between RWCDs No-Action and With-Action scenarios would be 124 parking spaces.
4. The proposed garage in/out is based on the ratio of garage capacity (263/538 = 0.4888).
5. Survey taken on January 20 and 25, 2011

The incremental 124 parking spaces would result in 51 vehicular trips (34 in and 17 out) for the AM peak hour (7-8 AM), 6 vehicular trips (2 in and 4 out) for midday peak hour (1-2 PM) and 34 vehicular trips (19 in and 15 out) of the PM peak hour (6-7 PM). It should be noted that proposed garage is only one block away from the existing garage. The existing garage utilization exceeds the licensed capacity as shown in the survey (see Table 1). Some vehicles using the existing garage are already in the study area and will go to the proposed garage. Therefore, the actual project generated vehicle trips should be lower than those in Table 1.

As shown in Table 1 the project generated vehicle trips would be below the CEQR threshold of 50 trips for the midday and PM peak hours. Trip assignments for the AM peak hour at adjacent intersections of 9th Avenue at 48th and 49th Streets are presented in Figure 18. As shown in Figure 1 the vehicle trips at the adjacent intersection of 9th Avenue and 48th Street would be 40 for the AM peak hour. The vehicle trips at the adjacent intersection of 9th Avenue and 49th Street would be 34 for the AM peak hour. The project generated vehicle trips would be below the CEQR threshold of 50 at any intersections for the AM peak hour. Therefore, no further traffic study is required.

Figure 18 Project Generated Trip Assignment-AM Peak Hour



MASS TRANSIT

The incremental difference of 124 parking spaces would not generate any mass transit users. The number of project generated bus riders from the incremental floor area of 24,241 gsf would be below the CEQR threshold of 200 trips. The number of project generated subway riders would be below the CEQR threshold of 200 trips. Therefore, no significant mass transit impacts are anticipated.

PEDESTRIAN

The incremental difference of 124 parking spaces would not generate any pedestrians since there are elevators and stairwells in the garage. The project generated pedestrians from the incremental difference of 24,241 gsf would be below the CEQR threshold of 200 trips. Therefore, no significant pedestrian impacts are anticipated.

Air Quality

STATIONARY SOURCE

The RWCDS With-Action scenario would be a new 7-story medical office building with the gross floor area of 201,563 square feet. The proposed building would use natural gas fired boilers for heating. However, both natural gas and fuel oil #2 are assumed to be used in order to conduct a conservative analysis. A screening analysis was performed in accordance with 3Q-322.1 of the CEQR Technical Manual to determine the potential for significant stationary source air quality impacts from the HVAC systems. The height of the boiler emission stack on the proposed building would be at a height of 119 feet (the penthouse building of 116 feet + stack height of 3 feet). The closest adjacent building with similar or greater height is located at 926 49th Street (see attachment 7). The closest distance from the proposed building to the adjacent building (926 49th Street) is approximately 120 feet. Based on intervening distance the NO₂ (natural gas) and SO₂ (fuel oil #2) emissions would be below the threshold value (Attachment 7). The proposed building would not result in significant air quality impacts.

The project site is located within R6 zoning district. The surrounding area within 400-foot radius from the project site is also in R6 zoning district. There are no manufacturing uses or processing facilities within the 400-foot radius area.

GARAGE EMISSIONS

The With-Action scenario would have a two-level parking garage located on two cellars below. The proposed garage would have 263 parking spaces, 116 spaces in the cellar and 147 spaces in the sub-cellar. The total floor area of the garage is 47,738 square feet. Garage air quality analysis was conducted for the RWCDS With-Action scenario in accordance with the CEQR Technical Manual. The garage air quality analysis results (see Attachment 7) indicate that the proposed garage would not result in significant air quality impacts.

Therefore, in accordance with the CEQR Technical Manual, the proposed project would not result in significant air quality impacts.

Noise

The project site is located on the east side of 9th Avenue between 48th and 49th Streets. 9th Avenue is a two-way roadway with traffic volumes of more than 500 for the weekday AM, midday and PM peak hours. 48th Street is a one way eastbound roadway with traffic volumes of more than 200 for the weekday AM, midday and PM peak hours. 49th Street is a one way westbound roadway with traffic volumes of more than 200 for the weekday AM, midday and PM peak hours. The proposed action would add 124 off-street accessory parking spaces. The project generated vehicle trips would not result in doubling of the existing traffic volumes on any streets. According to the CEQR Technical Manual, noise from the project generated and/or rerouted vehicular traffic is not expected to result in significant adverse noise impacts.

Construction Impacts

Construction of the new building will take 18-24 months to complete. During excavation and construction there may be periods when trucks entering or exiting the site might temporarily impede traffic. Such periods would be of short duration. It is not anticipated that there will be any long term narrowing of street access. The proposed action will follow the RAP and CHASP.

Hours of Work

Construction activities would be carried out in accordance with New York City laws and regulations, which allow construction activities between 7 AM and 6 PM on weekdays. Construction work would typically begin at 7AM on weekdays, with most workers arriving between 6 AM and 7 AM. Normally weekday work would end between 3:30 and 4 PM, but it can be expected that in order to meet the construction schedule or to complete certain critical tasks, the workday may occasionally be extended beyond normal work hours. Any extended work hours would generally end at 6PM and would not include all construction workers on-site, but only those involved in the specific task requiring additional work time.

Night and weekend work would not be scheduled regularly, but may occur occasionally to make up for bad weather delays, unforeseen circumstances, or special activities such as erecting/dismantling cranes. In such cases, appropriate work permits from DOB and DOT, would be obtained and advance notice to local residents would be made. Similar to an extended work day, the number of workers and pieces of equipment in operation would be limited to those needed to complete the particular task at hand. If required, the typical weekend workday would be on Saturday from approximately 9 AM to 5 PM.

Deliveries and Access

During construction, access to the construction site would be controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Security guards and flaggers would be posted as necessary. After work hours, the gates would be closed and locked. Security guards may patrol the construction site after work hours and on weekends to prevent unauthorized persons access. Material deliveries to the site would be controlled and scheduled. It is anticipated that the majority of the truck deliveries would enter and leave the site via 48th and 49th streets.

In a letter dated February 21, 2014 (see appendices) from Anthony M Tigre, Principal of Americon Construction Inc. to Robert Dobruskin, DCP Director of Environmental Review, the following is stated:

“The placement of the construction entrance to the site will be placed at the farthest feasible point on the opposite side of 9th Avenue away from the school. The proposed construction will mostly take place on the frontage of 48th and 49th street. Therefore most construction deliveries

and materials will be a good distance away from the school entrance on the opposite side of 9th Avenue.”

“With respect to pedestrian flow, at least one side of every street affected by the proposed work will be fully accessible to pedestrians and bicycles. Only the proposed building site will have sidewalk and lane closure at any time during construction.”

“No sidewalk or lane closures will take place adjacent to the school. It is not anticipated that any construction vehicles will drive on 48th or 49th streets adjacent to the school.”

Closures and Staging

Similar to other construction projects within New York City, temporary curb-lane and sidewalk closures would be required adjacent to the proposed development site. Flag persons may be present at active driveways, where needed, to manage the access and movement of trucks, and to ensure the safety of pedestrians. The staging and laydown of materials would be done either within the subject site or along the perimeter of the site within delineated areas. Maintenance and Protection of Traffic (MPT) plans would be developed for any temporary curb-lane or sidewalk closures. Approval of these plans and implementation of the closures would be coordinated with NYCDOT.

ENVIRONMENTAL EFFECTS OF PROJECT CONSTRUCTION ACTIVITIES

Construction can be disruptive to surrounding areas for periods of time. Because the proposed medical building would be near a school the following analyses describe potential construction impacts associated with the proposed medical building development with respect to transportation, air quality, and noise.

Number of Construction workers and material deliveries.

Excavation Phase

During the excavation phase of the project an estimated 21 workers will be on site. An estimated 60 trucks per day (120 trips) between 8AM and 4PM (approx.7.5 trucks per hour) will be involved in the excavation process.

Construction Phase

During construction an estimated 70 workers per day will be on site during the peak construction period. Various trades may come and go at different times during the day.

Transportation

The construction transportation analysis is based on a study of peak worker and truck trips taking into account several factors, including: worker modal splits, vehicle occupancy and trip distribution; and truck passenger car equivalents (PCEs) and arrival patterns.

Based on the latest available U.S. Census data (2000 Census) for workers in the construction and excavation industry it is anticipated that 51 percent of construction workers would commute by private auto at an average occupancy of 1.3 persons per vehicle. Therefore the number of vehicles (36) will not exceed the CEQR threshold of 50 trips during the peak hour for the requirement of a traffic study. The combination of construction traffic and construction worker vehicles would be not more than 44 (numbers rounded up) trips.

The distance from the school to the frontage of the proposed medical building is approximately 70 feet. No construction traffic will occur on the side of 9th Avenue adjacent to the school and no construction traffic will occur on 48th or 49th street on the side of 9th Avenue adjacent to the school, therefore there will be no significant impact on traffic in the immediate vicinity of the school.

Noise.

All construction equipment will comply with existing noise standards for such equipment. Since the number of PCE's will not exceed the requirement for a traffic study according to the CEQR Technical Manual there will be no significant impact from traffic generated noise.

Air Quality

Because of the low number of PCE's the mobile source air quality threshold for construction vehicles will not be exceeded,

Therefore, the proposed action would not result in significant Construction Impacts.

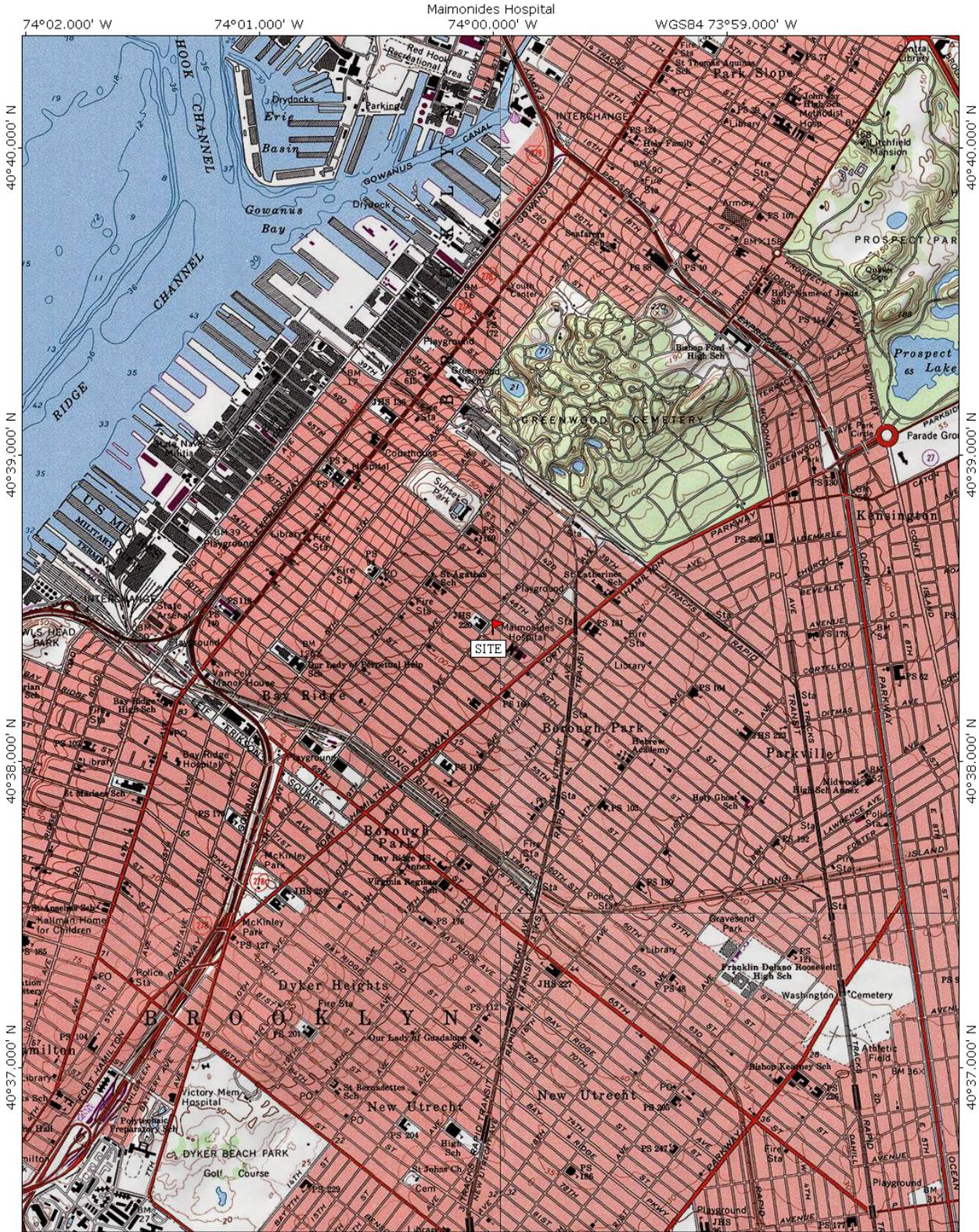
Average Daily Manpower Projection

EXCAVATION PHASE	
TIMES	Labor
7AM - 8 AM	10
8AM - 9 AM	3
9AM - 10 AM	3
10AM - 11 AM	3
11AM - 12 PM	
12PM - 1PM	
1PM - 2PM	
2PM - 3PM	1
3PM -4PM	1
4PM -5PM	
5PM -6PM	
6PM - 7PM	
Totals	21

CONSTRUCTION PHASE	
TIMES	Labor
7AM - 8 AM	50
8AM - 9 AM	10
9AM - 10 AM	10
10AM - 11 AM	
11AM - 12 PM	
12PM - 1PM	
1PM - 2PM	
2PM - 3PM	
3PM -4PM	
4PM -5PM	
5PM -6PM	
6PM - 7PM	
Totals	70

Attachment 1

Site Location Map



74°02.000' W 74°01.000' W 74°00.000' W WGS84 73°59.000' W

40°37.000' N 40°38.000' N 40°39.000' N 40°40.000' N

74°02.000' W 74°01.000' W 74°00.000' W WGS84 73°59.000' W

MN 13° TN

0 1000 FEET 0 500 1000 METERS

1 MILE

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Attachment 2

Land Use Map

Land Use Map

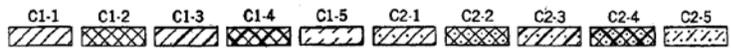
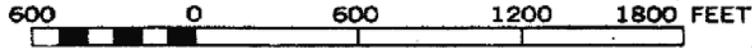
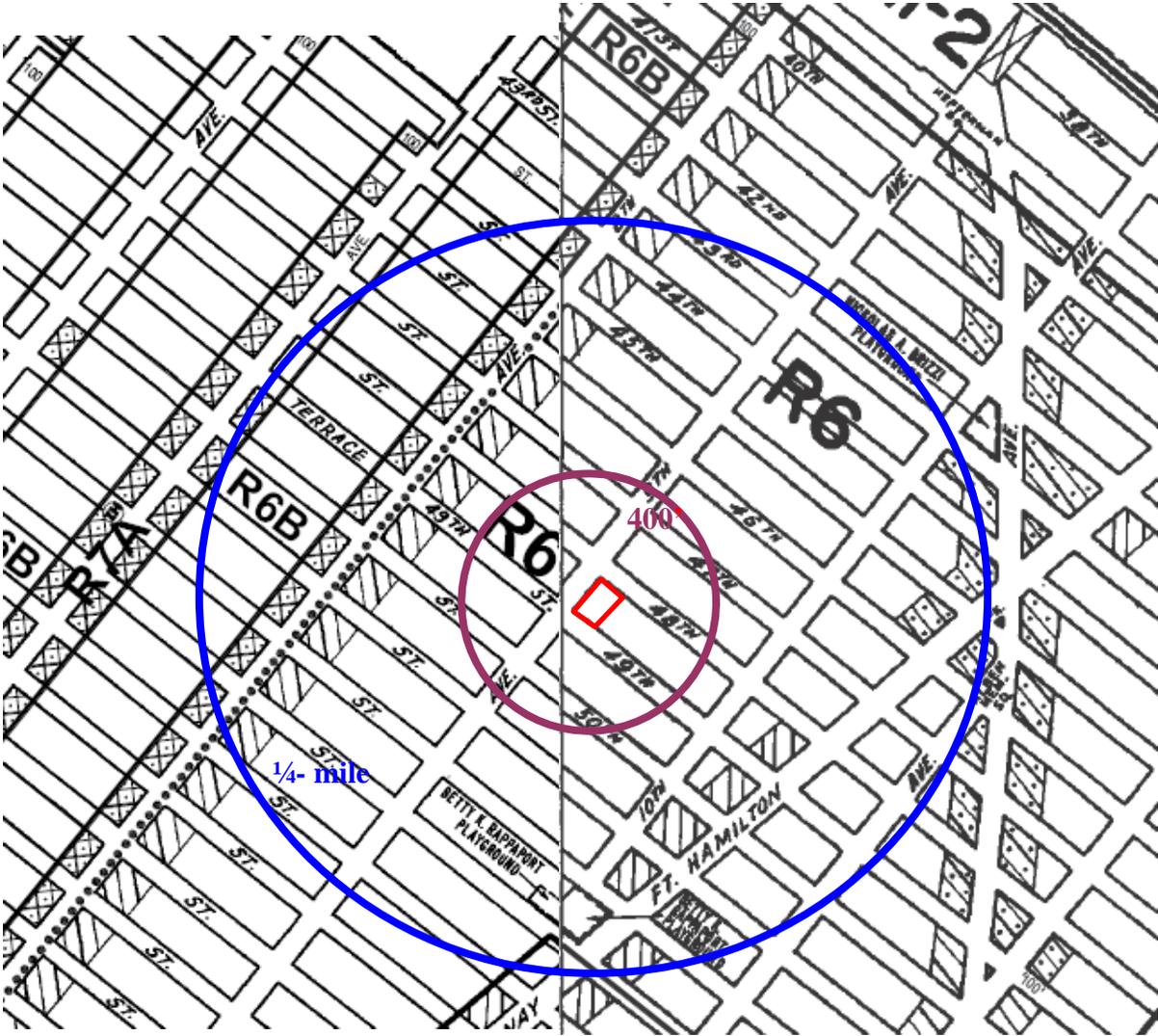


- | | | | |
|---|--|---|---------------------------------|
|  | Parks & Public Lands |  | 1 & 2 Family Residential |
|  | Forested Areas (NJ) |  | Multi-family Residential |
|  | Community Gardens |  | Mixed Use |
|  | School property with garden |  | Open space & outdoor recreation |
|  | Playgrounds |  | Commercial |
|  | Green Spaces Along Streets |  | Institutions |
|  | Golf Courses |  | Industrial |
|  | Baseball/Soccer/Football Fields |  | Parking |
|  | Tennis/Basketball/Handball Courts & Tracks |  | Transportation / Utilities |
|  | Cemeteries |  | Vacant Lots |

Attachment 3

Zoning Map

Zoning Map

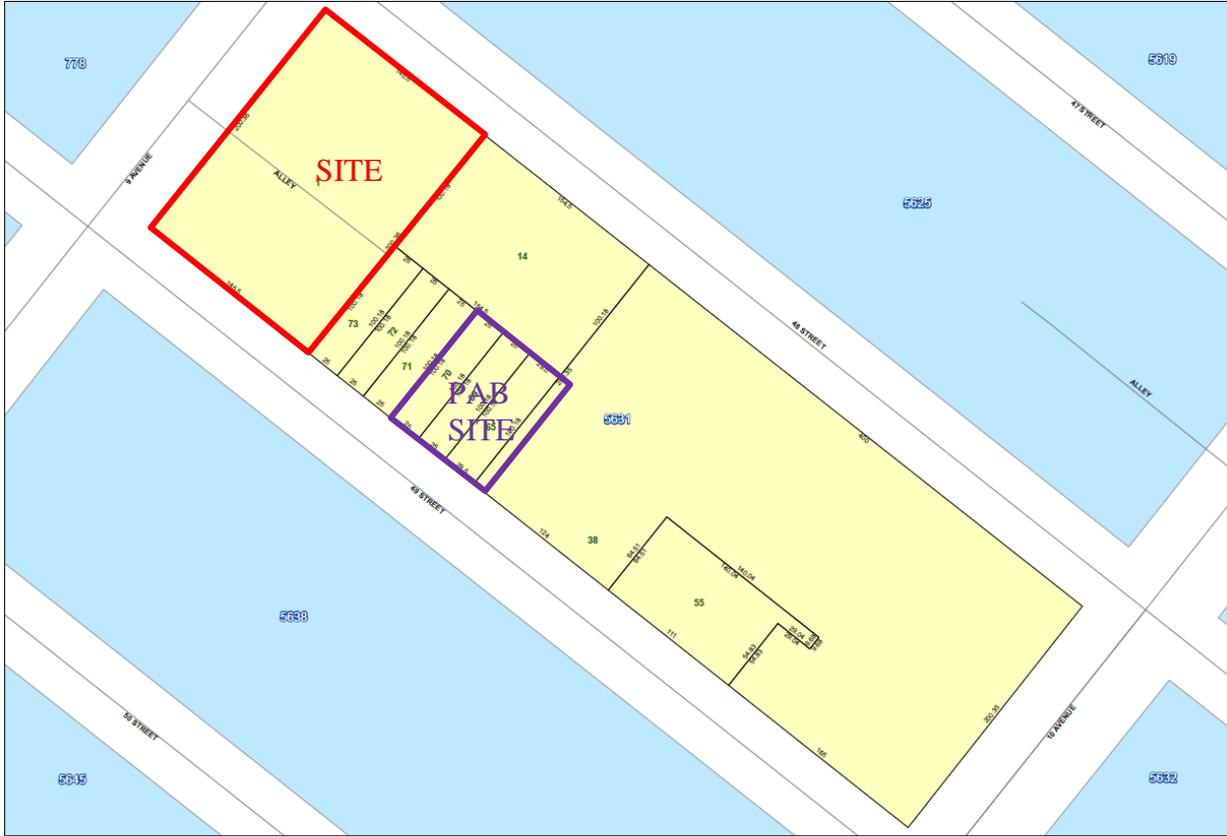


-  SPECIAL PURPOSE DISTRICT
 The letter(s) within the shaded area designates the special purpose district as described in the text of the Zoning Resolution.
-  D - RESTRICTIVE DECLARATION
-  E - CITY ENVIRONMENTAL QUALITY REVIEW DECLARATION

Attachment 4

Tax Map

Tax Map



0 5 10 20 30 40 Feet

Attachment 5

Site Plan

Maimonides Medical Center

COMMUNITY FACILITY BUILDING

Gensler
 Architect
 Rockefeller Center
 1230 Avenue of the Americas
 Suite 1500
 New York NY 10020
 Telephone 212.492.1400
 Facsimile 212.492.1472

MODIFICATION OF AUTHORIZATION FOR LARGE-SCALE COMMUNITY FACILITY DEVELOPMENT

July 22, 2013

4813 Ninth Avenue
 Brooklyn, NY 11220

ZONING DRAWING LIST	
Z-0	COVER
Z-1	LARGE SCALE DEVELOPMENT PLAN- PROPOSED
Z-1E	LARGE SCALE DEVELOPMENT PLAN- EXISTING
Z-2	LAND USE MAP
Z-3	ZONING ANALYSIS & ROOF PLAN
Z-3.1	GROUND FLR PLAN (ILLUSTRATIVE)
Z-4	ZONING ANALYSIS
Z-5	SITE CONTEXT ELEVATIONS
Z-6	BUILDING ELEVATIONS



LOCATION MAP

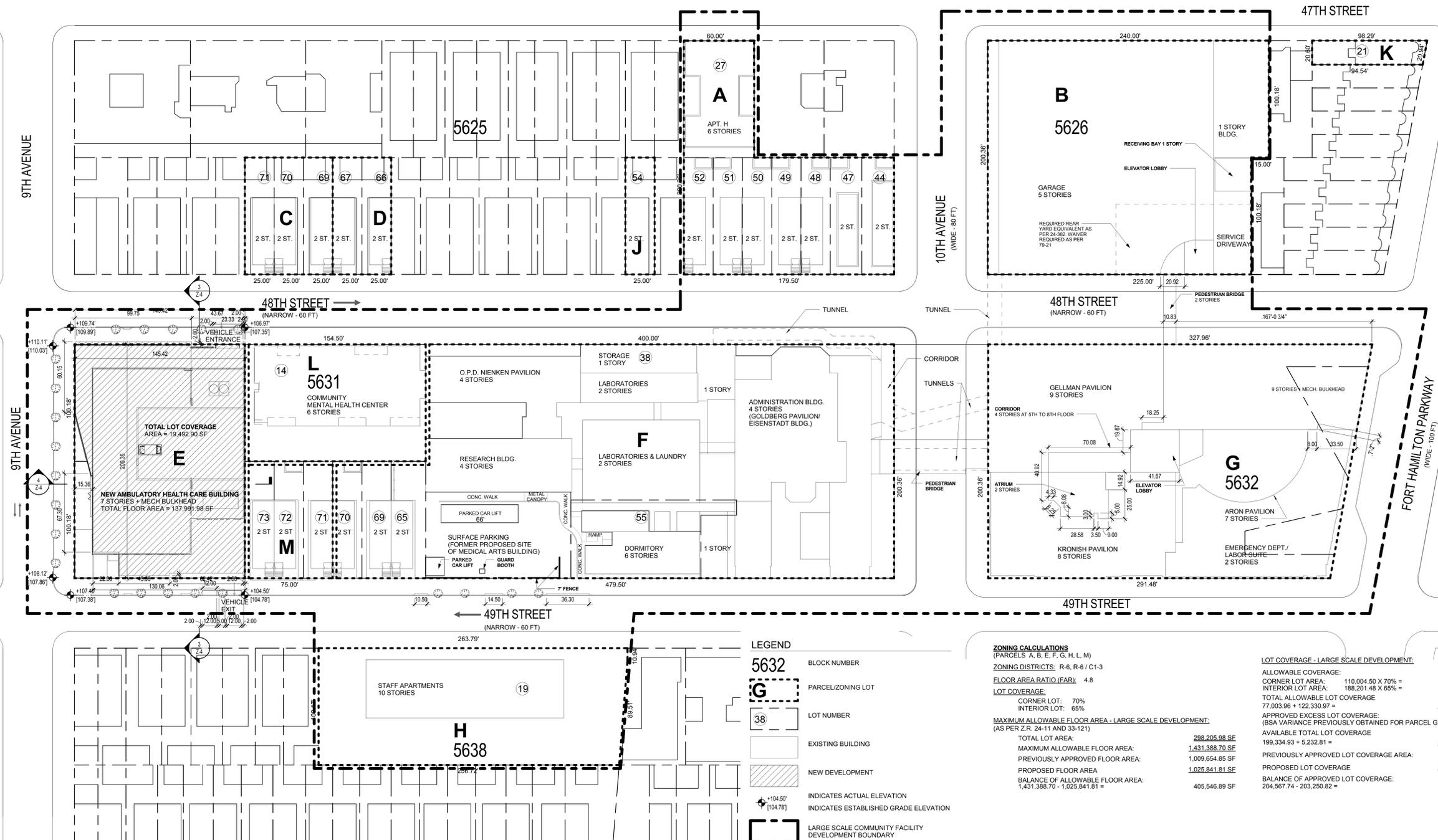


Maimonides Medical Center

4813 Ninth Avenue
Brooklyn, NY 11220

Rockefeller Center
1230 Avenue of the Americas
Suite 1500
New York, NY 10020
Telephone 212.492.1400
Facsimile 212.492.1472

Gensler



LEGEND

5632 BLOCK NUMBER

G PARCEL/ZONING LOT

38 LOT NUMBER

EXISTING BUILDING

NEW DEVELOPMENT

INDICATES ACTUAL ELEVATION

INDICATES ESTABLISHED GRADE ELEVATION

LARGE SCALE COMMUNITY FACILITY DEVELOPMENT BOUNDARY

ZONING CALCULATIONS

(PARCELS A, B, E, F, G, H, L, M)

ZONING DISTRICTS: R-6, R-6/C1-3

FLOOR AREA RATIO (FAR): 4.8

LOT COVERAGE:

CORNER LOT: 70%

INTERIOR LOT: 65%

MAXIMUM ALLOWABLE FLOOR AREA - LARGE SCALE DEVELOPMENT:
(AS PER Z.R. 24-11 AND 33-121)

TOTAL LOT AREA:	298,205.98 SF
MAXIMUM ALLOWABLE FLOOR AREA:	1,431,388.70 SF
PREVIOUSLY APPROVED FLOOR AREA:	1,009,654.85 SF
PROPOSED FLOOR AREA:	1,025,841.81 SF
BALANCE OF ALLOWABLE FLOOR AREA:	405,546.89 SF

LOT COVERAGE - LARGE SCALE DEVELOPMENT:

ALLOWABLE LOT COVERAGE:	77,003.96 SF
CORNER LOT AREA: 110,004.50 X 70% =	77,003.15 SF
INTERIOR LOT AREA: 188,201.48 X 65% =	122,330.97 SF
TOTAL ALLOWABLE LOT COVERAGE:	199,334.12 SF
APPROVED EXCESS LOT COVERAGE (BSA VARIANCE PREVIOUSLY OBTAINED FOR PARCEL G)	5,232.81 SF
AVAILABLE TOTAL LOT COVERAGE:	204,567.74 SF
PREVIOUSLY APPROVED LOT COVERAGE AREA:	199,557.92 SF
PROPOSED LOT COVERAGE:	203,250.82 SF
BALANCE OF APPROVED LOT COVERAGE:	1,316.92 SF

Issue	Date	Issue Description	By	Check
1	4/4/11	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
2	7/23/12	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
3	12/20/12	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
4	07/22/13	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		

CFC ACTIONS APPROVED

AUTHORIZATION PURSUANT TO SECTION 78-31 (CURRENT SECTION 79-21) TO ALLOW DISTRIBUTION OF LOT COVERAGE WITHOUT REGARD TO ZONING LOT LINES AND LOCATION OF BUILDINGS WITHOUT REGARD TO REAR YARD REGULATIONS. AUTHORIZATION PURSUANT TO SECTION 78-41 (CURRENT SECTION 79-31) TO ALLOW DISTRIBUTION OF ACCESSORY OFF-STREET PARKING SPACES TO BE LOCATED ANYWHERE WITHIN A LARGE-SCALE COMMUNITY FACILITY DEVELOPMENT ("LSCFD") (CP-19649) JAN. 4, 1967, CAL. NO. 13).

SPECIAL PERMIT PURSUANT TO SECTION 74-53 TO PERMIT AN ACCESSORY OFF-STREET PARKING GARAGE ON PARCEL G WITH MORE SPACES (336) THAN THE PRESCRIBED MAXIMUM AND TO PERMIT ROOFTOP PARKING. AUTHORIZATION PURSUANT TO SECTION 79-21 TO AUTHORIZE FLOOR AREA TO BE DISTRIBUTED WITHOUT REGARD TO ZONING LOT LINES. AUTHORIZATION PURSUANT TO SECTION 79-31 TO ALLOW DISTRIBUTION OF ACCESSORY OFF-STREET PARKING SPACES TO BE LOCATED ANYWHERE WITHIN THE LSCFD (C 760206 ZSK | MAY 18, 1977, CAL. NO. 19).

CONSENT TO CONSTRUCT, USE AND MAINTAIN A PEDESTRIAN AND SERVICE TUNNEL UNDER 48TH ST. TO CONNECT GARAGE ON PARCEL B TO BUILDING ON PARCEL G (C 760225 MFK | MAY 18, 1977, CAL. NO. 20).

MODIFICATION AND RENEWAL OF CONSENT TO USE AND MAINTAIN A PEDESTRIAN TUNNEL ACROSS 10TH AVE. CONNECTING BUILDINGS ON PARCELS F AND G (C 770012 MFK | MAY 18, 1977, CAL. NO. 21).

MODIFICATION AND RENEWAL OF CONSENT TO USE AND MAINTAIN A PEDESTRIAN TUNNEL ACROSS 10TH AVE. CONNECTING BUILDINGS ON PARCELS F AND G (C 770013 MFK | MAY 18, 1977, CAL. NO. 22).

MODIFICATION AND RENEWAL OF CONSENT TO USE AND MAINTAIN A PEDESTRIAN BRIDGE OVER 10TH AVE. CONNECTING BUILDINGS ON PARCELS F AND G (C 770014 MFK | MAY 18, 1977, CAL. NO. 23).

AUTHORIZATION PURSUANT TO SECTION 79-21 TO PERMIT DISTRIBUTION OF PERMITTED FLOOR AREA AND LOT COVERAGE WITHOUT REGARD TO ZONING LOT LINES IN CONNECTION WITH ENLARGEMENT OF COMMUNITY MENTAL HEALTH CENTER ON PARCEL F AND GOLDBERG PAVILION ON PARCEL F, AND TO LOCATE THE ENLARGEMENT OF THE GOLDBERG PAVILION WITHOUT REGARD FOR FRONT YARDS AND HEIGHT AND SETBACK REGULATIONS (N 810445 ZAK | JUL. 20, 1981, CAL. NO. 4).

MODIFICATION OF SITE PLAN TO ALLOW ADDITION OF VESTIBULE ON PARCEL (M810445A) ZAK | DEC. 12, 1983 (BY LETTERS)).

AUTHORIZATION PURSUANT TO SECTION 79-21 TO LOCATE A NEW MEDICAL ARTS BUILDING ON PARCEL F WITHOUT REGARD FOR HEIGHT AND SETBACK AND REAR YARD REGULATIONS AND TO MODIFY THE BOUNDARIES OF THE LSCFD (N 880525 ZAK | DEC. 27, 1989, CAL. NO. 41).

MODIFICATION OF SITE PLAN TO ALLOW ADDITION OF 1-STORY MRI BUILDING AND PASSAGEWAY AND REMOVAL 5,000 SF OF STORES ON PARCEL G (M 880525(A) ZAK | JUN. 10, 1991 (BY LETTER)).

AUTHORIZATION PURSUANT TO SECTION 79-21 TO ALLOW DISTRIBUTION OF REQUIRED OPEN SPACE AND LOT COVERAGE WITHOUT REGARD TO ZONING LOT LINES IN CONNECTION WITH ENLARGEMENT OF EMERGENCY ROOM AND DELIVERY SUITE FACILITIES ON PARCEL G (N 920689 ZAK | APR. 20, 1994, CAL. NO. 16).

SPECIAL PERMIT PURSUANT TO SECTION 74-53 TO ALLOW ENLARGEMENT OF PREVIOUSLY APPROVED 3-LEVEL AND ROOF ACCESSORY PARKING GARAGE ON PARCEL G FROM A CAPACITY OF 336 UNATTENDED SPACES TO A 5-LEVEL AND ROOF ACCESSORY PARKING GARAGE WITH 852 ATTENDED SPACES (C 970531 ZSK | SEP. 17, 1997, CAL. NO. 28).

AUTHORIZATION PURSUANT TO SECTION 79-21 TO LOCATE ENLARGEMENT OF ACCESSORY PARKING GARAGE ON PARCEL G WITHOUT REGARD FOR REAR YARD REGULATIONS. AUTHORIZATION PURSUANT TO SECTION 79-31 TO ALLOW OFF-STREET PARKING FACILITIES TO BE LOCATED ANYWHERE WITHIN LSCFD WITHOUT REGARD TO ZONING LOT LINES (N 970532 ZAK | SEP. 17, 1997, CAL. NO. 27).

AUTHORIZATION PURSUANT TO SECTION 79-21 TO WAIVE HEIGHT, SETBACK AND REAR YARD EQUIVALENT REQUIREMENTS AND TO ALLOW DISTRIBUTION OF FLOOR AREA WITHOUT REGARD TO ZONING LOT LINES TO PERMIT CONSTRUCTION OF A 9-STORY INFILL ADDITION TO THE ARON PAVILION ON PARCEL G AND RELATED IMPROVEMENTS TO BUILDING ON PARCELS B AND G (M 030252 ZAK | AUG. 27, 2003, CAL. NO. 13).

CONSENT TO CONSTRUCT, MAINTAIN AND USE AN ENCLOSED 2-STORY PEDESTRIAN BRIDGE OVER 48TH STREET CONNECTING BUILDINGS ON PARCELS B AND G (C 030253 GFK | AUG. 27, 2003, CAL. NO. 14).

MODIFICATIONS REQUESTED

MODIFICATION OF PREVIOUSLY APPROVED SITE PLAN FOR LSCFD:

- TO MODIFY BOUNDARY OF LSCFD TO INCLUDE LOT 9 ON PARCEL E AND LOTS 71 AND 73 ON PARCEL M
- TO ALLOW DEVELOPMENT OF NEW 7-STORY BUILDING CONTAINING USE GROUP 4 AMBULATORY DIAGNOSTIC AND TREATMENT HEALTH CARE FACILITIES AND/OR HOSPITAL RELATED FACILITIES, ACCESSORY OFF-STREET PARKING AND RELATED ACCESSORY USES ("HEALTH CARE USES") ON PARCEL E
- TO REMOVE PROPOSED 10-STORY BUILDING (APPROVED PURSUANT TO N 880525 ZAK) ON LOTS 65, 69 AND P/O LOT 38 ON PARCEL F ("PAB SITE") CONTAINING HEALTH CARE USES AND ELIMINATION OF RELATED HEIGHT AND SETBACK AND REAR YARD WAIVERS; AND
- TO CHANGE THE APPROVED USES FOR THE PAB SITE TO ALLOW THE EXISTING ATTENDED ACCESSORY OFF-STREET PARKING AND HEALTH CARE USES TO REMAIN.

NOTES

1. PERMITTED LOT COVERAGE ON PARCEL G INCLUDES 5,232.81 SF OF ADDITIONAL LOT COVERAGE PER BSA VARIANCE GRANTED PURSUANT TO SECTION 77-21(NO. 262-02-82)

SCHEDULE

PARCEL	BLOCK	LOTS	LOT AREA	LOT COVERAGE			FLOOR AREA			COMMENTS
				PERMITTED	PREVIOUSLY APPROVED	PROPOSED	PERMITTED	PREVIOUSLY APPROVED	PROPOSED	
A	5625	27,44,47,48,49,50,51,52	24,009.89 SF	16,106.43 SF	14,172.00 SF	14,172.00 SF	115,247.47 SF	55,929.60 SF	55,929.60 SF	
B	5626	1	46,589.70 SF	31,283.31 SF	36,860.72 SF	36,860.72 SF	223,630.56 SF	103,692.15 SF	103,692.15 SF	
E	5631	1,6,9,10,11,12,13,14,75,76,77,78	29,152.38 SF	19,949.85 SF	13,996.00 SF	19,492.90 SF	139,931.42 SF	27,992.00 SF	137,991.98 SF	
F	5631	38,55,65,69,70	88,134.31 SF	58,287.30 SF	58,186.20 SF	53,730.20 SF	423,044.69 SF	268,042.10 SF	168,925.08 SF	
G	5632	1, 19, 27	61,249.10 SF	47,044.95 SF*	57,702.00 SF*	57,702.00 SF*	293,995.68 SF	411,707.00 SF	411,707.00 SF	SEE NOTE 1
H	5638	19	26,079.30 SF	16,951.55 SF	8,446.00 SF	8,446.00 SF	125,180.64 SF	84,460.00 SF	84,460.00 SF	
L	5631	14	15,477.80 SF	10,060.57 SF	8,869.00 SF	8,869.00 SF	74,293.44 SF	55,180.00 SF	55,180.00 SF	
M	5631	71, 72, 73	7,513.50 SF	4,883.78 SF	1,326.00 SF	3,978.00 SF	36,064.80 SF	2,652.00 SF	7,956.00 SF	
TOTALS			298,205.98 SF	204,567.74 SF*	199,557.92 SF*	203,250.82 SF	1,431,388.70 SF	1,009,654.85 SF	1,025,841.81 SF	SEE NOTE 1
BALANCE REMAINING			-	-	-	-	-	-	405,546.89 SF	

Seal/Signature

Project Name
COMMUNITY FACILITY BUILDING

Project Number
06.7020.002

Description
LARGE SCALE DEVELOPMENT PLAN- PROPOSED

Scale
0 2 4 8 16

Z-1

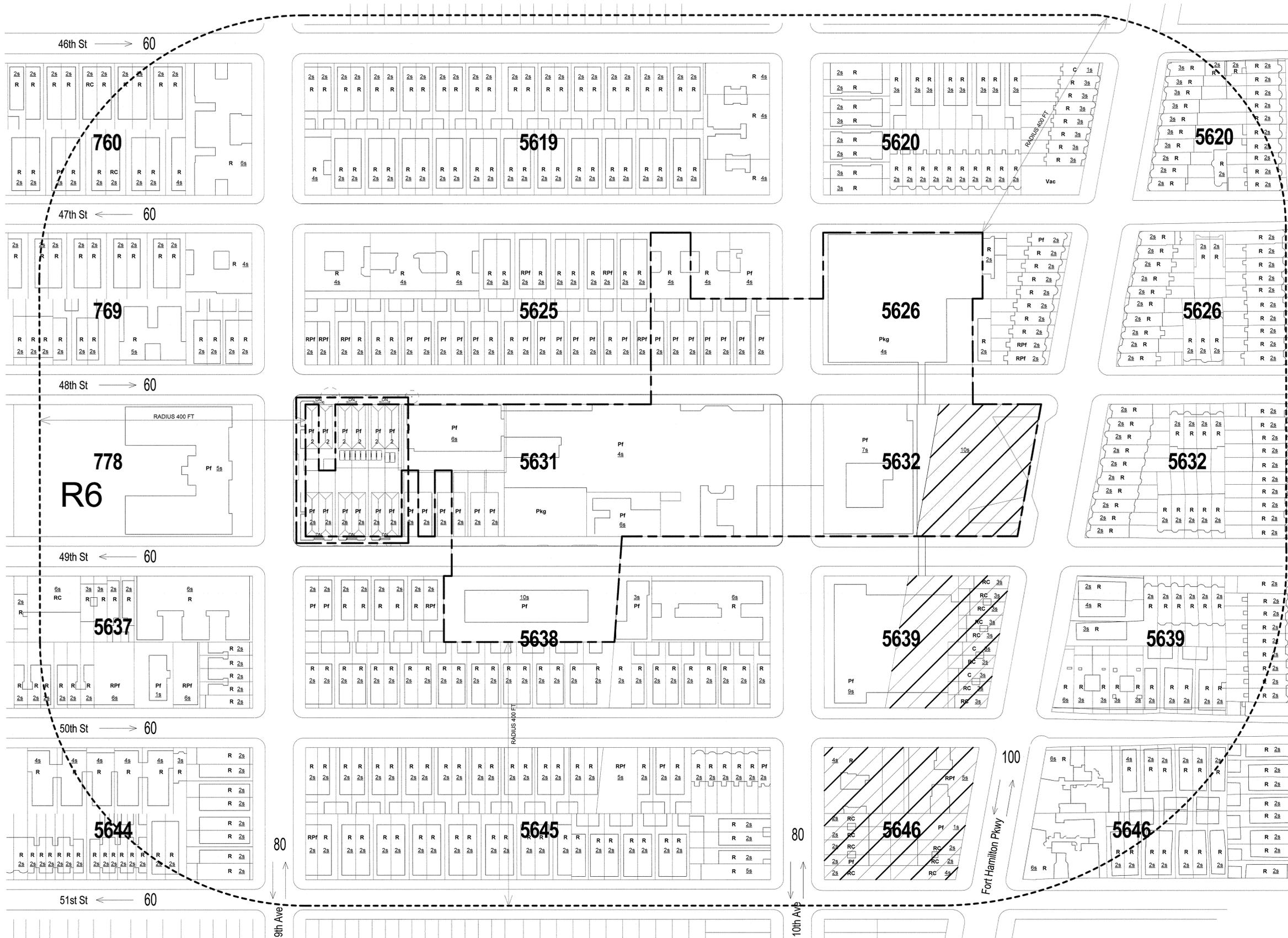
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Maimonides Medical Center

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LEGEND

- LARGE-SCALE COMMUNITY FACILITY DEVELOPMENT BOUNDARY
- PROJECT SITE BOUNDARY
- STUDY AREA BOUNDARY (400-FOOT PERIMETER)

- 5632 BLOCK NUMBER
- 60 STREET WIDTH
- STREET DIRECTION ARROW
- 2s NUMBER OF STORIES
- R RESIDENTIAL

- RC MIXED COMMERCIAL / RESIDENTIAL
- C COMMERCIAL
- Pf PUBLIC FACILITIES & INSTITUTIONS
- RPf MIXED RESIDENTIAL / PUBLIC FACILITIES
- Pkg PARKING

- Vac VACANT
- R6** ZONING
- C1-3 OVERLAY

Issue	Date & Issue Description	By	Check
1	4/4/11 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
2	7/23/12 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
3	12/20/12 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
4	07/22/13 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		



Project Name
COMMUNITY FACILITY BUILDING

Project Number
06.7020.002

Description
LAND USE MAP

Scale
As indicated

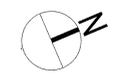
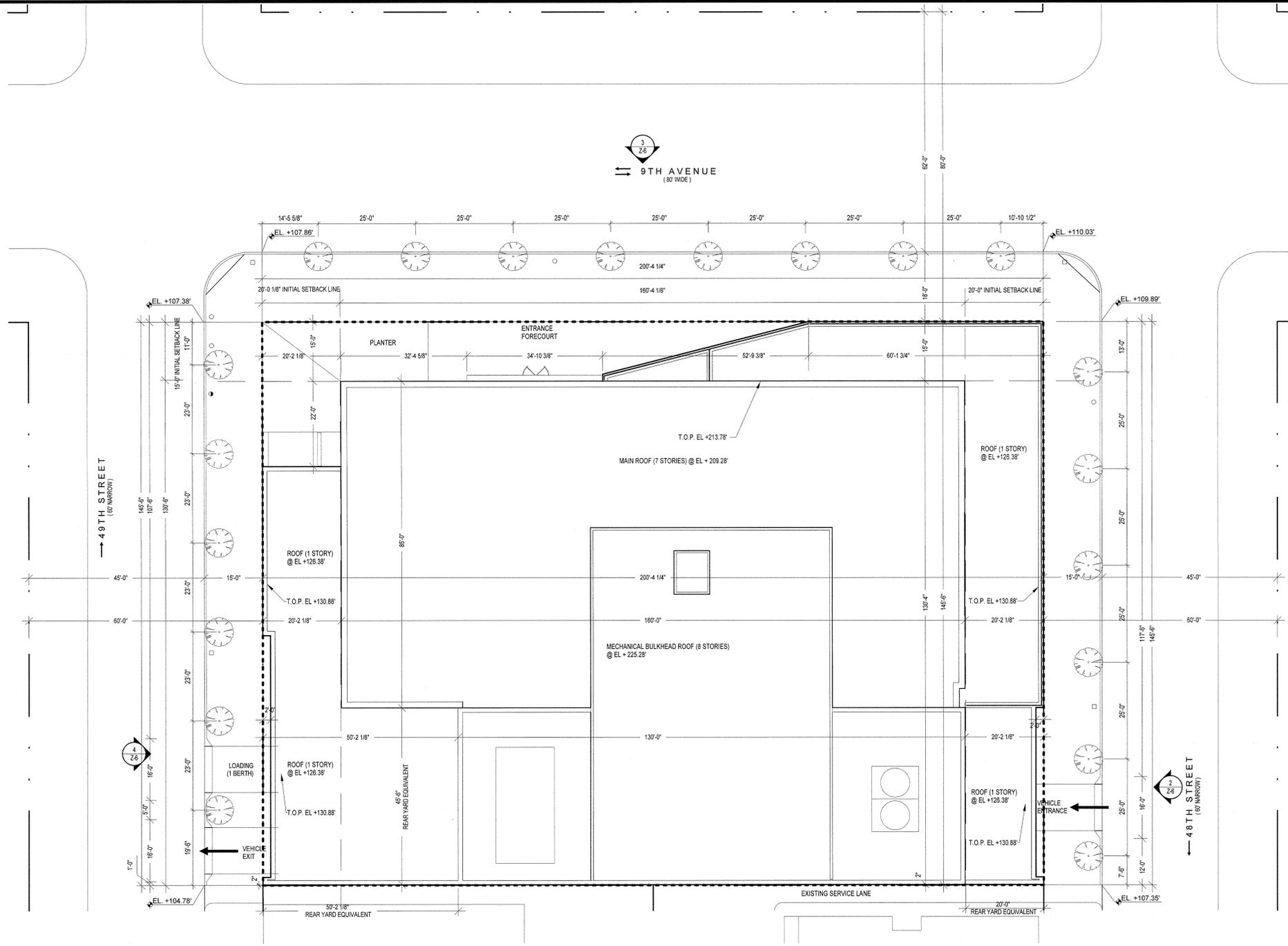


Z-2

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SECTION	ITEM	Permitted/ Required	Proposed	APPLICABILITY
	Zoning District	R6		General Note(G.N.)
	Zoning Block/ Lots	Block 5631/ Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78 (Parcel E)		G.N.
	Lot Area	29,152.38 sf		G.N.
22-14	Uses Groups	Use Groups 1 - 4	Use Group 4A	COMPLIES
24-11	FAR - Community Facility	4.8	4.8	
	Floor Area	139,931.42 zsf = 29,152.38 sf X 4.8	137,991.98 zsf	COMPLIES
24-11/24-12	Lot Coverage	19,949.85 (see diagram 2/Z-4 for detail)	19,492.90 sf	COMPLIES
24-34/33-25	Front Yard	None required.	None provided	COMPLIES
	Side Yard	None required.	None provided	COMPLIES
24-36/24-391/24-382	Rear Yard/ Rear Yard Equivalents	No Rear Yard required for Corner Lot portion. 60ft Rear Yard Equivalent required for Through Lot portion	2,700 sf Rear Yard Equivalent provided	COMPLIES
26-40	Street Tree Planting & Planting Strip Requirements	Every 25 feet of street frontage of the zoning lot	20 trees provided (see diagram 2/Z-3)	COMPLIES
24-52	Height & Setback Regulations	Maximum height of front wall: 60ft or 6 stories Minimum Initial Setback Distance: 20ft(Narrow Street) 15ft (Wide Street) Sky Exposure Plane above Base: 2.7 : 1(Narrow Street) 5.6 : 1(Wide Street)	See Diagram 3/Z-4 & 4/Z-4 See Diagram 3/Z-4 & 4/Z-4 See Diagram 3/Z-4 & 4/Z-4 See Diagram 3/Z-4 & 4/Z-4	COMPLIES COMPLIES- 4' PARAPET WALLS PER 24-51(J) COMPLIES COMPLIES COMPLIES
25-12/25-13/25-18/25-19/25-30	Off Street Accessory Parking Spaces	1 per 800 sf of Use Group 4A (139,931.42 ÷ 800 = 167). Maximum of 1 per 400 sf of Lot Area (29,152.38 ÷ 40 = 728.81)	263 spaces proposed	INCREASE PER 25-12, 25-13, 25-19
25-72	Off Street Accessory Loading Berths Hospitals and related facilities	The first 10,000 sf - None required The next 290,000 sf - 1 berth required Each 300,000 sf thereof - 1 berth required	137,992 sf proposed 1 accessory off-street loading berth proposed	COMPLIES

ZONING TABLE



- LEGEND**
- STREET TREE
 - LIGHT POLE
 - SIGN
 - HYDRANT

ROOF PLAN

SCALE: 3/32" = 1'-0"

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Issue	Date & Issue Description	By	Check
1	4/4/11 ISSUED TO DEPT OF CITY PLANNING; BROOKLYN OFFICE		
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3	12/20/12 ISSUED TO DEPT OF CITY PLANNING; BROOKLYN OFFICE		
4	07/22/13 ISSUED TO DEPT OF CITY PLANNING; BROOKLYN OFFICE		



Project Name
COMMUNITY FACILITY BUILDING

Project Number
06.7020.002

Description
ZONING ANALYSIS & ROOF PLAN



Z-3

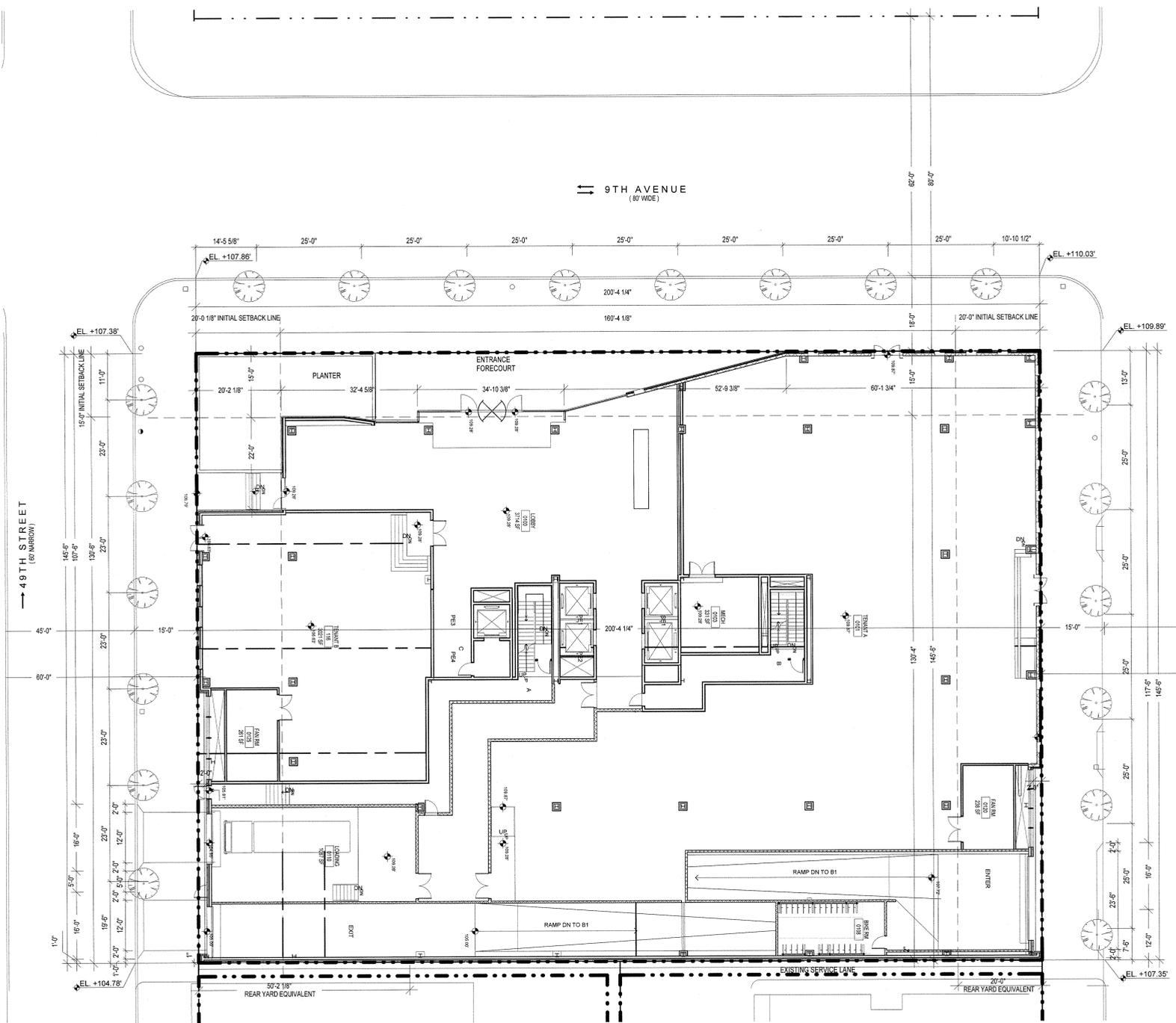
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Z-GROUND FL PLAN
SCALE: 3/32" = 1'-0"

NOTE: THIS DRAWING FOR ILLUSTRATIVE PURPOSES ONLY.

Issue	Date & Issue Description	By	Check
1	07/22/13 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		

Seal/Signature

Project Name
COMMUNITY FACILITY BUILDING

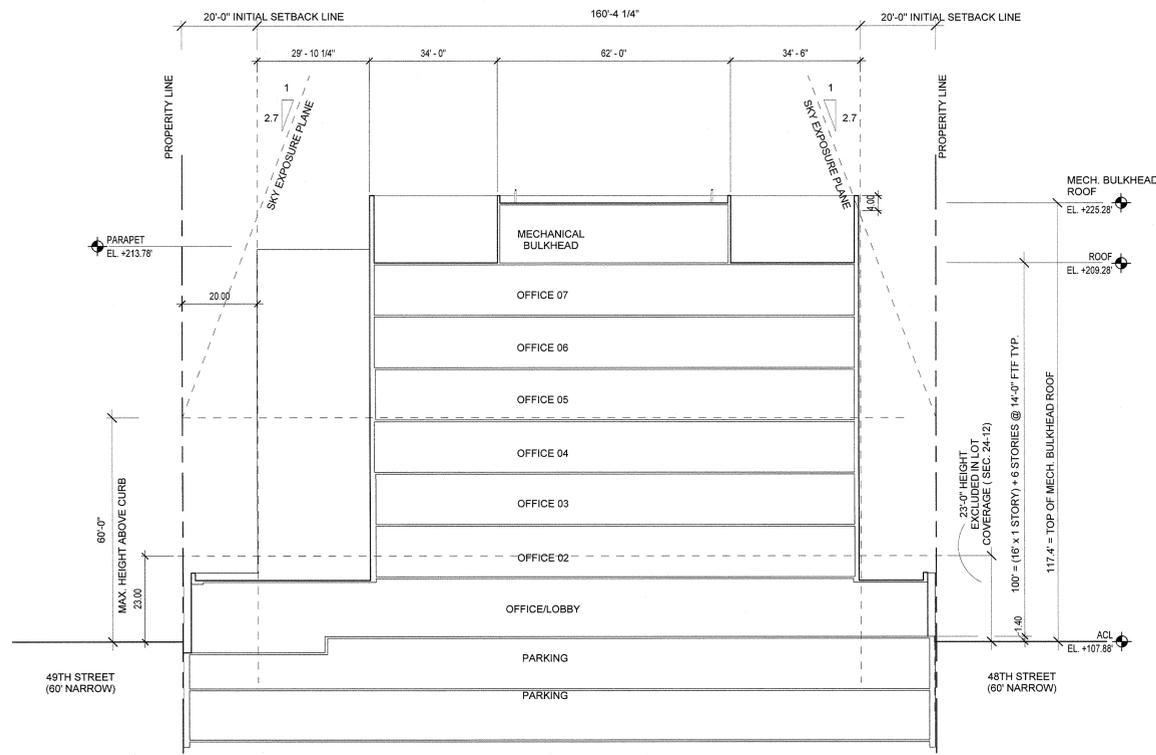
Project Number
06.7020.002

Description
GROUND FLR PLAN (ILLUSTRATIVE)



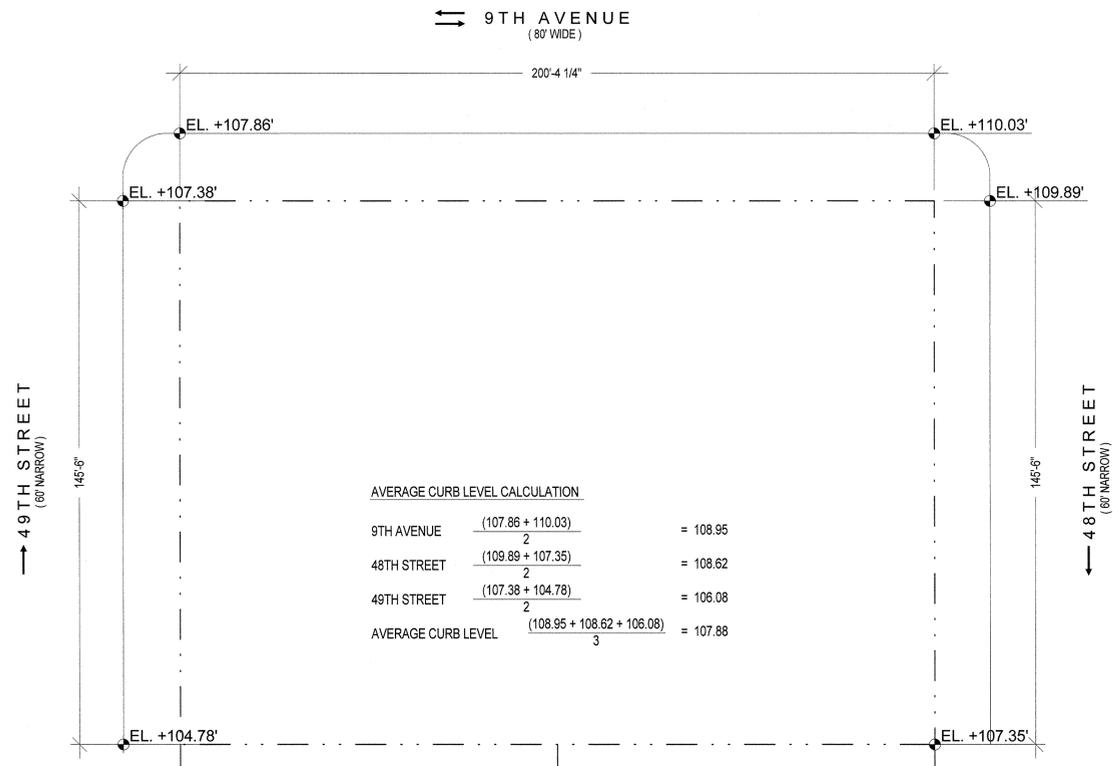
Z-3.1

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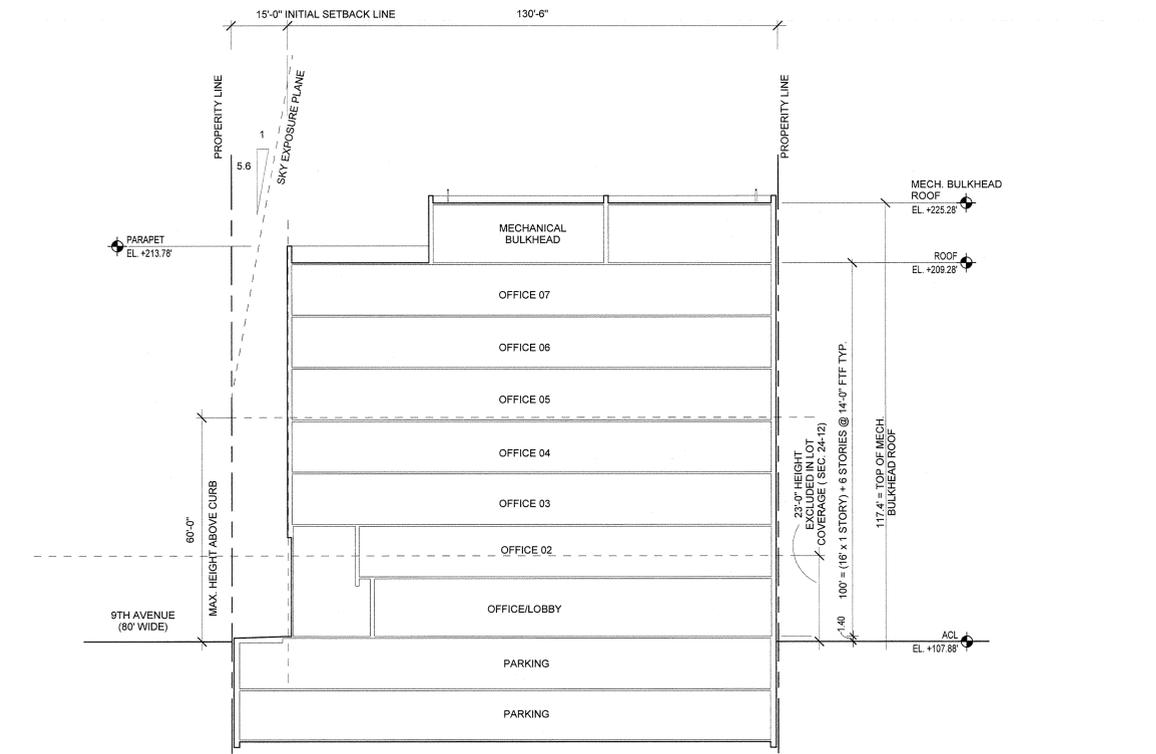
ZONING SECTION
SCALE: 1/16" = 1'-0"

3



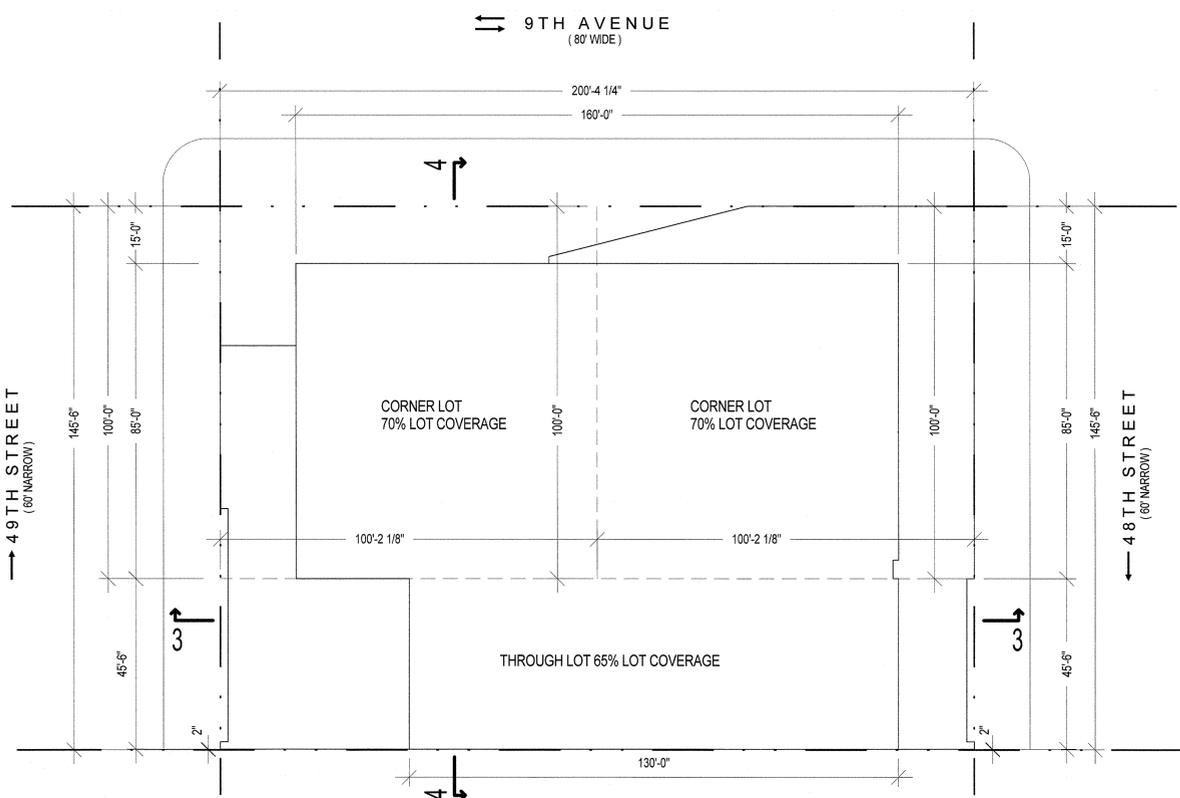
AVG. CURB LEVEL DIAGRAM
SCALE: 1/8" = 1'-0"

1



ZONING SECTION
SCALE: 1/16" = 1'-0"

4



PERMITTED LOT COVERAGE
19,949.85 SF = 7,012.25 SF (CORNER LOT = 0.7 X (100.00' X 100.17')) + 7,012.25 SF (CORNER LOT = 0.7 X (100.00' X 100.17')) + 5,925.35 SF (THROUGH LOT = 0.65 X (45.50' X 200.35'))

PROVIDED LOT COVERAGE
19,492.90 SF = 13,600.00 SF (CORNER LOT = 160.00' X 85.00') + 5,892.90 SF (THROUGH LOT = 130.00' X 45.33')

LOT COVERAGE AREA DIAGRAM
SCALE: 1/8" = 1'-0"

2

Issue	Date & Issue Description	By	Check
1	4/4/11 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
2	7/23/12 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
3	12/20/12 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
4	07/22/13 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		

Seal/Signature



Project Name
COMMUNITY FACILITY BUILDING

Project Number
08.7020.002

Description
ZONING ANALYSIS

Scale
NOT TO SCALE

Z-4

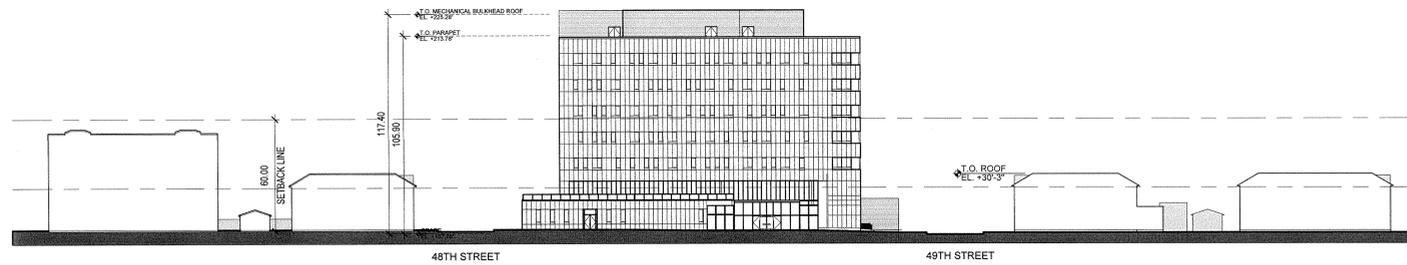
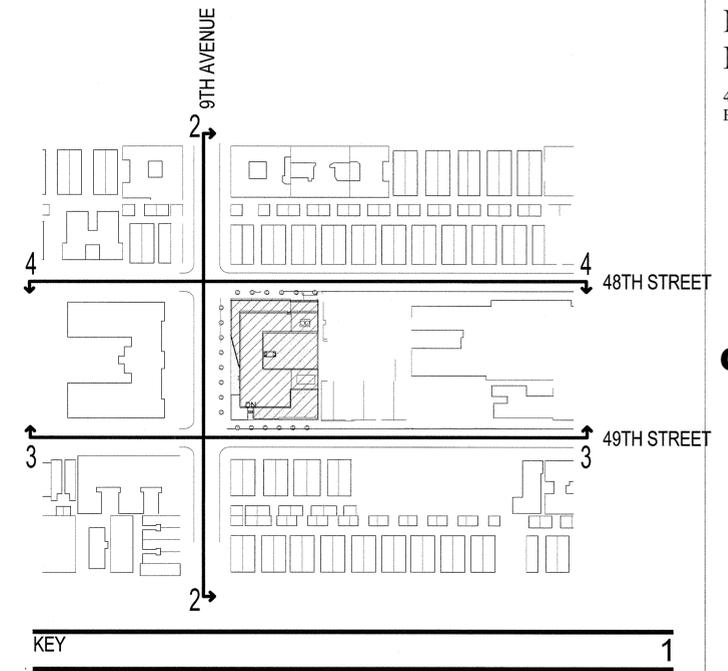
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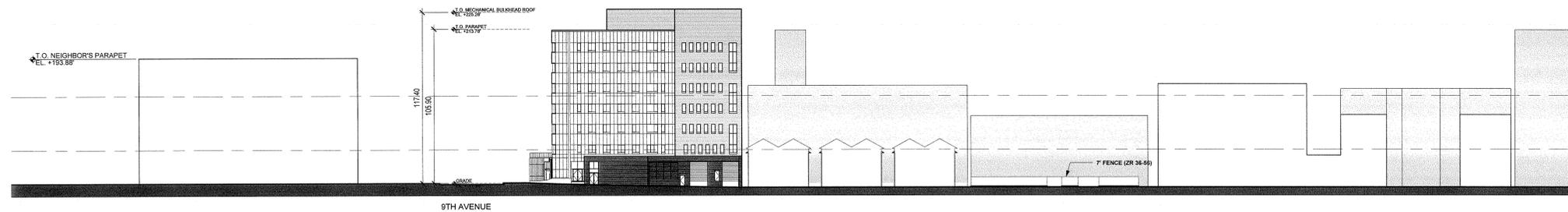
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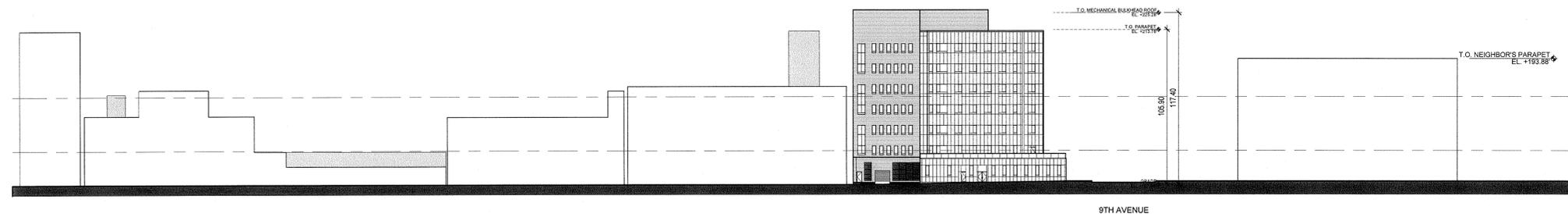
SITE ELEVATION - WEST
SCALE: 1/32" = 1'-0"

2



SITE ELEVATION - SOUTH
SCALE: 1/32" = 1'-0"

3



SITE ELEVATION - NORTH
SCALE: 1/32" = 1'-0"

4

Issue	Date	Issue Description	By	Check
1	4/4/11	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
2	7/23/12	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
3	12/20/12	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
4	07/22/13	ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		

Seal/Signature



Project Name
COMMUNITY FACILITY BUILDING

Project Number
06.7020.002

Description
SITE CONTEXT ELEVATIONS



Z-5

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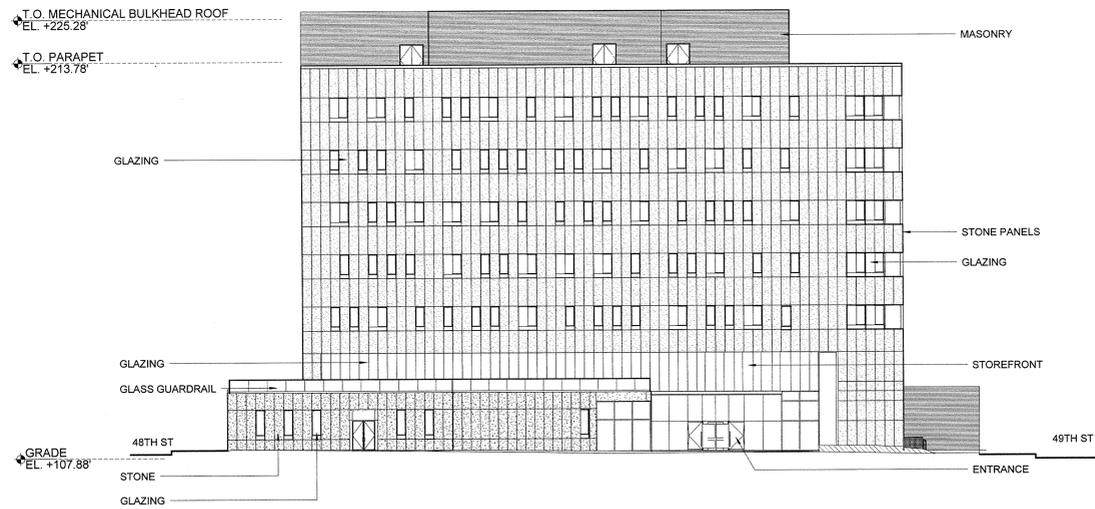
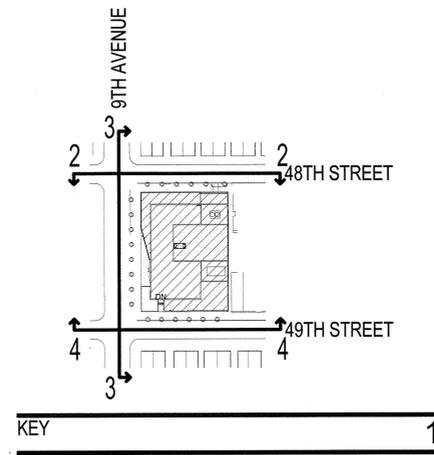
NOTE: THIS DRAWING FOR ILLUSTRATIVE PURPOSES ONLY.

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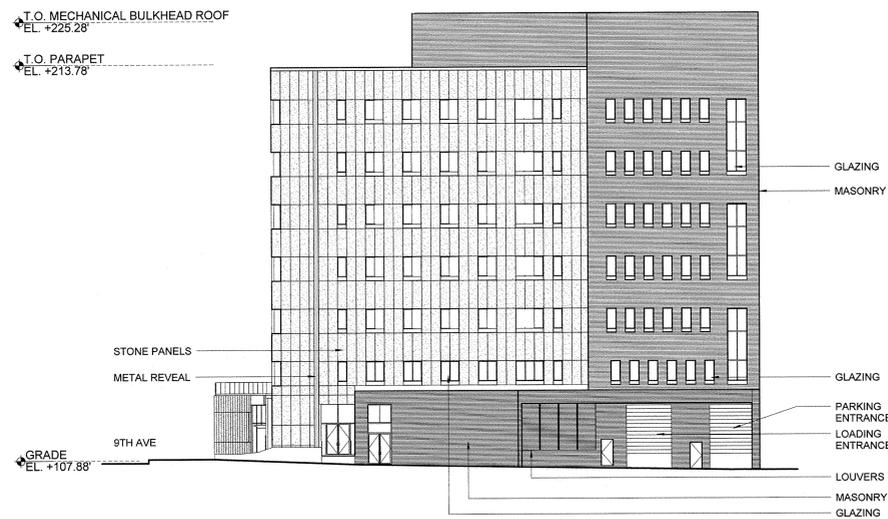
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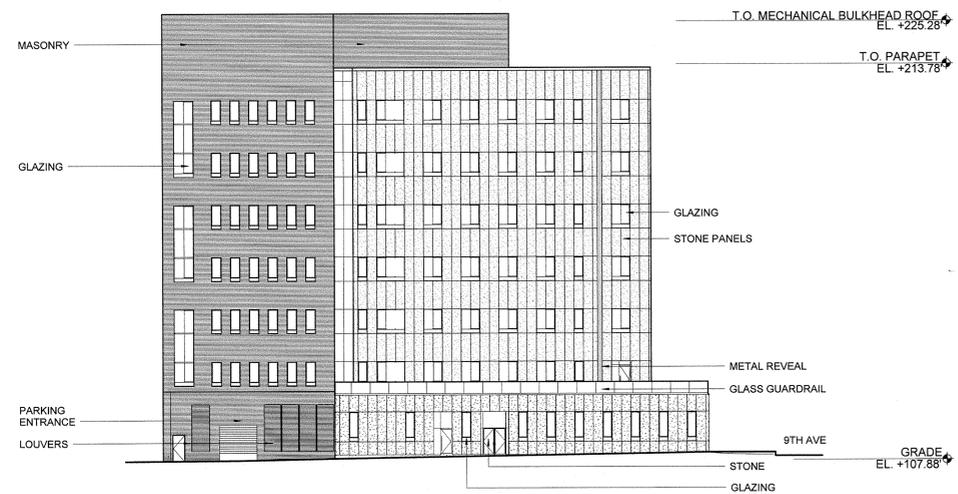
BUILDING ELEVATION - WEST
SCALE: 1/16" = 1'-0"

3



BUILDING ELEVATION - SOUTH
SCALE: 1/16" = 1'-0"

4



BUILDING ELEVATION - NORTH
SCALE: 1/16" = 1'-0"

2

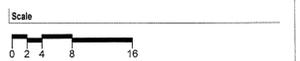
Issue	Date & Issue Description	By	Check
1	4/4/11 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		
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4	07/22/13 ISSUED TO DEPT OF CITY PLANNING: BROOKLYN OFFICE		

Seal/Signature

Project Name
COMMUNITY FACILITY BUILDING

Project Number
06.7020.002

Description
BUILDING ELEVATIONS



Z-6

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Attachment 6

Photographs

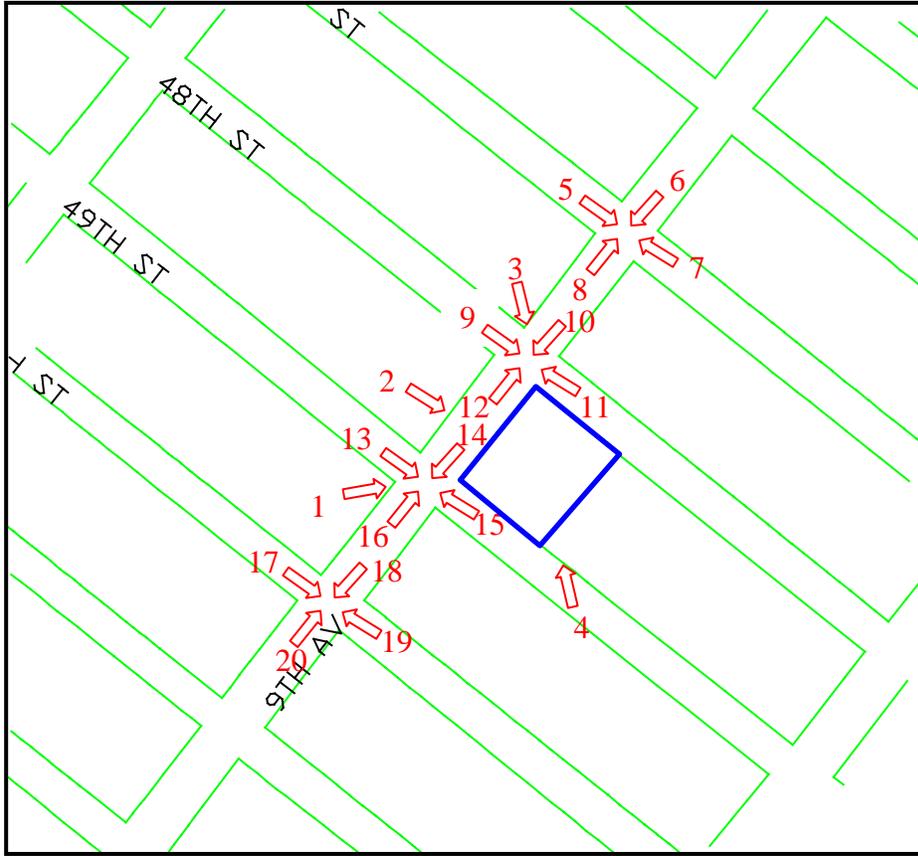


Photo Index



1. Looking at the site on 9th Avenue and 49th Street



2. Looking at the site from the 9th Avenue



3. Looking at the site from 9th Avenue and 48th Street



4. Looking at the site from 49th Street



5. Looking due east on 47th Street from 9th Avenue



6. Looking due south on 9th Avenue from 47th Street



7. Looking due west on 47th Street from 9th Avenue



8. Looking due north on 9th Avenue from 47th Street



9. Looking due east on 48th Street from 9th Avenue



10. Looking due south on 9th Avenue from 48th Street



11. Looking west on 48th Street from 9th Avenue



12. Looking due west on 9th Avenue form 48th Street



13. Looking due east on 49th Street from 9th Avenue



14. Looking south on 9th Avenue from 49th Street



15. Looking due west on 49th Street from 8th Avenue



16. Looking due north on 9th Avenue from 49th Street



17. Looking due east on 50th Street from 9th Avenue



18. Looking due south on 9th Avenue from 50th Street



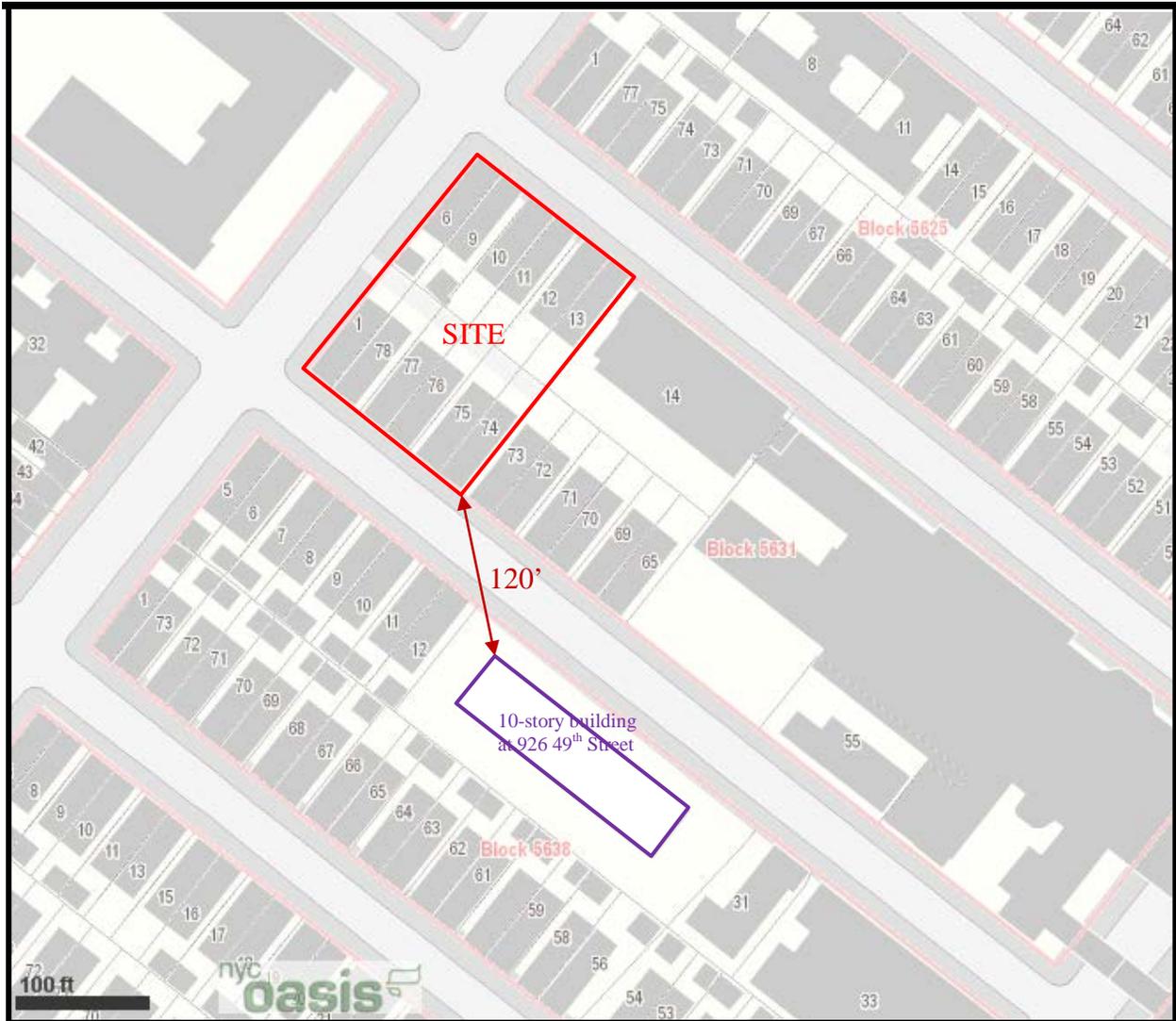
19. Looking due west on 59th Street from 9th Avenue



20. Looking due north on 9th Avenue from 50th Street

Attachment 7

Air Quality



The Map for Air Quality Screening Analysis

FIG App 17-8
 NO₂ BOILER SCREEN
 COMMERCIAL AND OTHER NON-RESIDENTIAL DEVELOPMENT - NATURAL GAS

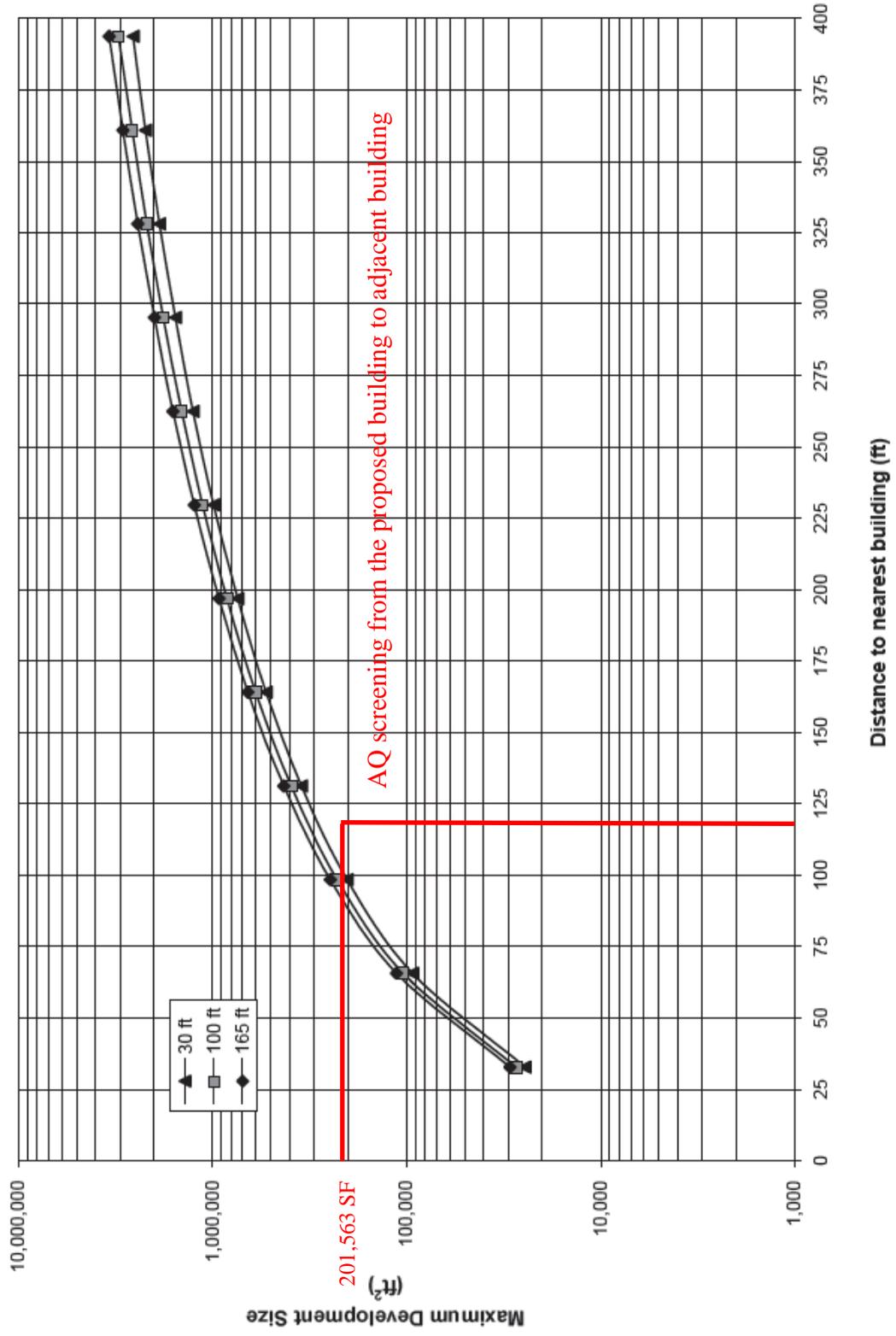
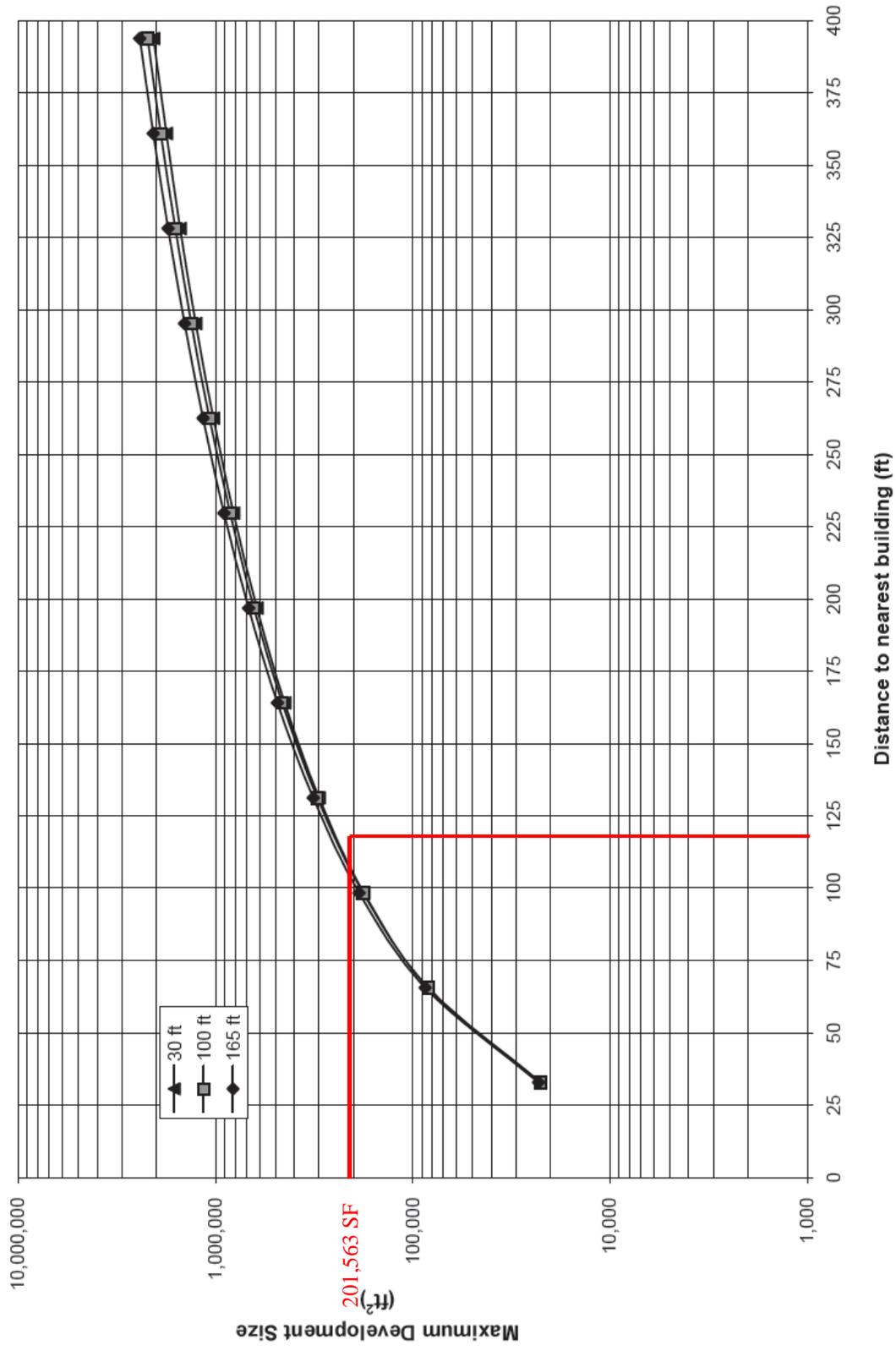


FIG App 17-6
 SO₂ BOILER SCREEN
 COMMERCIAL AND OTHER NON-RESIDENTIAL DEVELOPMENT - FUEL OIL #2



PARKING GARAGE AIR QUALITY ANALYSES

Maimonides Medical Center
901-915 49th Street
902-916 48th Street
Brooklyn, New York

March 17, 2014

Prepared by:

**Sustainable Management LLC
1370 Broadway, 5th Floor
New York, NY 10018
(646)380-1940**

PARKING GARAGE AIR QUALITY ANALYSIS

1. Introduction

The proposed action is a minor modification of the existing Large Scale Community Facility Development Plan special permit for the Maimonides Medical Center to include a proposed 7-story plus mechanical bulkhead medical office building. The proposed building would have ambulatory diagnostic and treatment health care facilities, offices and reception areas plus a 263-space underground accessory parking garage. The Build year of the proposed project is 2016.

The proposed building would have a gross floor area of 201,567 square feet (SF). The project site is located on the east side of 9th Avenue between 48th and 49th Streets. The proposed parking garage would be located on two cellar levels of the proposed building.

This air quality analysis was conducted to determine if there would be impacts from the garage emissions. The total proposed garage parking area is 47,738 SF. The parking area of the cellar is 23,505 SF with 116 parking spaces. The parking area of the sub-cellar is 24,233 SF with 147 parking spaces. The site plan and the proposed garage space layout are presented in Appendix A. The entrance of the proposed garage is located on 48th Street and the exit of the proposed garage is located on 49th Street.

The garage ventilation vent location is not determined yet. In order to conduct a conservative analysis it was assumed that there would be only one ventilation vent although a second vent could be added on the design. The first floor is 16 feet in height. It is also assumed that the single ventilation vent would be located near the first floor ceiling and it is approximately 12 feet above the sidewalks on either 48th Street or 49th Street.

The garage emissions are related to vehicle activity within the garage. The higher vehicle volumes result in the more carbon monoxide (CO) emissions from the garage. The proposed accessory parking garage would have a total of 263 spaces. The proposed garage would be used for accessory parking for the medical center and would be similar to the existing medical center garage which is located at 4723 10th Avenue (between 47th and 48th Streets). The garage survey at the existing garage with a capacity of 538 parking spaces was conducted from 7AM to 7 PM. The survey data is presented in Appendix B and summarized in Table 1. The in

and out vehicle trips for the proposed garage are calculated based on the survey at the existing hospital garage. The calculated vehicle in/out trips for the proposed garage are presented in Table 1. The highest 8-hour vehicle trips would occur during the period of 11 AM to 7 PM with a total of 317 vehicular trips (91 ins and 226 outs). The average peak hour vehicle trips are 11 ins and 28 outs. In order to conduct a conservative analysis, the highest entering vehicles of 72 during the 7-8 AM and highest exiting vehicles of 57 during 5-6 PM were used in the analysis although they would never happen in the reality.

Table 1 Existing Garage Survey and the Proposed Garage In/Out Trips

Time Period	1/20/2011 Survey		1/25/2011 Survey		Survey Average				Standardized at Existing Garage				Proposed Garage (263 Spaces)				Project Generated		
	Hr In	Hr Out	Hr In	Hr Out	Hr In	Hr Out	Accu.	%	Hr In	Hr Out	Accu.	%	Hr In	Hr Out	Accu.	%	8-Hr In	8-Hr Out	In+Out
							422	78.4%			330	61.3%			161	61.3%			
7-8 AM	198	91	180	97	189	94	517	96.1%	148	73	404	75.1%	72	36	198	75.1%			
8-9 AM	172	31	158	48	165	40	643	119.4%	129	31	502	93.4%	63	15	246	93.4%			
9-10 AM	51	17	76	19	64	18	688	127.9%	50	14	538	100.0%	24	7	263	100.0%			
10-11 AM	13	19	23	18	18	19	688	127.8%	14	14	538	99.9%	7	7	263	99.9%			
11-12 PM	12	21	23	25	18	23	682	126.8%	14	18	533	99.1%	7	9	261	99.1%			
12-1 PM	9	17	17	21	13	19	676	125.7%	10	15	529	98.2%	5	7	258	98.2%			
1-2 PM	10	29	14	20	12	25	664	123.3%	9	19	519	96.4%	5	9	254	96.4%			
2-3 PM	8	61	14	51	11	56	619	115.0%	9	44	484	89.9%	4	21	236	89.9%	187	112	299
3-4 PM	19	86	32	111	26	99	546	101.4%	20	77	427	79.3%	10	38	208	79.3%	124	114	238
4-5 PM	26	162	31	109	29	136	439	81.5%	22	106	343	63.7%	11	52	168	63.7%	72	150	222
5-6 PM	29	146	27	154	28	150	317	58.8%	22	117	247	46.0%	11	57	121	46.0%	59	201	259
6-7 PM	105	82	101	86	103	84	336	62.4%	81	66	262	48.8%	39	32	128	48.8%	91	226	317

Note:

- Existing garage capacity at 4723 10th Avenue is 538
- Proposed garage capacity is 263 spaces.
- Incremental difference between RWCDS No-Action and With-Action scenarios would be 124 parking spaces.
- The proposed garage in/out is based on the ratio of garage capacity (263/538 = 0.4888).
- Survey conducted on January 20 and 25, 2011

The garage air quality analysis is based on inbound and outbound vehicle trips during the 8-hour periods in accordance with the CEQR guideline.

The peak hour truck trips generated from the proposed project would be below the threshold of 12 truck trips per hour. Therefore, a PM2.5 impact analysis is not required. It should be noted that the project generated trucks would not use the proposed garage.

2. Methodology

The air quality impacts of the proposed parking garage were evaluated by calculating the auto emissions under the Build Condition (year of 2016) within the garage. The vehicle trips which would go into and out of the garage were

analyzed. The MOVES2010b computer model (an EPA approved model) was used to compute emissions. In order to conduct a conservative analysis, it is assumed that all departing autos are in a cold start state and all arriving autos are in hot start. All departing autos are projected to idle for one minute before traveling to the exit of the parking garage, and all arriving and departing autos are assumed to travel at 5 miles per hour within the parking garage. The carbon monoxide (CO) concentrations resulting from these emissions were then determined using the methodology described in the CEQR Technical Manual-Air Quality/**GUIDELINES FOR EVALUATING AIR QUALITY IMPACTS FROM PARKING GARAGES** (see Table 3).

Basic data for MOVES inputs is presented in Table 2.

Table 2 MOVES Input Data

Location County	Kings County, New York
Calendar Year	2016
Month	January
Time	5:00 PM to 5:59:59 PM (hour 18)
Weekday/Weekend	Weekday
Temperature	43 °F
Humidity	57.3%
Road type of links	Link 1: Off-network Link 2 (inbound): Urban unrestricted access Link 3 (outbound): Urban unrestricted access
Roadway link length	Link 2 (inbound): 611 feet (0.116 miles) Link 3 (outbound): 611 feet (0.116 miles)
Off-Network Idling Time	Link 1: Idling for 1 minute
Link Traffic Volume Inbound (Link 2)	72 vehicles per hour
Link Traffic Volume Outbound (Link 3)	57 vehicles per hour
Link Average Speed Inbound (Link 2)	5 miles per hour
Link Average Speed Outbound (Link 3)	5 miles per hour
Average Road Grade Inbound (Link 2)	-0.07
Average Road Grade Outbound (Link 3)	0.07

A mean winter temperature of 43 °F and a persistence factor of 0.7 (8-hour) were used in accordance with the CEQR Technical Manual.

The mean travel distance used in the emission calculation was 611 feet (including 180-foot ramps) which are calculated as following:

Mean Travel Distance

$$\begin{aligned}
 &= 2/3 \times (\text{garage length} + \text{Garage width}) + \text{Average Ramp Length} \\
 &= 2/3 \times (200' + 145') + (180' \times 116 + 540' \times 147)/(116 + 147) \\
 &= 611 \text{ feet}
 \end{aligned}$$

where 180' is the ramp length for the cellar, 540' is approximately three times the ramp length for the sub-cellar since a vehicle has to make approximately three times the ramp length to get to the sub-cellar, 116 parking spaces are planned for the cellar and 147 parking spaces are planned for the sub-cellar.

The emission dispersion was performed in accordance with the CEQR Technical Manual Appendices-Air Quality/**GUIDELINES FOR EVALUATING AIR QUALITY IMPACTS FROM PARKING GARAGES**. CO concentration at a receptor was calculated using the closed garage methodology. It should be noted that the MOVES outputs are in grams per hour. The dispersion input as shown in Table 4 is in grams per second. The MOVES output divided by 3,600 seconds/hour results in grams per second (g/s).

3. Background CO Levels

The background CO levels are from the NYC Department of City Planning. The CO concentration of 3.1 parts per million (ppm) was used for the background concentration.

The mobile line source CO concentration for 48th or 49th Streets was calculated based on the MOVES2010b results for 348 vehicles and the CEQR Technical Manual. The MOVES2010b output for 348 vehicles is 1,484 grams/mile-hour which is equal to 0.0002561 g/m-s. The CEQR method for maximum mobile source emission results in:

$$\begin{aligned}
 &\mathbf{307.7 \times (8\text{-hour persistence factor}) \times MOVES (g/m-s)} \\
 &= \mathbf{307.7 \times 0.7 \times 0.0002561} \\
 &= \mathbf{0.055 \text{ ppm}}
 \end{aligned}$$

4. Receptor Locations

The adjacent sidewalks are approximately 15 feet in width on 48th and 49th Streets. Both 48th and 49th Streets are approximately 30 feet in width. The first floor is 16 feet in height.

Three (3) receptors were selected to represent the worst case scenario and are described below:

- 1 Receptor 1 is located on the south sidewalk of 48th Street, approximately 7 feet from the garage vent and assuming at the 6 feet below the garage vent.
- 2 Receptor 2 is located on the north sidewalk of 48th Street, approximately 52 feet from the garage vent and assuming at the 6 feet below the garage vent.
- 3 Receptor 3 is located on the window on the second floor and is assumed to be just above the garage vent (0 feet from the garage vent).

The receptor locations are presented in Appendix A. The CO concentrations due to the parking garage emissions were superimposed onto the background concentrations to determine total concentrations on the receptors.

5. Comparison to and Conformance with Air Quality Standards

The one-hour and eight-hour CO standards of the National Ambient Air Quality Standards (NAAQS) are 35 ppm and 9 ppm, respectively. CO levels from the parking garage emissions were superimposed on the background concentrations to determine the total concentrations for each receptor. The total concentrations were compared to the NAAQS. In addition to the NAAQS, the City of New York applies a *de minimis* impact criterion to determine the significance of the incremental increase in CO concentrations that would result from the proposed project. These set the minimum change in eight-hour average carbon monoxide concentrations that constitutes a significant environmental impact. According to these criteria, significant impacts are defined as follows:

- An increase of 0.5 parts per million (ppm) or more in the maximum eight-hour average carbon monoxide concentration at a location where the predicted no action eight-hour concentration is equal to 8 ppm or between 8 ppm and 9 ppm; or
- An increase of more than half the difference between baseline (i.e., no-action) concentrations and the 8-hour standard, when no-action concentrations are below 8 ppm.

The CO levels due to the project were compared to the *de minimis* criterion.

6. Analysis Results

The MOVES2010b outputs for mobile line source emissions are presented in Appendix C. The emission factors from MOVES2010b and dispersion analysis results for the proposed garage are presented in Table 4. The total 8-hour concentrations consist of the combination of the background concentration, mobile line source emission concentration and the garage emission concentrations. The analysis results are summarized in Table 3.

Table 3 Total Concentration

Receptor location	Background ppm	Mobile Line Source, ppm	Analysis Result, ppm	Total Conc. ppm
1	3.1	0.0	0.58	3.7
2	3.1	0.06	0.44	3.6
3	3.1	N/A	0.80	3.9

The highest total 8-hour concentration would be 3.9 ppm (3.1 ppm background level + 0.80 ppm garage emission concentration) at Receptor 3 (the receptor at the 2nd floor window). The predicted eight-hour CO level of 3.9 ppm is below the NAAQS standard of 9 ppm.

The potential impact of the project on CO levels was evaluated at the three receptor locations. The results of the air quality analyses indicate that the proposed garage would not result in a significant impact on CO levels in the Study Area with an air ventilation flow rate of 2 cubic feet per minute per square foot of garage area. In addition to the NAAQS, the City of New York applies a *de minimis* impact criterion to estimate impacts on air quality. The analysis results show that the *de minimis* criterion would not be exceeded.

7. Conclusions

The proposed accessory garage with 263 spaces would not result in significant air quality impacts.

**Table 4 Garage Dispersion Analysis
Screen for Garage CO Emission Analysis**

PLEASE FILL IN THE HIGHLIGHTED AREAS ONLY

Project ID: **Maimonides Medical Center** Date: 17-Mar-14

Analyst(s): **Chunyuan Li**

Project Year: **2016** Borough: **Brooklyn**

Garage Data & Emissions:

Cars Out: **57** Cars In: **72** No. of Vehicles: 129
(cold cars) (hot cars) (cold+hot)

Garage Length: **200** feet = 60.96 meters
 Garage Width: **145** feet = 44.20 meters
 Ramp Length: **180** feet = 54.86 meters
 Garage Area: 47738.0 ft² = 2694.19 m²
 Travel Distance: 611.0 feet = 186.23 meters
 Adjacent Sidewalk Dist.: **7** feet = 2.13 meters
 Opposite Sidewalk Dist.: **52** feet = 15.85 meters
 Receptor Height **6** feet = 1.83 meters
 Effective Emis. Ht. (H): **12** feet = 3.66 meters
 MOVES emissions **1404.88** g/mi-hr = #####

Travelling Emission (cold at 5 mph @45 °F: **6.579** g/veh-mi
 Travelling Emission (hot) at 5 mph @45 °F: **6.535** g/veh-mi
 Travelling Emission (cold at 5 mph @45 °F: **6.579** g/veh-mi
 Travelling Emission (hot) at 5 mph @45 °F: **6.535** g/veh-mi
 Idle Emissions for Cold Cars @45 °F: **1.2516** g/veh-min

Volumetric Flow Rate of Garage Air: **1** ft³/min-ft²
 Average Idle Time for Vehicles in Garage: **1** min/veh
 Average Wind Velocity: **1** m/sec

Emissions	g/sec
Incoming Vehicles	0.0151
Outgoing Vehicles	0.0319
Total (In + Out)	0.0470

Distrib. (m)	Adjacent	Opposite
r o	2.6780	2.6780
r y'	0.3413	2.5299
r y	2.6996	3.6840
r z'	0.2986	2.2137
r z	2.6946	3.4745
v (g/m ³)	2.06E-03	1.17E-03

1-hr Concentrations	g/m ³	ppm
Background	0.00354	3.1
Qtot / A V	2.09E-03	1.8148
Adjacent Sidewalk	9.46E-04	0.8231
Line Source Contr.	4.54E-05	0.0395
Across Street	6.77E-04	0.5887

Xa 1.03E-03
 Xb 7.94E-01
 Xc 1.26E-01
 Xa2 5.84E-04
 Xb2 8.71E-01
 Xc2 2.87E-01

8-hr Concentrations	g/m ³	ppm
De Minimus Criterion	3.33E-03	2.9000
Adjacent Sidewalk	6.62E-04	0.5762
Project Status		Pass
Across Street	5.05E-04	0.4397
Project Status		Pass

Screen for Garage CO Emission Analysis

PLEASE FILL IN THE HIGHLIGHTED AREAS ONLY

Project ID: **Maimonides Medical Center**
 Analyst(s):

Date: 3/24/2014

Project Year: **2016**

Borough: **Brooklyn**

Garage Data & Emissions:

Cars Out: **57** (cold cars) Cars In: **72** (hot cars) No. of Vehicles: 129 (cold+hot)

Garage Length:	200	feet =	<u>60.96</u> meters
Garage Width:	145	feet =	<u>44.20</u> meters
Ramp Length:	180	feet =	<u>54.86</u> meters
Garage Area:	<u>29000.0</u>	ft ² =	<u>2694.19</u> m ²
Travel Distance:	<u>385.8</u>	feet =	<u>117.60</u> meters
Adjacent Sidewalk Dist.:	7	feet =	<u>2.13</u> meters
Opposite Sidewalk Dist.:	52	feet =	<u>15.85</u> meters
Receptor Height	12	feet =	<u>3.66</u> meters
Effective Emis. Ht. (H):	12	feet =	<u>3.66</u> meters
MOVES emissions	1404.88	g/mi-hr =	<u>428.2074</u>

Travelling Emission (cold)	at 5 mph @45 °F:	6.579 g/veh-mi
Travelling Emission (hot)	at 5 mph @45 °F:	6.535 g/veh-mi
Travelling Emission (cold)	at 5 mph @45 °F:	6.579 g/veh-mi
Travelling Emission (hot)	at 5 mph @45 °F:	6.535 g/veh-mi
Idle Emissions for Cold Cars	@45 °F:	1.2516 g/veh-min

Volumetric Flow Rate of Garage Air:	1 ft ³ /min-ft ²
Average Idle Time for Vehicles in Garage:	1 min/veh
Average Wind Velocity:	1 m/sec

Emissions	g/sec
Incoming Vehicles	0.0096
Outgoing Vehicles	0.0274
Total (In + Out)	0.0370

1-hr Concentrations	g/m ³	ppm
Background	0.00354	3.1
Qtot / A V	2.70E-03	2.3507
Adjacent Sidewalk	1.32E-03	1.1510
Line Source Contr.	4.54E-05	0.0395
Across Street	6.23E-04	0.5416

Distrib. (m)	Adjacent	Opposite
r o	2.0872	2.0872
r y'	0.3413	2.5299
r y	2.1149	3.2798
r z'	0.2986	2.2137
r z	2.1085	3.0425
v (g/m ³)	2.64E-03	1.18E-03

8-hr Concentrations	g/m ³	ppm
De Minimus Criterion	5.75E-04	0.5000
Adjacent Sidewalk	9.26E-04	0.8057
Project Status	Violation	
Across Street	4.68E-04	0.4068
Project Status	Pass	

APPENDIX A

Garage Plans

**Maimonides
Medical Center**
483 South Avenue
Brooklyn, NY 11220

Gensler
Architects, P.C.
300 Madison Avenue
New York, NY 10017
Phone: 212.651.4122

APPLICABILITY
General Regs (G.L.)
G.N.
G.N.
COMPLIES
COMPLIES
COMPLIES
COMPLIES
COMPLIES
COMPLIES

Proposed
Use Group 44 - Ambulatory, diagnostic or treatment health care facilities
133,432.99 sq ft
19,949.85 sq ft
None provided
None provided
45 X (20' x 40') = 2,700 sq ft
20 levels provided (see diagram 2/2-3)
See Diagram 107-4 & 477-4

12% spaces proposed
333,428 sq ft proposed
1 accessory off-street loading berth proposed

Block 663J/ Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78 (Piece E)
25,152.38 sq ft
Use Groups 1 - 4
None required
19,949.85 (see diagram 2/2-4 for detail)
None required
See Diagram 107-4 for details. 568 Rear Yard
See Diagram 107-4 for details. 45 X (20' x 40') = 2,700 sq ft
Every 25 feet of street frontage of this zoning lot
Maximum height of front wall: 60R or 6 stories
Minimum initial setback distance: 150' (New York Street)
Sky Exposure Plane above Base: 2:7:1 (New York Street)
1 per 800 sq ft of Use Group 44 (170' x 170' x 170')
Maximum of 1 per 400 sq ft of Lot Area (25,152.38 ÷ 40 = 73).
The first 10,000 sq ft - None required
END 300,000 sq ft thereof - 1 berth required

ZONING TABLE

SECTION

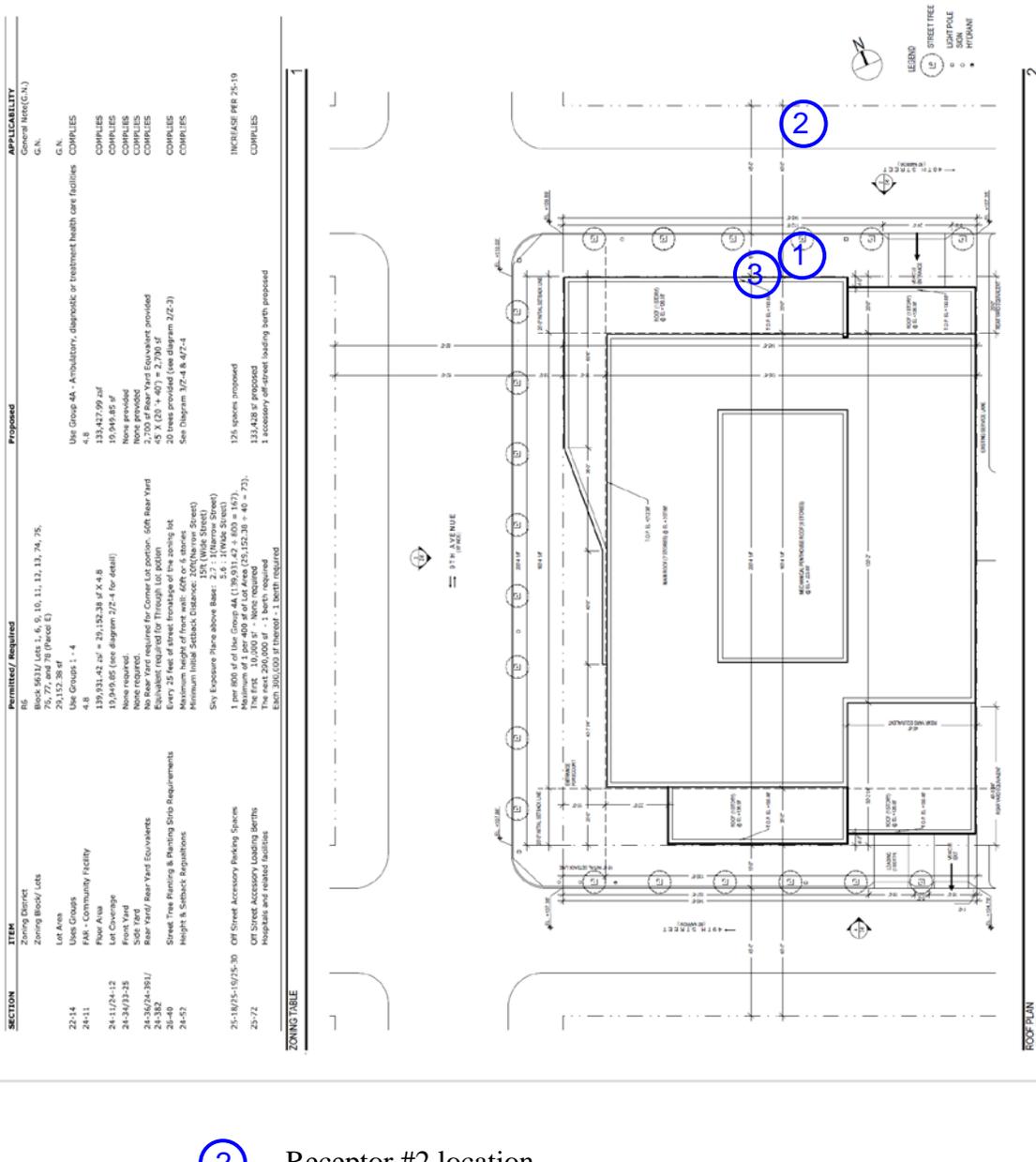
ITEM

Permitted/ Required

APPLICABILITY

General Regs (G.L.)

SECTION	ITEM	Permitted/ Required	APPLICABILITY
22-14	Zoning District	Block 663J/ Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78 (Piece E)	G.N.
24-11	Uses Groups	25,152.38 sq ft	G.N.
24-11/24-12	Use Group	19,949.85 (see diagram 2/2-4 for detail)	COMPLIES
24-14/23-25	Front Yard	None required	COMPLIES
24-16(a)-(b)/24-38A	Rear Yard/ Rear Yard Enclosures	See Diagram 107-4 for details. 568 Rear Yard	COMPLIES
24-38B	Street Tree Planting & Retaining Wall Requirements	Every 25 feet of street frontage of this zoning lot	COMPLIES
24-52	Height & Setback Regulations	Maximum height of front wall: 60R or 6 stories Minimum initial setback distance: 150' (New York Street)	COMPLIES
25-10/25-10/25-30	Off Street Accessory Parking Spaces	1 per 800 sq ft of Use Group 44 (170' x 170' x 170')	INCREASE PER 25-19
25-72	Off Street Accessory Loading Berths	Maximum of 1 per 400 sq ft of Lot Area (25,152.38 ÷ 40 = 73). The first 10,000 sq ft - None required END 300,000 sq ft thereof - 1 berth required	COMPLIES



2

ROOF PLAN

2-3

2 Receptor #2 location

**PROGRESS SET NOT
FOR CONSTRUCTION**

LEGEND
STREET TREE
LIGHT POLE
SIGN
PYLON

Scale: 1" = 10'-0"

DATE: 10/15/2024

APPENDIX B

Parking Survey Data



PARKING COUNTS

(ATI #11006)

Location: 10th Ave bet. 47th & 48th Streets

Surveyors: _____ Day/Date: Thur 1/20/11

Number of cars parked at 7:00AM inside garage: 361

Time	Movement	
	IN	OUT
7:15	69	9
7:30	39	15
7:45	48	33
8:00	42	34
8:15	42	14
8:30	43	8
8:45	44	4
9:00	43	5
9:15	24	7
9:30	13	2
9:45	9	1
10:00	5	7
10:15	6	6
10:30	5	6
10:45	1	7
11:00	1	0
11:15	4	4
11:30	2	10
11:45	4	1
12:00	2	6
12:15	2	4
12:30	0	4
12:45	6	2
1:00	1	7

Time	Movement	
	IN	OUT
1:15	0	3
1:30	2	13
1:45	6	8
2:00	2	5
2:15	2	11
2:30	2	17
2:45	0	19
3:00	4	14
3:15	1	17
3:30	4	20
3:45	6	30
4:00	8	19
4:15	3	40
4:30	11	51
4:45	6	36
5:00	6	35
5:15	10	33
5:30	4	43
5:45	8	43
6:00	7	27
6:15	11	22
6:30	20	12
6:45	29	31
7:00	45	17

PARKING COUNTS

(ATI #11006)

Location: 10th Ave bet. 47th & 48th Streets

Surveyors: _____ Day/Date: Tue 1/25/11

Number of cars parked at 7:00AM inside garage: 483

Time	Movement	
	IN	OUT
7:15	84	6
7:30	36	17
7:45	28	39
8:00	32	35
8:15	47	16
8:30	27	15
8:45	44	9
9:00	40	8
9:15	28	6
9:30	22	2
9:45	11	5
10:00	15	6
10:15	8	3
10:30	5	5
10:45	5	7
11:00	5	3
11:15	8	6
11:30	5	3
11:45	6	9
12:00	4	7
12:15	5	5
12:30	5	5
12:45	5	10
1:00	2	1

Time	Movement	
	IN	OUT
1:15	4	4
1:30	1	4
1:45	5	5
2:00	4	7
2:15	4	14
2:30	2	11
2:45	3	12
3:00	5	14
3:15	3	17
3:30	4	22
3:45	14	34
4:00	11	38
4:15	8	32
4:30	9	36
4:45	5	22
5:00	9	19
5:15	9	35
5:30	5	47
5:45	6	40
6:00	7	32
6:15	10	20
6:30	16	16
6:45	34	24
7:00	41	26

APPENDIX C

MOVES Outputs

EPA MOVES RunSpec File Name:

C:\MySQL\data\MMC2 Garage\mmc2_main

Description:

Proposed MMC Garage Air Quality Analysis

Domain/Scale: Project

Calculation Type: Inventory

Time Spans:

Aggregate By: Hour

Years:

2016

Months:

January

Days:

Weekdays

Hours:

Begin Hour: 17:00 - 17:59

End Hour: 17:00 - 17:59

Geographic Bounds:

LINK geography

Selection: NEW YORK - Kings County

On Road Vehicle Equipment:

Gasoline - Passenger Car

Road Types:

Off-Network

Urban Unrestricted Access

Pollutants And Processes:

Running Exhaust Carbon Monoxide (CO)

Start Exhaust Carbon Monoxide (CO)

Crankcase Running Exhaust Carbon Monoxide (CO)

Crankcase Start Exhaust Carbon Monoxide (CO)

Crankcase Extended Idle Exhaust Carbon Monoxide (CO)
Extended Idle Exhaust Carbon Monoxide (CO)

Strategies:

Strategies:

Rate of Progress:

Rate of Progress calculations are disabled

Manage Input Data Sets:

General Output:

Output Database Server Name: localhost

Output Database Name: mmc2_output

Units:

Mass Units: Grams

Energy Units: Joules

Distance Units: Miles

Activity Outputs:

Distance Traveled

Starts

Output Emissions Breakdown:

Emission Process

On Road/Off Road

Road Type

Source Use Type

Output Time Step

Hour

Geographic Output Detail

LINK

Advanced Performance Features:

Do Not Execute:

Save Data From:

Do Not Save Generator Data

Saved Data Database Server Name: [using default]

Saved Data Database Name: [using default]
Custom Default Database Server Name: [using default]
Custom Default Database Name: [using default]
Perform Final Aggregation (if necessary)

Run Header Item: Item Value

Report Description: Summary Report

Report Date/Time: 2014-2-28 11:26:15

MOVES Output Database: mmc2_output

Emission Process: All

1 Run Date/Time: 2014-02-28 11:24:55.0

1 Run Specification: mmc2_main

1 Run Spec File Date/Time: 2014-02-28 11:24:46.0

1 Run Spec Description: Proposed MMC Garage Air Quality Analysis

1 Mass Units: g

1 Energy Units: KJ

1 Distance Units: mi

1 Time Units: hour

Year	Month	Day	Hour	State	County	Zone	Source	Road	Run	CO
2016	1	5	18	36	36047	360470	21	1	1	1040
2016	1	5	18	36	36047	360470	21	5	1	31

Category Field Value Description

stateID 36 NEW YORK

countyID 36047 Kings County

sourceTypeID 21 Passenger Car

roadTypeID

1 Off-Network

roadTypeID

5 Urban Unrestricted Access

EPA MOVES RunSpec File Name:

C:\MySQL\data\MMC2 Garage\mmc2_main

Description:

Proposed MMC Garage Air Quality Analysis

Domain/Scale: Project

Calculation Type: Inventory

Time Spans:

Aggregate By: Hour

Years:

2016

Months:

January

Days:

Weekdays

Hours:

Begin Hour: 17:00 - 17:59

End Hour: 17:00 - 17:59

Geographic Bounds:

LINK geography

Selection: NEW YORK - Kings County

On Road Vehicle Equipment:

Gasoline - Passenger Car

Road Types:

Off-Network

Urban Unrestricted Access

Pollutants And Processes:

Running Exhaust Carbon Monoxide (CO)

Start Exhaust Carbon Monoxide (CO)

Strategies:

Strategies:

Rate of Progress:

Rate of Progress calculations are disabled

Manage Input Data Sets:

General Output:

Output Database Server Name: localhost

Output Database Name: mmc2_outputs

Units:

Mass Units: Grams

Energy Units: Joules

Distance Units: Miles

Activity Outputs:

[No Activity Outputs Selected]

Output Emissions Breakdown:

Emission Process

On Road/Off Road

Source Use Type

Output Time Step

Hour

Geographic Output Detail

[LINK](#)

Advanced Performance Features:

Do Not Execute:

Save Data From:

Do Not Save Generator Data

Saved Data Database Server Name: [using default]

Saved Data Database Name: [using default]

Custom Default Database Server Name: [using default]

Custom Default Database Name: [using default]

Perform Final Aggregation (if necessary)

Run Header Item: Item Value
 Report Description: Summary Report
 Report Date/Time: 2014-3-14 11:5:11
 MOVES Output Database: mmc2_outputs
 Emission Process: All
 1 Run Date/Time: 2014-03-14 11:04:03.0
 1 Run Specification: mmc2_main
 1 Run Spec File Date/Time: 2014-03-14 11:03:57.0
 1 Run Spec Description: Proposed MMC Garage Air Quality Analysis
 1 Mass Units: g
 1 Energy Units: KJ
 1 Distance Units: mi
 1 Time Units: hour

Year	Month	Day	Hour	State	County	Zone	Source	Run	CO
2016	1	5	18	36	36047	360470	21	1	1484

Category Field	Value	Description
stateID	36	NEW YORK
countyID	36047	Kings County
sourceTypeID	21	Passenger Car

Attachment 8

LPC Letter

ENVIRONMENTAL REVIEW

Project number: NO LEAD AGENCY / NL-CEQR-K
Project: CASA BAMBINI MAIMONIDES MEDICAL CENTER
Date received: 10/24/2013

Properties with no Architectural or Archaeological significance:

- 1) ADDRESS: 901 49 STREET, BBL: 3056310001
- 2) ADDRESS: 902 48 STREET, BBL: 3056310006
- 3) ADDRESS: 908 48 STREET, BBL: 3056310010
- 4) ADDRESS: 910 48 STREET, BBL: 3056310011
- 5) ADDRESS: 914 48 STREET, BBL: 3056310012
- 6) ADDRESS: 916 48 STREET, BBL: 3056310013
- 7) ADDRESS: 915 49 STREET, BBL: 3056310074
- 8) ADDRESS: 913 49 STREET, BBL: 3056310075
- 9) ADDRESS: 909 49 STREET, BBL: 3056310076
- 10) ADDRESS: 907 49 STREET, BBL: 3056310077
- 11) ADDRESS: 903 49 STREET, BBL: 3056310078
- 12) ADDRESS: 904 48 STREET, BBL: 3056310009

Gina Santucci

11/4/2013

SIGNATURE
Gina Santucci, Environmental Review Coordinator

DATE

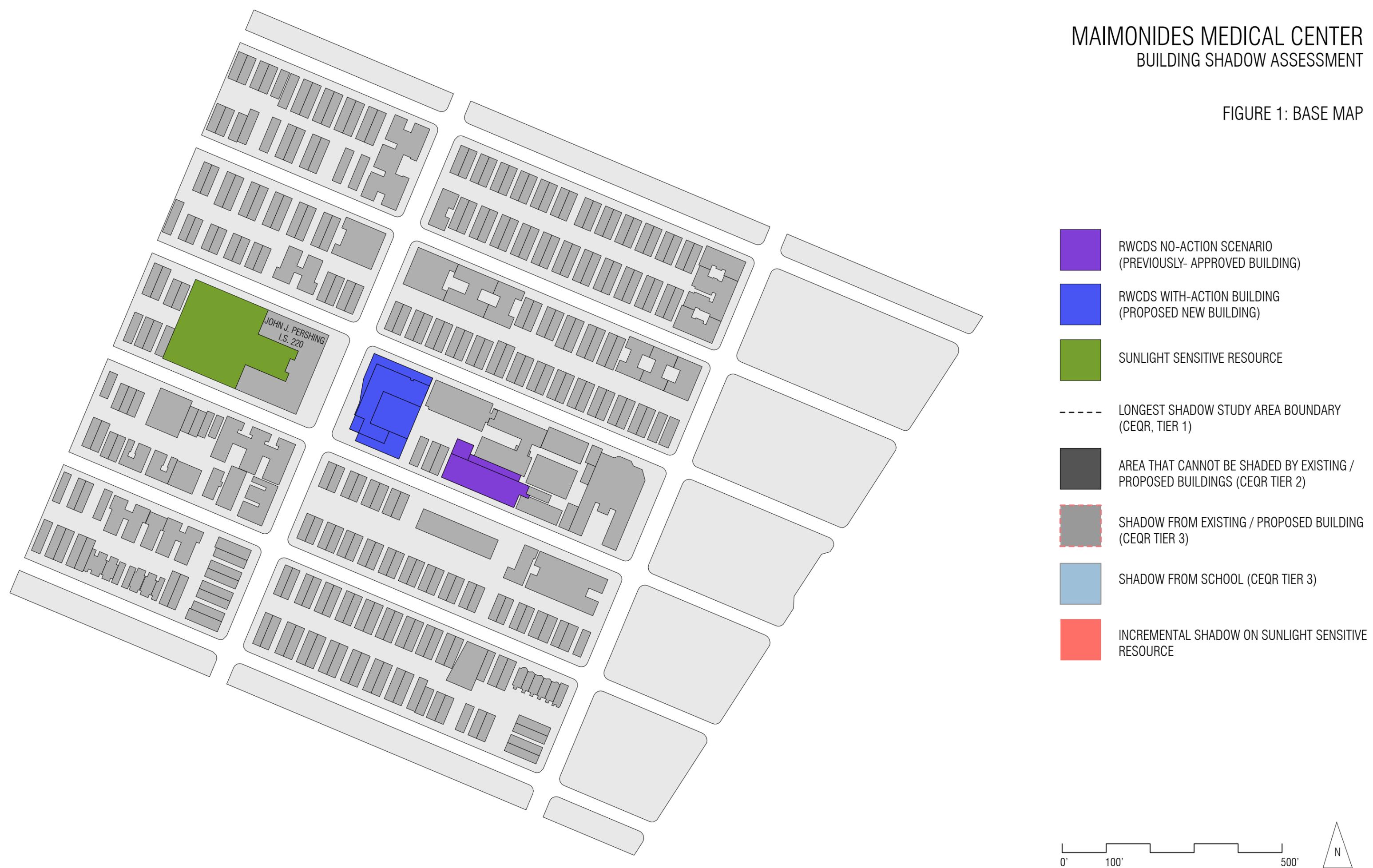
File Name: 27667_FSO_DNP_10302013.doc

Attachment 9

Shadow Study

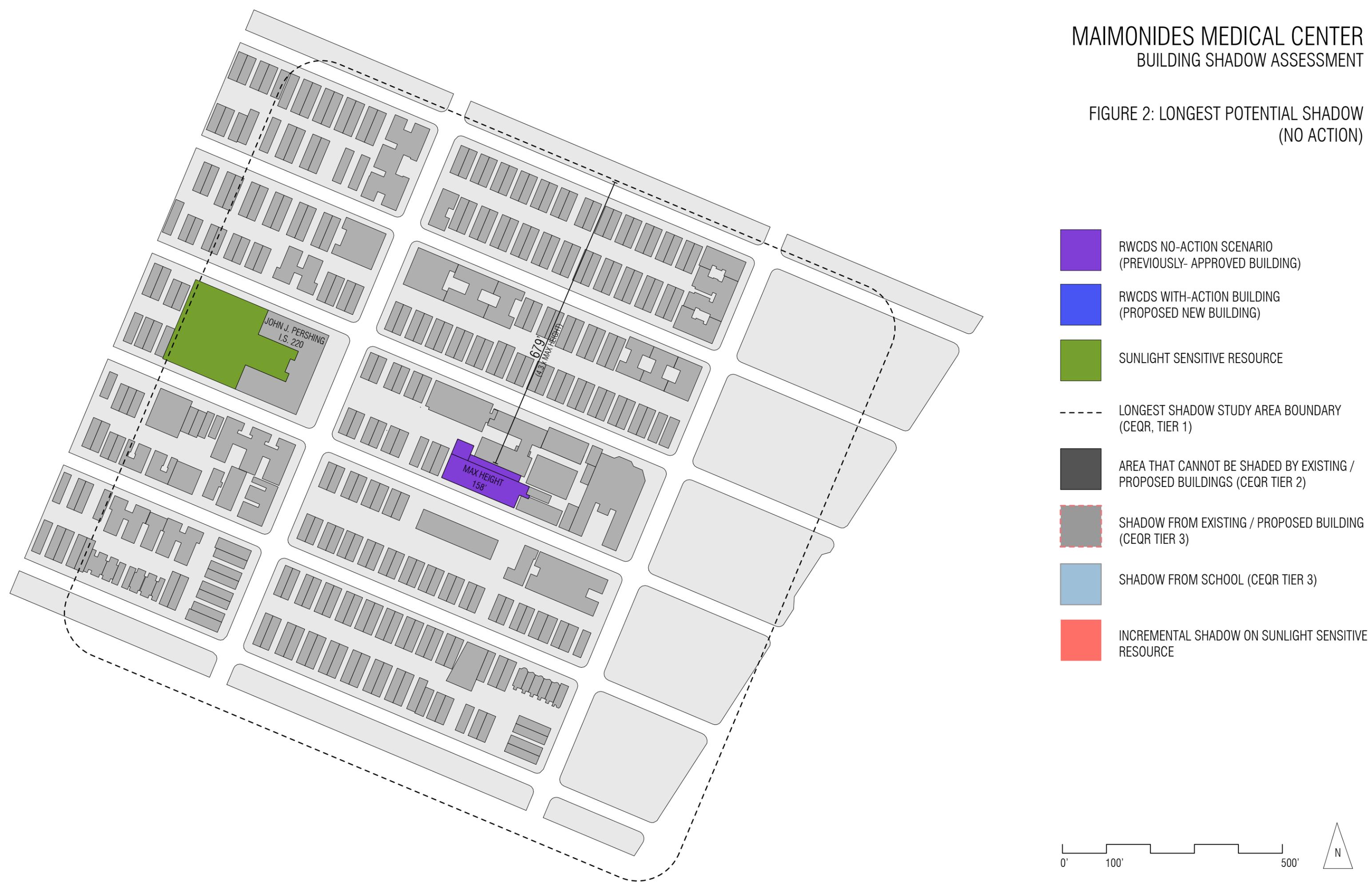
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 1: BASE MAP



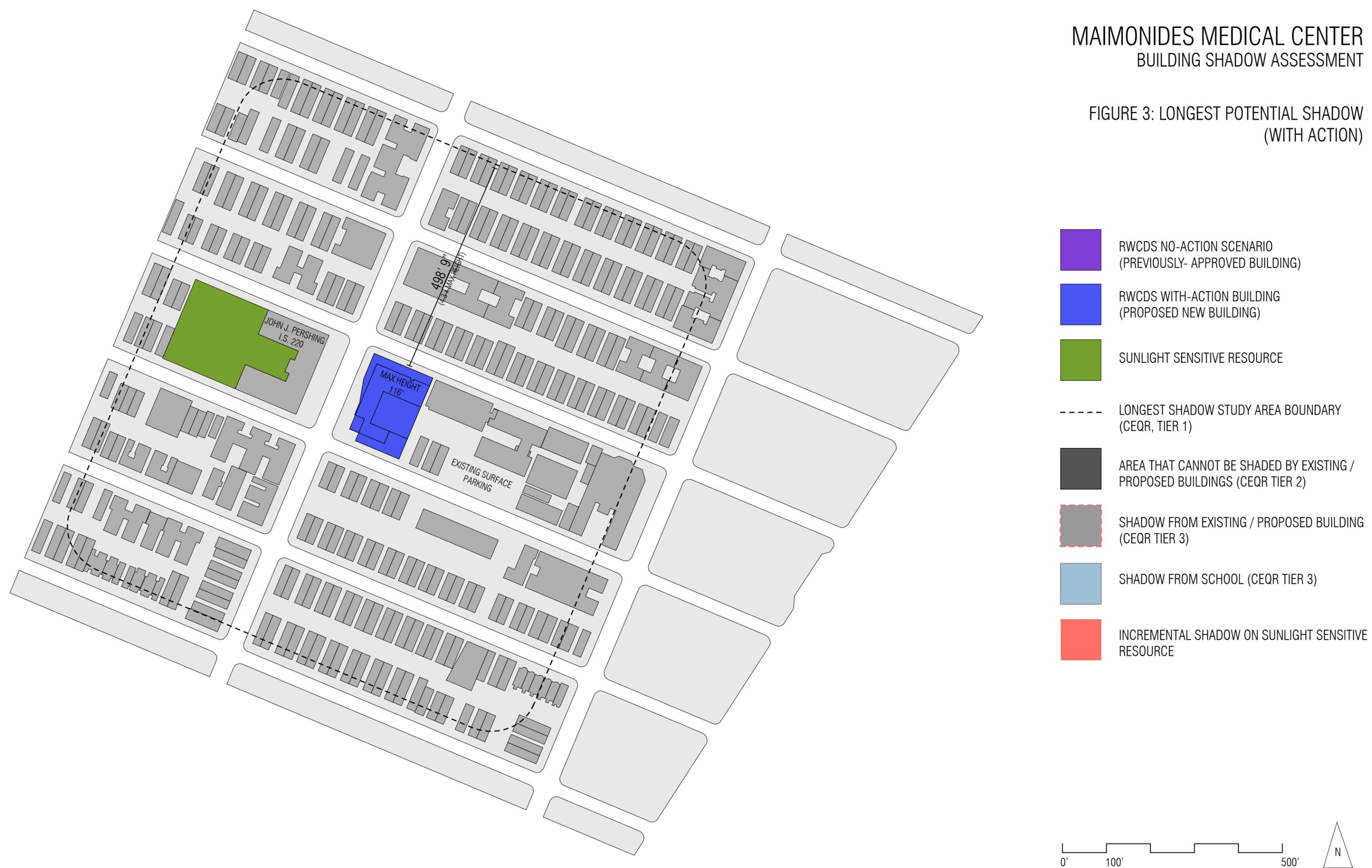
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 2: LONGEST POTENTIAL SHADOW
(NO ACTION)



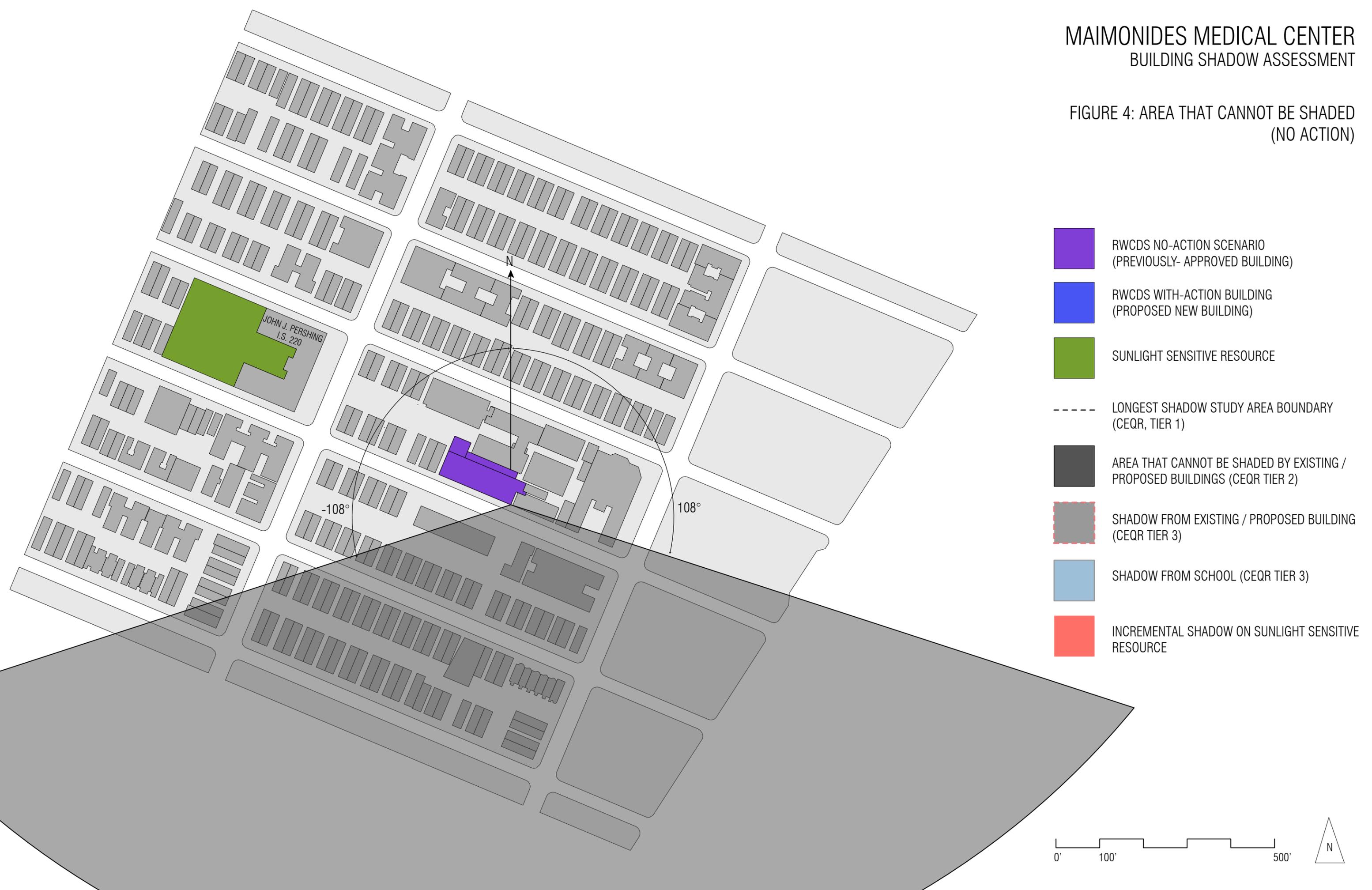
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 3: LONGEST POTENTIAL SHADOW
(WITH ACTION)

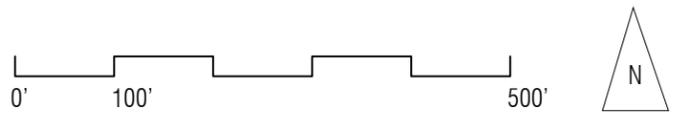


MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 4: AREA THAT CANNOT BE SHADED
(NO ACTION)

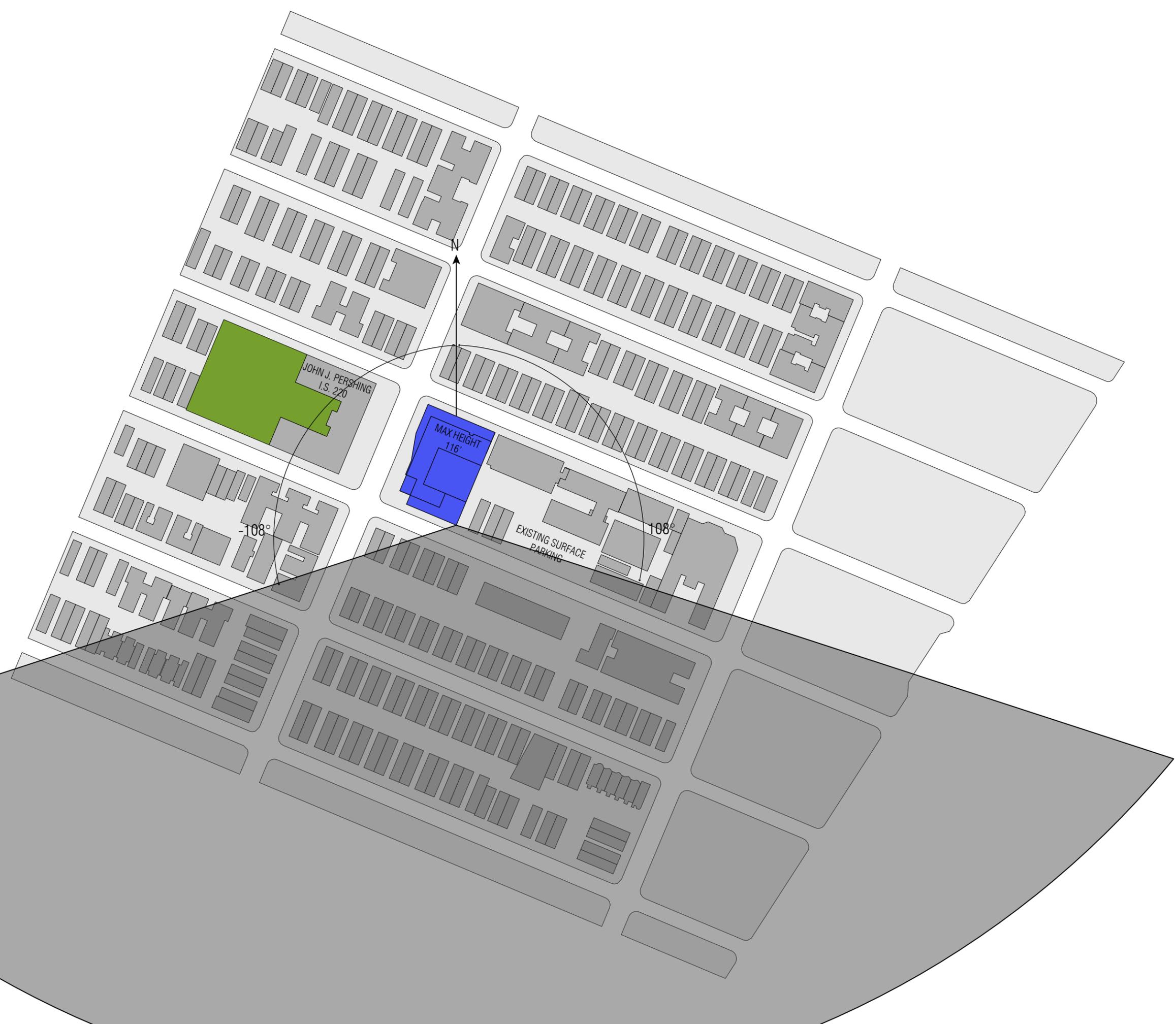


-  RWCDs NO-ACTION SCENARIO (PREVIOUSLY-APPROVED BUILDING)
-  RWCDs WITH-ACTION BUILDING (PROPOSED NEW BUILDING)
-  SUNLIGHT SENSITIVE RESOURCE
-  LONGEST SHADOW STUDY AREA BOUNDARY (CEQR, TIER 1)
-  AREA THAT CANNOT BE SHADED BY EXISTING / PROPOSED BUILDINGS (CEQR TIER 2)
-  SHADOW FROM EXISTING / PROPOSED BUILDING (CEQR TIER 3)
-  SHADOW FROM SCHOOL (CEQR TIER 3)
-  INCREMENTAL SHADOW ON SUNLIGHT SENSITIVE RESOURCE

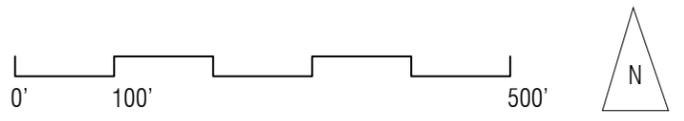


MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 5: AREA THAT CANNOT BE SHADED
(WITH ACTION)

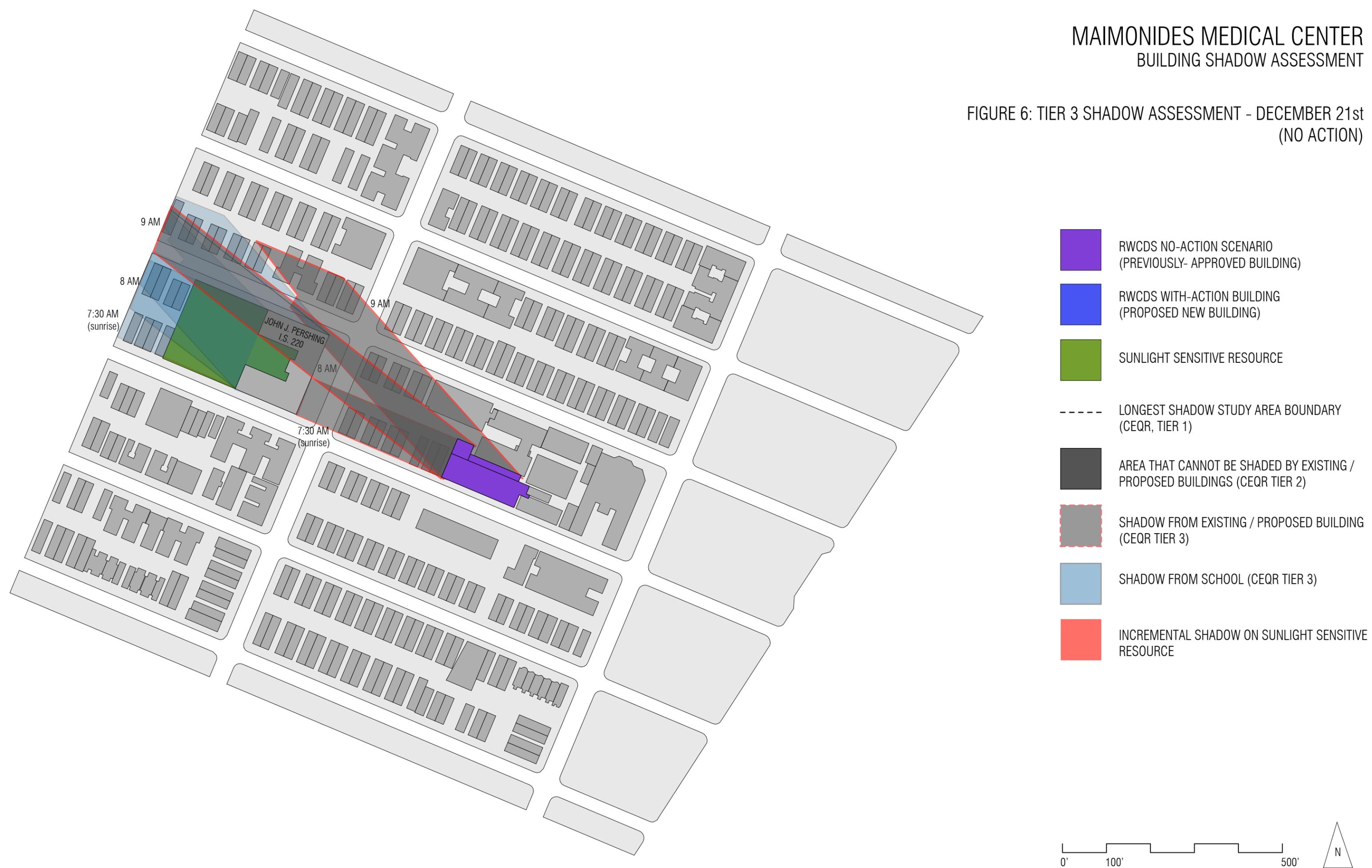


-  RWCDs NO-ACTION SCENARIO (PREVIOUSLY- APPROVED BUILDING)
-  RWCDs WITH-ACTION BUILDING (PROPOSED NEW BUILDING)
-  SUNLIGHT SENSITIVE RESOURCE
-  LONGEST SHADOW STUDY AREA BOUNDARY (CEQR, TIER 1)
-  AREA THAT CANNOT BE SHADED BY EXISTING / PROPOSED BUILDINGS (CEQR TIER 2)
-  SHADOW FROM EXISTING / PROPOSED BUILDING (CEQR TIER 3)
-  SHADOW FROM SCHOOL (CEQR TIER 3)
-  INCREMENTAL SHADOW ON SUNLIGHT SENSITIVE RESOURCE



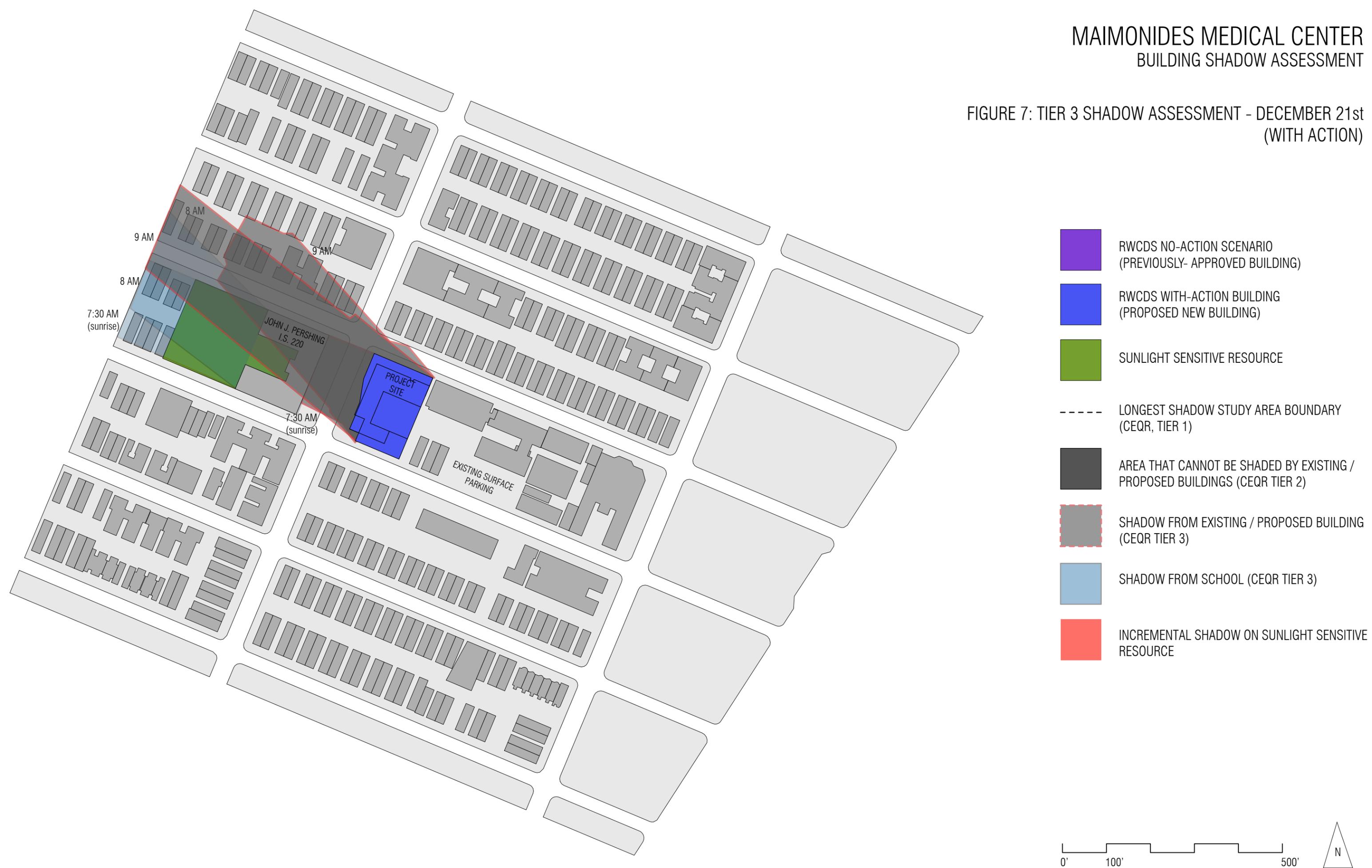
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 6: TIER 3 SHADOW ASSESSMENT - DECEMBER 21st
(NO ACTION)



MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

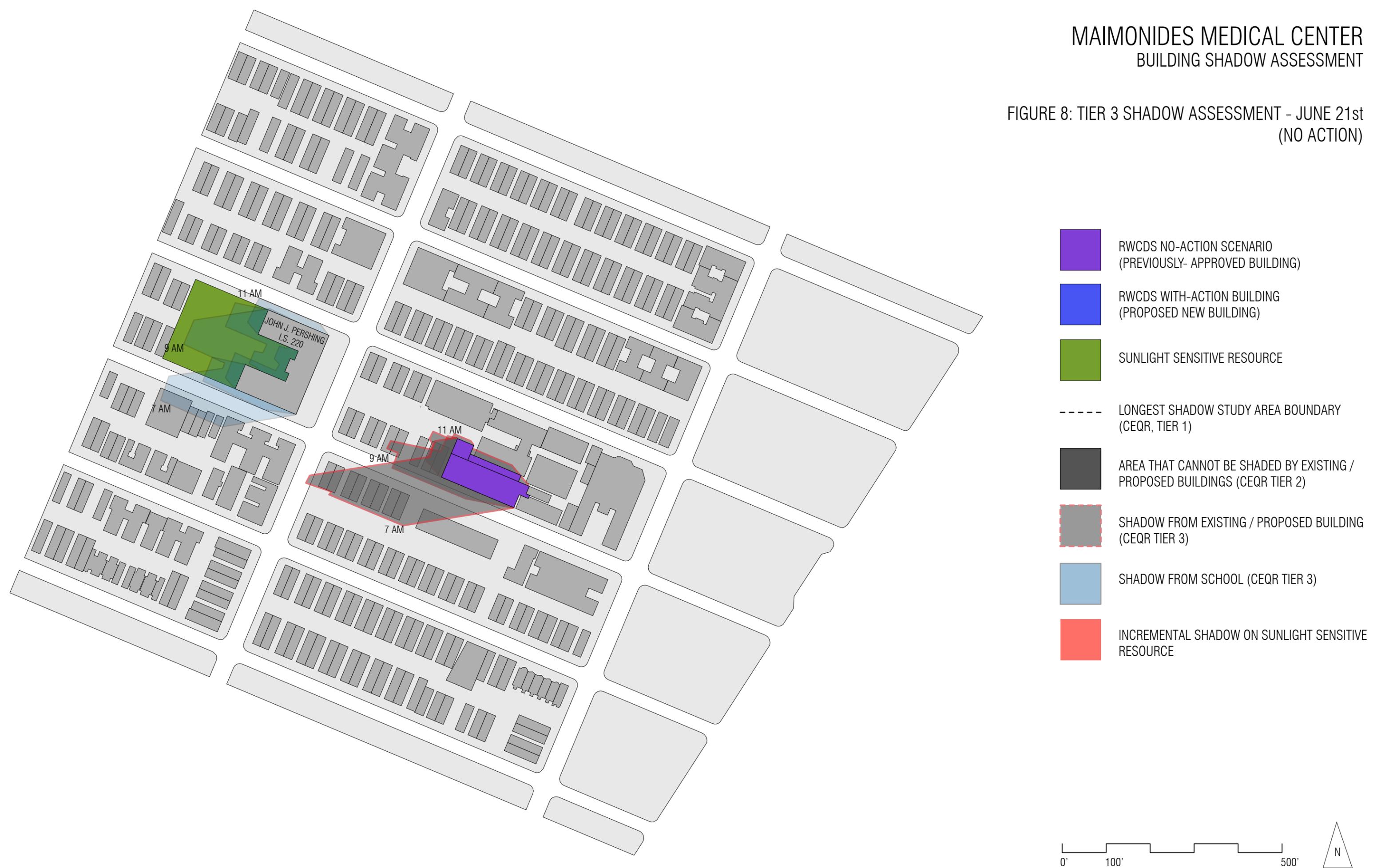
FIGURE 7: TIER 3 SHADOW ASSESSMENT - DECEMBER 21st
(WITH ACTION)



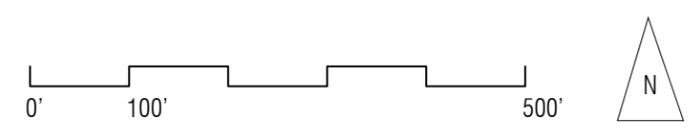
-  RWCDs NO-ACTION SCENARIO (PREVIOUSLY-APPROVED BUILDING)
-  RWCDs WITH-ACTION BUILDING (PROPOSED NEW BUILDING)
-  SUNLIGHT SENSITIVE RESOURCE
-  LONGEST SHADOW STUDY AREA BOUNDARY (CEQR, TIER 1)
-  AREA THAT CANNOT BE SHADED BY EXISTING / PROPOSED BUILDINGS (CEQR TIER 2)
-  SHADOW FROM EXISTING / PROPOSED BUILDING (CEQR TIER 3)
-  SHADOW FROM SCHOOL (CEQR TIER 3)
-  INCREMENTAL SHADOW ON SUNLIGHT SENSITIVE RESOURCE

MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 8: TIER 3 SHADOW ASSESSMENT - JUNE 21st
(NO ACTION)

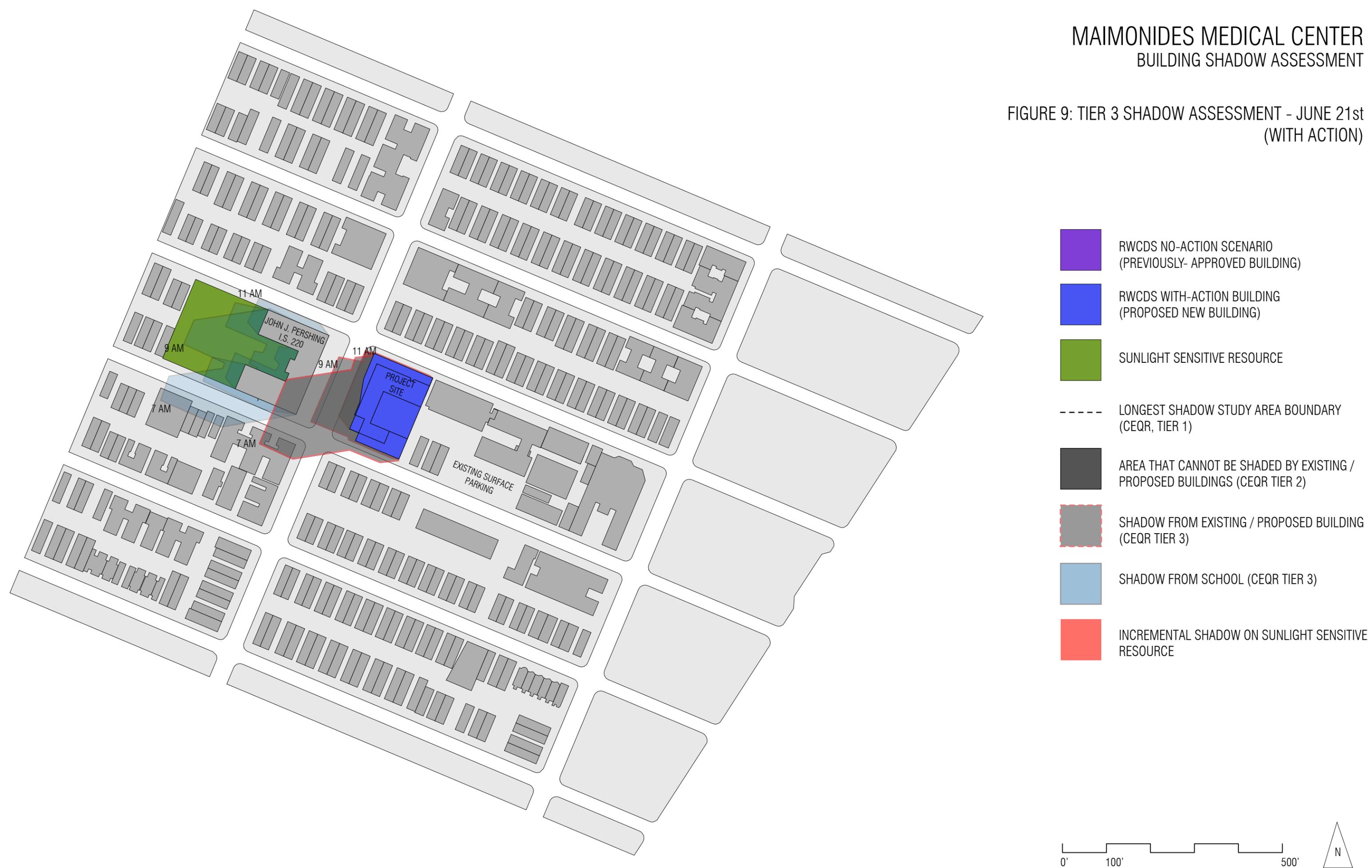


-  RWCDs NO-ACTION SCENARIO (PREVIOUSLY- APPROVED BUILDING)
-  RWCDs WITH-ACTION BUILDING (PROPOSED NEW BUILDING)
-  SUNLIGHT SENSITIVE RESOURCE
-  LONGEST SHADOW STUDY AREA BOUNDARY (CEQR, TIER 1)
-  AREA THAT CANNOT BE SHADED BY EXISTING / PROPOSED BUILDINGS (CEQR TIER 2)
-  SHADOW FROM EXISTING / PROPOSED BUILDING (CEQR TIER 3)
-  SHADOW FROM SCHOOL (CEQR TIER 3)
-  INCREMENTAL SHADOW ON SUNLIGHT SENSITIVE RESOURCE



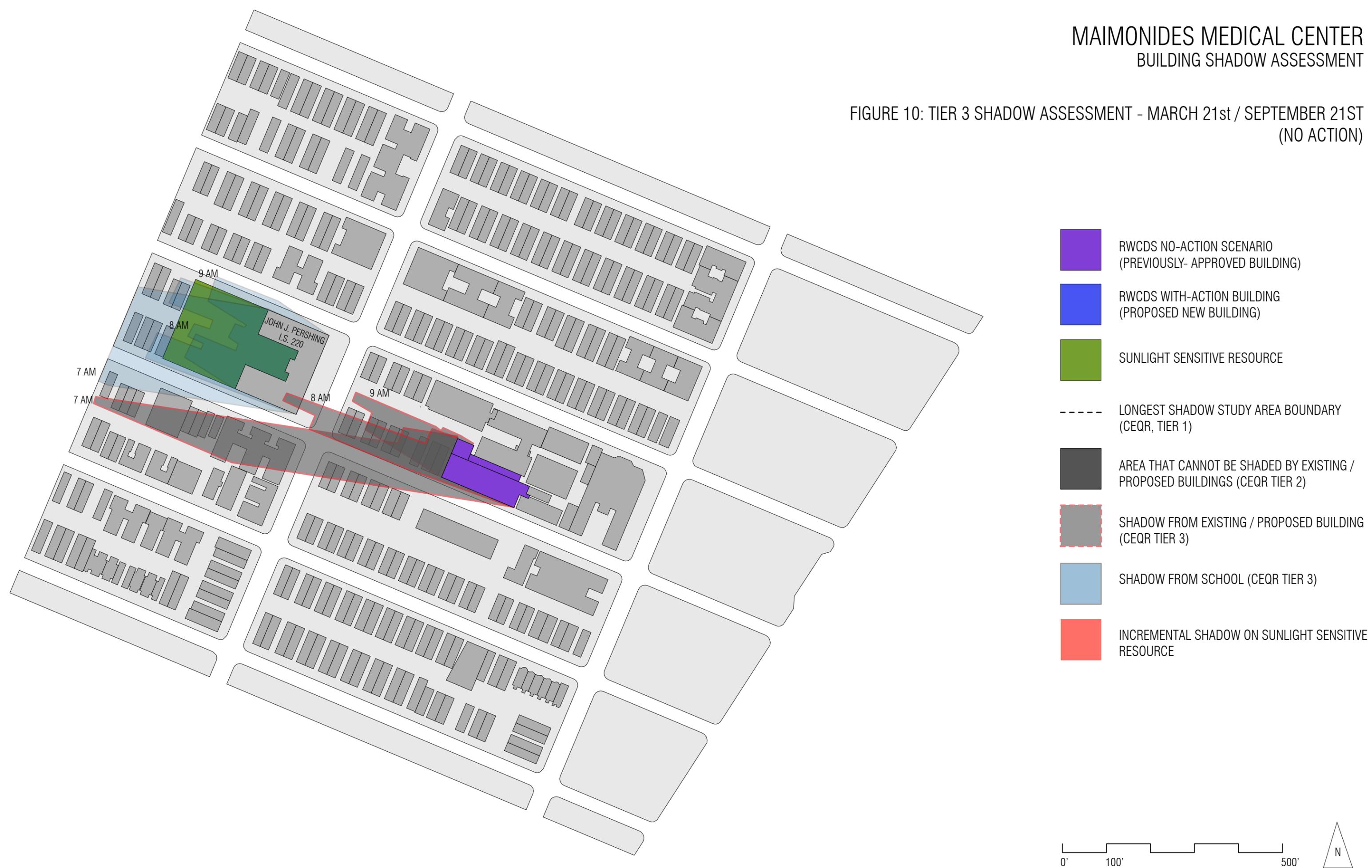
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 9: TIER 3 SHADOW ASSESSMENT - JUNE 21st
(WITH ACTION)



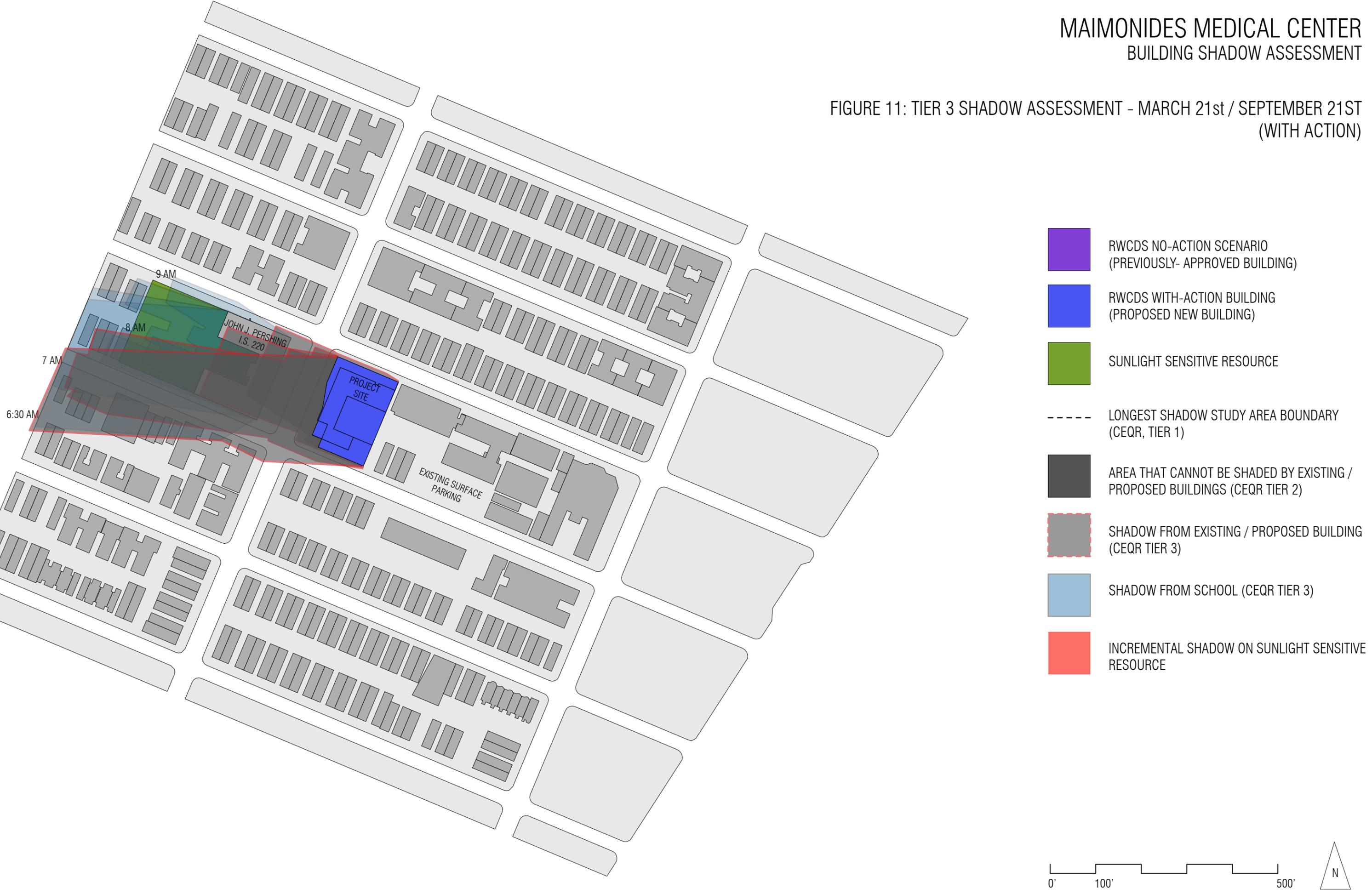
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 10: TIER 3 SHADOW ASSESSMENT - MARCH 21st / SEPTEMBER 21ST
(NO ACTION)



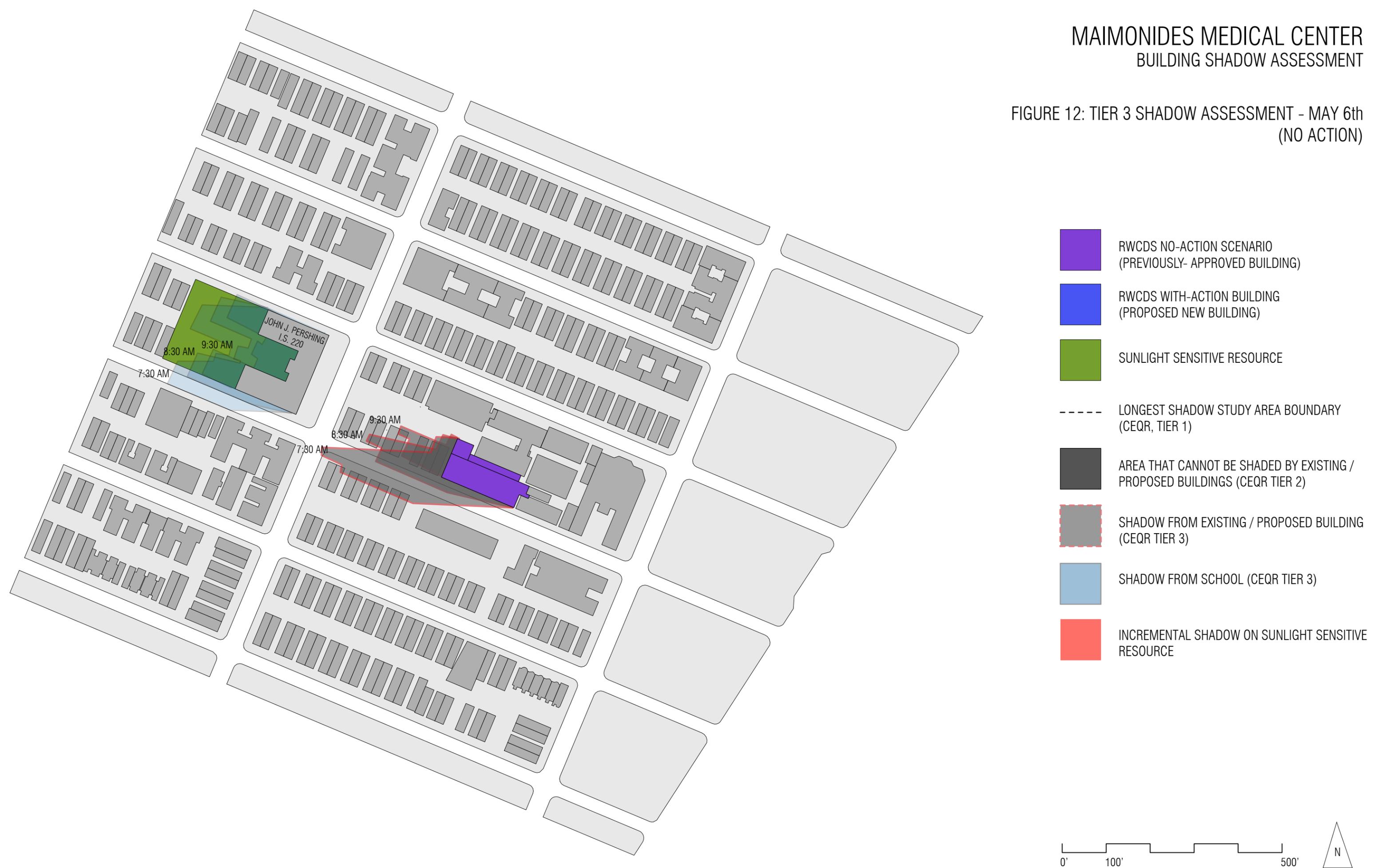
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 11: TIER 3 SHADOW ASSESSMENT - MARCH 21st / SEPTEMBER 21st
(WITH ACTION)



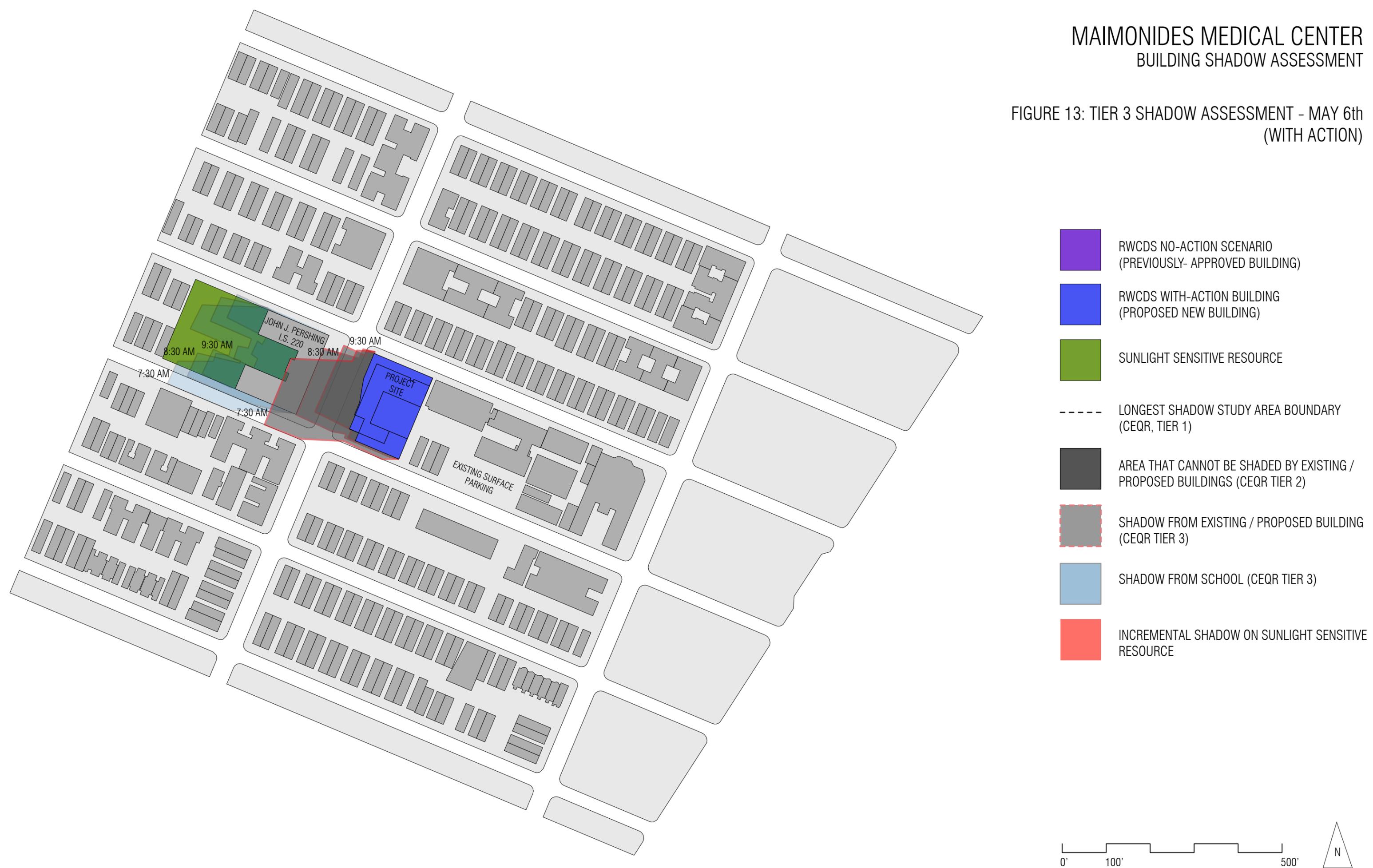
MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 12: TIER 3 SHADOW ASSESSMENT - MAY 6th
(NO ACTION)



MAIMONIDES MEDICAL CENTER BUILDING SHADOW ASSESSMENT

FIGURE 13: TIER 3 SHADOW ASSESSMENT - MAY 6th
(WITH ACTION)



- RWCDS NO-ACTION SCENARIO
(PREVIOUSLY- APPROVED BUILDING)
- RWCDS WITH-ACTION BUILDING
(PROPOSED NEW BUILDING)
- SUNLIGHT SENSITIVE RESOURCE
- LONGEST SHADOW STUDY AREA BOUNDARY
(CEQR, TIER 1)
- AREA THAT CANNOT BE SHADED BY EXISTING /
PROPOSED BUILDINGS (CEQR TIER 2)
- SHADOW FROM EXISTING / PROPOSED BUILDING
(CEQR TIER 3)
- SHADOW FROM SCHOOL (CEQR TIER 3)
- INCREMENTAL SHADOW ON SUNLIGHT SENSITIVE
RESOURCE

Attachment 10

DEP Correspondence and CHASP



Carter H. Strickland, Jr.
Commissioner

Angela Licata
Deputy Commissioner
of Sustainability
alicata@dep.nyc.gov

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April 24, 2013

Mr. Robert Dobruskin
Director, Environmental Assessment and Review Division
New York City Department of City Planning
22 Reade Street, Room 4E
New York, New York 10007-1216

**Re: Maimonides Expansion
901-913 49th Street and 902-916 48th Street
Block 5631, Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78
DEP # 13DEPTECH056K / CEQR # 77DCP051K
Brooklyn, New York**

Dear Mr. Dobruskin:

The New York City Department of Environmental Protection, Bureau of Environmental Planning and Analysis (DEP) has reviewed the January 2013 Environmental Assessment Statement prepared by Sustainable Management LLC and the July 2012 Phase I Environmental Site Assessment Reports (Phase I) prepared by Arcturus Environmental Services on behalf of Maimonides Medical Center (applicant) for the above referenced project. It is our understanding that the applicant is seeking modifications of the existing large scale community facility development plan special permit for the Maimonides Medical Center from the New York City Department of City Planning (DCP). The proposed modifications would allow development of a new seven-story plus penthouse medical office building serving the pediatric population on the Maimonides Hospital Site with examining rooms, offices, reception areas and one floor of accessory temporary live-in space for hospitalized pediatric patients and their families, plus a 263-space underground accessory garage. The project site consists of multiple tax lots that will be merged into a single zoning lot with an aggregate lot area of 29,152.4 square feet (sf) and is currently improved with twelve 2-story semi-detached buildings, originally constructed for residential uses but now used for ambulatory diagnostic and treatment health care facilities and related uses, containing an aggregate of approximately 27,992 sf of floor area. The project site is bounded by 10th Avenue, 49th Street, 9th Avenue, and 48th Street in the Borough Park neighborhood of Brooklyn Community District 2.

Block 5631, Lots 1 and 78 (901 49th Street and 903 49th Street)

The July 2012 Phase I report revealed that historical on-site and surrounding area land uses consisted of variety of commercial, residential, and industrial uses including dwellings, a school, an office building, upholstery, the New York Telephone Company, the Diagnostic Center for Vascular Diseases. Three

above-ground oil tanks with a total capacity of 825 gallons (275-gallons each) were observed at the subject property. Two of the three above-ground oil tanks are located in the basement of 901 49th Street. The remaining above-ground oil tank is located in the basement of 903 49th Street. The New York State Department of Environmental Conservation (NYSDEC) SPILLS database identified one active-status and 11 closed spills within a 1/8-mile radius of the project site and the NYSDEC LTANKS database identified 14 closed LTANKS within a 1/2-mile radius of the project site.

Block 5631, Lots 6 and 9 (902 48th Street and 904 48th Street)

The July 2012 Phase I report revealed that historical on-site and surrounding area land uses consisted of variety of commercial, residential, and industrial uses including dwellings, an office building, a school, commercial buildings, and the New York Telephone Company. A 275-gallon above-ground oil tank was observed in the basement at 902 48th Street and an unidentified container was observed at 902 48th Street. The NYSDEC SPILLS database identified one active-status and 11 closed spills within a 1/8-mile radius of the project site and the NYSDEC LTANKS database identified 14 closed LTANKS within a 1/2-mile radius of the project site.

Block 5631, Lots 77 and 76 (907 49th Street and 909 49th Street)

The July 2012 Phase I report revealed that historical on-site and surrounding area land uses consisted of variety of commercial, residential, and industrial uses including dwellings, a music school, commercial buildings, and the New York Telephone company. Two above-ground oil tanks with a total capacity of 550 gallons were observed at the subject property. One of the two above-ground oil tanks is located in the basements of 907 49th Street. The remaining above-ground oil tank is located in the basements of 909 49th Street. The NYSDEC SPILLS database identified one active-status and 11 closed spills within a 1/8-mile radius of the project site and the NYSDEC LTANKS database identified 14 closed LTANKS within a 1/2-mile radius of the project site.

Block 5631, Lots 10 and 11 (909 48th Street and 910 48th Street)

The July 2012 Phase I report revealed that historical on-site and surrounding area land uses consisted of variety of commercial, residential, and industrial uses including office buildings, dwellings, a music school, a commercial building, and the New York Telephone company. Two 275-gallon above-ground oil tanks with a total capacity of 550 gallons were observed at the subject property. One of the two above-ground oil tanks is located in the basement of 908 48th Street. The remaining above-ground oil tank is located in the basement of 910 48th Street. In addition, an oil stain on the concrete floor near the oil tank was observed in the basement at 910 48th Street. Suspect asbestos containing materials (ACM) were observed on the heating pipes in the basement at 910 48th Street. The NYSDEC SPILLS database identified one active-status and 11 closed spills within a 1/8-mile radius of the project site and the NYSDEC LTANKS database identified 14 closed LTANKS within a 1/2-mile radius of the project site.

Block 5631, Lots 75 and 74 (913 49th Street and 915 49th Street)

The July 2012 Phase I report revealed that historical on-site and surrounding area land uses consisted of variety of commercial, residential, and industrial uses including office buildings, dwellings, commercial buildings, and the New York Telephone company. Three above-ground oil tanks with a total capacity of 825 gallons were observed at the subject property. Two of the three above-ground oil tanks are located in the basement of 913 49th Street. The remaining above-ground oil tank is located in the basement of 915 49th Street. Suspect ACM were observed on the heating pipe in the basement at 913 49th Street. The NYSDEC SPILLS database identified one active-status and 11 closed spills within a 1/8-mile radius of the project site and the NYSDEC LTANKS database identified 14 closed LTANKS within a 1/2-mile radius of the project site.

Block 5631, Lots 12 and 13 (914 48th Street and 916 48th Street)

The July 2012 Phase I report revealed that historical on-site and surrounding area land uses consisted of variety of commercial, residential, and industrial uses including office buildings, dwellings, a community health center, a music school, commercial buildings, and the New York Telephone company. Two 275-gallon above-ground oil tanks with a total capacity of approximately 550 gallons were observed on the subject property. One of the two above-ground oil tanks is located in the basement of 914 48th Street. The remaining above-ground oil tank is located in the basement of 916 48th Street. The NYSDEC SPILLS database identified one active-status and 11 closed spills within a 1/8-mile radius of the project site and the NYSDEC LTANKS database identified 14 closed LTANKS within a 1/2-mile radius of the project site.

Based upon our review of the submitted documentation, we have the following comments and recommendations to DCP:

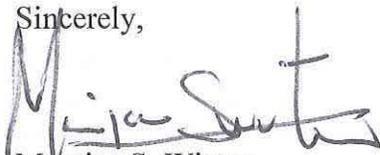
- DCP should inform the applicant that based on the historical on-site and surrounding area land uses, a Phase II Environmental Site Assessment (Phase II) is necessary to adequately identify/characterize the surface and subsurface soils of the subject parcel. A Phase II Investigative Protocol/Work Plan summarizing the proposed drilling, soil, groundwater, and soil vapor sampling activities should be submitted to DEP for review and approval. The Work Plan should include blueprints and/or site plans displaying the current surface grade and sub-grade elevations and a site map depicting the proposed soil boring locations and soil vapor sampling locations. Soil and groundwater samples should be collected and analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for the presence of volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 8260, semi-volatile organic compounds by EPA Method 8270, pesticides by EPA Method 8081, polychlorinated biphenyls by EPA Method 8082, Target Analyte List metals (filtered and unfiltered for groundwater samples) and soil vapor samples by EPA Method TO-15. The soil vapor sampling should be conducted in accordance with NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York. The soil vapor samples should be collected and analyzed by a NYSDOH ELAP certified laboratory for the presence of VOCs by

EPA Method TO-15. An Investigative Health and Safety Plan (HASP) should also be submitted to DEP for review and approval.

- DCP should inform the applicant that ACM may be present in the on-site structures. These materials should be properly removed and/or managed prior to the start of any renovation/construction activities and disposed of in accordance with all federal, state, and local regulations.

DCP should also instruct the applicant that the Phase II Work Plan and HASP should be submitted to DEP for review and approval prior to the start of any fieldwork. Future correspondence and submittals related to this project should include the following tracking number **13DEPTECH056K**. If you have any questions, you may contact Mr. Wei Yu at (718) 595-4358.

Sincerely,

A handwritten signature in black ink, appearing to read "Maurice S. Winter". The signature is written in a cursive style with a large initial "M".

Maurice S. Winter
Deputy Director, Site Assessment

c: E. Mahoney
M. Winter
W. Yu
T. Estes
M. Wimbish
C. Evans – DCP
J. Keller – DCP
File



Carter H. Strickland, Jr.
Commissioner

Angela Licata
Deputy Commissioner
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June 10, 2013

Mr. Robert Dobruskin
Director, Environmental Assessment and Review Division
New York City Department of City Planning
22 Reade Street, Room 4E
New York, New York 10007-1216

Re: Maimonides Expansion
901-913 49th Street and 902-916 48th Street
Block 5631, Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78
DEP # 13DEPTECH056K / CEQR # 77DCP051K
Brooklyn, New York

Dear Mr. Dobruskin:

The New York City Department of Environmental Protection, Bureau of Environmental Planning and Analysis (DEP) has reviewed the May 2013 Phase II Environmental Site Assessment Work Plan (Phase II Work Plan) and Health and Safety Plan (HASP) prepared by Sustainable Management LLC on behalf of Maimonides Medical Center (applicant) for the above referenced project. It is our understanding that the applicant is seeking modifications of the existing large scale community facility development plan special permit for the Maimonides Medical Center from the New York City Department of City Planning (DCP). The proposed modifications would allow development of a new seven-story plus penthouse medical office building serving the pediatric population on the Maimonides Hospital Site with examining rooms, offices, reception areas and one floor of accessory temporary live-in space for hospitalized pediatric patients and their families, plus a 263-space underground accessory garage. The project site consists of multiple tax lots that will be merged into a single zoning lot with an aggregate lot area of 29,152.4 square feet (sf) and is currently improved with twelve 2-story semi-detached buildings, originally constructed for residential uses but now used for ambulatory diagnostic and treatment health care facilities and related uses, containing an aggregate of approximately 27,992 sf of floor area. The project site is bounded by 10th Avenue, 49th Street, 9th Avenue, and 48th Street in the Borough Park neighborhood of Brooklyn Community District 2.

The May 2013 Work Plan proposes to conduct soil, groundwater, and soil vapor sampling. Ten soil borings (SB-1 through SB-10) will be advanced from 0-30 feet below surface grade (bsg). The first soil sample will be collected from 0-2 feet bsg. The second soil sample will be collected from the interval exhibiting the highest level of contamination based on highest photoionization detector readings and/or direct observation. If no evidence of contamination is

encountered, the second soil sample will be collected from 28-30 feet bsg (two feet below the cellar). Groundwater samples will be collected from five temporary monitoring wells (GW-1 through GW-5). Twenty soil samples and five groundwater samples will be analyzed for volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 8260, semi-volatile organic compounds by EPA Method 8270, pesticides by EPA Method 8081, polychlorinated biphenyls by EPA Method 8082, and Target Analyte List metals (filtered and unfiltered for groundwater). Eight soil vapor samples will be collected from soil vapor points SV-1 to SV-8 and analyzed for VOCs by EPA Method TO-15.

Based upon our review of the submitted documentation, we have the following comments and recommendations to DCP:

Work Plan

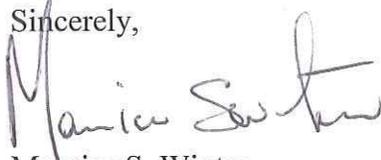
- DCP should instruct the applicant that twenty (20) soil samples should be submitted for laboratory analysis as described in page 1 and not ten (10) as described in page 3.
- DCP should inform the applicant that upon completion of the investigation activities, the consultant should submit a detailed Phase II report to DEP for review and approval. The report should include, at a minimum, an executive summary, narrative of the field activities, laboratory data and conclusions, comparison of soil, groundwater, and soil vapor analytical results (i.e., New York State Department of Environmental Conservation (NYSDEC) 6NYCRR Part 375, NYSDEC Water Quality Regulations, and New York State Department of Health's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York), updated site plans depicting sample locations, boring logs, and remedial recommendations, if warranted.

Health and Safety Plan

- DCP should instruct the applicant to include the names and phone numbers of the site safety personnel (i.e. Project Manager, Site Supervisor, Site Health and Safety Officer, and Alternates) in the HASP.
- DCP should instruct the applicant to include an Incident Reporting Log Form in the HASP.

DEP finds the May 2013 Phase II Work Plan and HASP for the proposed project acceptable as long as the aforementioned information is incorporated into the Work Plan and HASP. Future correspondence and submittals related to this project should include the following tracking number **13DEPTECH056K**. If you have any questions, you may contact Mr. Wei Yu at (718) 595-4358.

Sincerely,

A handwritten signature in cursive script, appearing to read "Maurice S. Winter".

Maurice S. Winter

Deputy Director, Site Assessment

- c: E. Mahoney
- M. Winter
- W. Yu
- T. Estes
- M. Wimbish
- C. Evans – DCP
- J. Keller – DCP
- File



Carter H. Strickland, Jr.
Commissioner

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October 4, 2013

Mr. Robert Dobruskin
Director, Environmental Assessment and Review Division
New York City Department of City Planning
22 Reade Street, Room 4E
New York, New York 10007-1216

Re: Maimonides Expansion
901-913 49th Street and 902-916 48th Street
Block 5631, Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78
DEP # 13DEPTECH056K / CEQR # 77DCP051K
Brooklyn, New York

Dear Mr. Dobruskin:

The New York City Department of Environmental Protection, Bureau of Environmental Planning and Analysis (DEP) has reviewed the August 2013 Phase II Environmental Site Investigation (Phase II) prepared by Sustainable Management LLC on behalf of Maimonides Medical Center (applicant) for the above referenced project. It is our understanding that the applicant is seeking modifications of the existing large scale community facility development plan special permit for the Maimonides Medical Center from the New York City Department of City Planning (DCP). The proposed modifications would allow development of a new seven-story plus penthouse medical office building serving the pediatric population on the Maimonides Hospital Site with examining rooms, offices, reception areas and one floor of accessory temporary live-in space for hospitalized pediatric patients and their families, plus a 263-space underground accessory garage. The project site consists of multiple tax lots that will be merged into a single zoning lot with an aggregate lot area of 29,152.4 square feet (sf.) and is currently improved with twelve 2-story semi-detached buildings, originally constructed for residential uses but now used for ambulatory diagnostic and treatment health care facilities and related uses, containing an aggregate of approximately 27,992 sf. of floor area. The project site is bounded by 10th Avenue, 49th Street, 9th Avenue, and 48th Street in the Borough Park neighborhood of Brooklyn Community District 2.

During the July 2013 fieldwork, Sustainable Management LLC advanced ten soil borings (SB-1 through SB-10) to approximately 30 feet below grade surface (bgs). Two soil samples were collected from each soil boring. The first soil sample was collected at the surface (0-2') and the second soil sample was collected from the interval exhibiting the highest level of contamination based on highest photoionization detector readings and/or direct observation. If no evidence of contamination is encountered, the second soil sample was collected directly 28'-30' (two feet below the cellar). Twenty soil samples were collected and analyzed for volatile organic compounds (VOCs) by United States

Environmental Protection Agency (EPA) Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, pesticides by EPA Method 8081, polychlorinated biphenyls (PCBs) by EPA Method 8082, and Target Analyte List (TAL) metals.

The groundwater samples were planned to be collected from five borings (GW-1 through GW-5) using a temporary well point. Three groundwater drillings were made but did not encounter groundwater (the deepest groundwater drilling was 76 feet bgs). However, one groundwater sample was collected from a permanent groundwater monitoring well (approximately 82 feet bgs) on the site which is located on the driveway between 903 and 907 49th Streets, approximately 30 feet from the north curb of 49th Street. Groundwater sample from the permanent groundwater monitoring well was collected and analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, pesticides by EPA Method 8081, PCBs by EPA Method 8082, and TAL metals (filtered and unfiltered).

Eight soil vapor sample points were advanced to approximately 30 feet bgs (2 feet below the basement). Eight soil vapor samples were collected and analyzed for VOCs by EPA Method TO-15.

The soil analytical results revealed SVOC, pesticide, and PCB concentrations were either non-detect or below their respective New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (SCOs) and SCOs for Restricted Residential Use. One VOC (1,4 dioxane) and several metals (chromium, hexavalent, and lead) were detected above their respective NYSDEC Unrestricted Use SCOs.

The groundwater analytical results revealed the laboratory analysis Limit of Detection of one VOC (1,2-Dibromo-3-chloropropane), one SVOC (hexachlorobutadiene), several pesticides (dieldrin and toxaphene), PCBs, and one metal (antimony) were higher than their respective NYSDEC Water Quality Standards. Several metals (iron and sodium) were detected above their respective NYSDEC Water Quality Standards.

The soil vapor analytical results revealed several VOCs (dichlorodifluoromethane, chloromethane, tetrahydrofuran, trichlorofluoromethane, tert-butyl alcohol, acetone, carbon disulfide, cyclohexane, 2-butanone, carbon tetrachloride, 2,2,4-trimethylpentane, benzene, 4-methyl-2-pentanone, toluene, tetrachloroethene, ethyl benzene, m/p-xylene, o-xylene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, hexane, bromomethane, heptane, 4-ethyltoluene, benzene, methylene chloride, styrene, 1,4-dichlorobenzene, 1,2-dichloroethane, and trichloroethene) were detected.

Based upon our review of the submitted documentation, we have the following comments and recommendations to DCP:

- DCP should instruct the applicant to develop and submit a Remedial Action Plan (RAP) for the proposed construction project for review and approval. The RAP should delineate that contaminated soils should be properly disposed of in accordance with the applicable NYSDEC regulations. Additional testing of the soils may be required by the disposal and/or recycling facility.

- DCP should instruct the applicant to submit a site-specific Construction Health and Safety Plan (CHASP) on the basis of workers exposure to contaminants for the proposed construction project. The CHASP should be submitted to DEP for review and approval. Soil disturbance should not occur without DEP's written approval of the CHASP.
- DCP should inform the applicant that a vapor barrier should be incorporated into the design plan of the proposed construction project.
- DCP should instruct the applicant that for all areas, which will either be landscaped or covered with grass (not capped), a minimum of two (2) feet of clean fill/top soil must be imported from an approved facility/source and graded across all landscaped/grass covered areas of the sites not capped with concrete/asphalt. The clean fill/top soil must be segregated at the source/facility, have qualified environmental personnel collect representative samples at a frequency of one (1) sample for every 250 cubic yards, analyze the samples for Target Compound List (TCL) VOCs, SVOCs, pesticides, PCBs, and TAL metals by a New York State Department of Health Environmental Laboratory Approval Program certified laboratory, compared to NYSDEC Part 375 Environmental Remediation Programs.
- DCP should instruct the applicant that excavated soils, which are temporarily stockpiled on-site, must be covered with polyethylene sheeting while disposal options are determined. Additional testing may be required by the disposal/recycling facility. Excavated soil should not be reused for grading purposes.
- DCP should instruct the applicant that if any petroleum-impacted soils (which display petroleum odors and/or staining) are encountered during the excavation/grading activities, the impacted soils should be removed and properly disposed of in accordance with all NYSDEC regulations.
- DCP should instruct the applicant that dust suppression must be maintained by the contractor during the excavating and grading activities at the site.
- DCP should instruct the applicant that all known or found underground storage tanks (including dispensers, piping, and fill-ports) must be properly removed/closed in accordance with all applicable NYSDEC regulations.
- DCP should instruct the applicant that if de-watering into New York City storm/sewer drains will occur during the proposed construction, a New York City Department of Environmental Protection Sewer Discharge Permit must be obtained prior to the start of any de-watering activities at the site.

Future correspondence and submittals related to this project should include the following tracking number **13DEPTECH056K**. If you have any questions, you may contact Mr. Wei Yu at (718) 595-4358.

Sincerely,

A handwritten signature in black ink, appearing to read "Maurice S. Winter". The signature is fluid and cursive, with a large initial "M" and a long, sweeping underline.

Maurice S. Winter
Deputy Director, Site Assessment

c: E. Mahoney
M. Winter
W. Yu
T. Estes
M. Wimbish
C. Evans – DCP
J. Keller – DCP
File



Carter H. Strickland, Jr.
Commissioner

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November 25, 2013

Mr. Robert Dobruskin
Director, Environmental Assessment and Review Division
New York City Department of City Planning
22 Reade Street, Room 4E
New York, New York 10007-1216

Re: Maimonides Expansion
901-913 49th Street and 902-916 48th Street
Block 5631, Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77, and 78
DEP # 13DEPTECH056K / CEQR # 77DCP051K
Brooklyn, New York

Dear Mr. Dobruskin:

The New York City Department of Environmental Protection, Bureau of Environmental Planning and Analysis (DEP) has reviewed the October 2013 Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP) prepared by Sustainable Management LLC on behalf of Maimonides Medical Center (applicant) for the above referenced project. It is our understanding that the applicant is seeking modifications of the existing large scale community facility development plan special permit for the Maimonides Medical Center from the New York City Department of City Planning (DCP). The proposed modifications would allow development of a new seven-story plus penthouse medical office building serving the pediatric population on the Maimonides Hospital Site with examining rooms, offices, reception areas and one floor of accessory temporary live-in space for hospitalized pediatric patients and their families, plus a 263-space underground accessory garage. The project site consists of multiple tax lots that will be merged into a single zoning lot with an aggregate lot area of 29,152.4 square feet (sf.) and is currently improved with twelve 2-story semi-detached buildings, originally constructed for residential uses but now used for ambulatory diagnostic and treatment health care facilities and related uses, containing an aggregate of approximately 27,992 sf. of floor area. The project site is bounded by 10th Avenue, 49th Street, 9th Avenue, and 48th Street in the Borough Park neighborhood of Brooklyn Community District 2.

The October 2013 RAP proposes an appropriate vapor barrier system to be incorporated into the design plan for all structures during the proposed construction; proper handling, transportation, and disposal of contaminated soil in accordance with applicable New York State Department of Environmental Conservation (NYSDEC) regulations; proper removal/closing of underground storage tanks in accordance with applicable NYSDEC regulations; de-watering into storm/sewer drains in accordance with applicable New York City Department of Environmental Protection requirements; dust monitoring;

on-site soil will be stockpiled and covered with polyethylene sheeting; and two feet of clean fill/top soil will be used to cover all areas to be landscaped or unpaved areas. The October 2013 CHASP addresses worker and community health and safety during redevelopment.

Based upon our review of the submitted documentation, we have the following comments and recommendations to DCP:

- DCP should instruct the applicant to include the names and phone numbers of the Project Manager, Site Supervisor, and Alternates in the CHASP.
- DCP should instruct the applicant to include an Incident Reporting Log Form in the CHASP.

DEP finds the October 2013 RAP and CHASP for the proposed project acceptable as long as the aforementioned information is incorporated into the CHASP. DCP should instruct the applicant that at the completion of the project, a Professional Engineer (P.E.) certified Remedial Closure Report should be submitted to DEP for review and approval for the proposed project. The P.E. certified Remedial Closure Report should indicate that all remedial requirements have been properly implemented (i.e., proof of installation of vapor barrier; proper transportation/disposal manifests and certificates from impacted soils removed and properly disposed of in accordance with all NYSDEC regulations; and two feet of certified clean fill/top soil capping requirement in any landscaped/grass covered areas not capped with concrete/asphalt, etc.).

Future correspondence and submittals related to this project should include the following tracking number **13DEPTECH056K**. If you have any questions, you may contact Mr. Wei Yu at (718) 595-4358.

Sincerely,

Wei Yu For

Maurice S. Winter
Deputy Director, Site Assessment

c: E. Mahoney
M. Winter
W. Yu
T. Estes
M. Wimbish
C. Evans – DCP
J. Keller – DCP
File

Incident Log Form

Site name: Maimonides Medical Center-9th Avenue Building

Site location:

Date:

Day:

Time	Description of Incident

Construction Health and Safety Plan

**Maimonides Expansion
901-913 49th Street
902-916 48th Street
Brooklyn, NY 11220
CEQR# 77DCP051K
NYC DEP# 13DEPTECH056K**

October 22, 2013

Prepared For:

**Maimonides Medical Center
4802 10th Avenue
Brooklyn, NY 11219**

For Submittal to:

**NYC Department of Environmental Protection
Office of Environmental Planning and Assessment
59-17 Junction Boulevard
Flushing, NY 11373**

Prepared By:

**Sustainable Management LLC
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**Construction Health and Safety Plan
Maimonides Medical Center
4802 10th Avenue
Brooklyn, New York**

1.0 Purpose

The purpose of this Construction Health and Safety Plan (CHASP) is to establish a protocol for protection of Sustainable Management LLC employees and other on-site and off-site personnel from incidents that may arise while performing field activities related to soil excavation for the redevelopment of the Maimonides Medical Center site located in Brooklyn, New York. This CHASP has been prepared in accordance with the United States Environmental Protection Agency (USEPA) document “Emergency and Remedial Response Division’s Standard Operating Safety Guides”, November 1984. This plan establishes personnel protection standards, mandatory operations procedures, and provides contingencies for situations that may arise while field activities are being conducted at the site. All field personnel will be required to abide by the procedures set forth in this CHASP. Adherence to this CHASP will minimize the possibility that personnel at the site or in the surrounding community will be injured or exposed to site-related contaminants during field activities. Subcontractor personnel will be provided with a copy of this CHASP for their consideration. A copy of this CHASP will be maintained at the site for the duration of the field activities.

Personnel performing the field activities involving chemical substances may encounter conditions that are unsafe or potentially unsafe. In addition to the potential risks associated with the physical, chemical, biological and toxicological properties of the material(s) which may be encountered, other types of hazards (i.e. electricity, water, temperature, heavy equipment, falling objects, loss of balance, tripping, etc.) can have an adverse effect on the health and safety of field personnel. It is important that personnel protective equipment (PPE) and safety requirements be appropriate to protect against potential and/or known hazards. PPE will be selected based on the type(s), concentration(s), and routes of personnel exposure from identified hazardous substances at the site. In situations where the type of materials and possibilities of contact are unknown or the potential hazards are not clearly identifiable, a more subjective and conservative determination will be made of the PPE required for initial safety.

2.0 Site Conditions

The subject site is located at 901-913 49th Street and 902-916 48th Street, Brooklyn, Kings County, New York. The subject site is referred to as Block 5631, Lots 1, 6, 9, 10, 11, 12, 13, 74, 75, 76, 77 and 78 by the City of New York Tax Assessor’s Office. The land area is 29,152 square feet. The subject site is located on the east side of 9th Avenue between 48th and 49th Streets in the Borough Park section of Brooklyn, New York. Currently the subject site consists of twelve (12) 2-story medical office buildings.

The environmental conditions of the site known to date have been presented in the following reports:

3.0 Personnel Safety

Personnel involved in field activities must often make decisions regarding safety and, therefore, must be qualified personnel having technical judgment to evaluate a particular situation and determine the appropriate safety requirements.

3.1 Training and Medical Surveillance

All personnel will be trained to carry out their designated field activities. Training will be provided in the use of all equipment, including respiratory protection apparatus and protective clothing, safety practices and procedures, general safety requirements, and hazard recognition and evaluation. Pursuant to 29 CFR 1910.120, each individual involved in field activities potentially exposing them to hazardous substances and/or situations has been provided with 40-hours of OSHA HAZWOPER training as well as medical surveillance. The on-site Health and Safety Officer as well as supervisory and management personnel are required to have received 40-hours of OSHA HAZWOPER training and an additional 8-hours of OSHA HAZWOPER SUPERVISOR training in the enforcement of the health and safety program (See Appendix 1).

Each individual must be provided with a copy of this Construction Health and Safety Plan.

3.2 Health and Safety Manager

The Health and Safety Manager shall be responsible for overall implementation and coordination of the Health and Safety Program for field personnel at the site. Responsibilities include providing adequate staffing, materials, equipment, and time needed to safely accomplish the tasks under the site investigation. The Health and Safety Manager is also responsible for evaluating and taking appropriate corrective actions when unsafe acts or practices arise. The Health and Safety Manager is Chunyuan Li (646-380-1939) of Sustainable Management LLC.

3.3 Site Health and Safety Officer

A designated individual(s) will perform the function of the project Site Health and Safety Officer (SHSO). The SHSO will be responsible for the following:

1. Assuring that all personnel protective equipment is available and properly utilized by all field personnel at the site.
2. Assuring that all personnel are familiar with standard operating safety procedures and additional instructions contained in the Health and Safety Plan.
3. Assuring that all personnel are aware of the hazards associated with the field operations.
4. Conducting and documenting daily site safety briefings for field personnel.
5. Inspecting and documenting the site for hazards before field operations.
6. Conducting daily work area inspections to determine the effectiveness of the site CHASP and identify and correct unsafe conditions in the responsible work area.
7. Determining personal protection levels including clothing and equipment for personnel and periodic inspection of protective clothing and equipment.
8. Monitoring of site conditions prior to initiation of field activities, and at various intervals during on-going operations as deemed necessary for any changes in site hazard conditions. Monitoring parameters include, but are not limited to, volatile

- organic contaminant levels in the atmosphere, chemical hazard information, and weather conditions.
9. Executing decontamination procedures.
 10. Monitoring the work parties for signs of stress such as cold exposure, heat stress, or fatigue.
 11. Prepare reports pertaining to incidents resulting in physical injuries or exposure to hazardous materials.

The project Site Health and Safety Officer (SHSO) is Chunyuan Li (646-380-1939) of Sustainable Management LLC. The SHSO may designate another qualified employee as an alternate SHSO. All designees will be familiar with all aspects of the CHASP and their responsibilities.

4.0 Levels of Protection

Anyone entering the site must be protected against potential hazards. The purpose of the personal protection clothing and equipment is to minimize exposure to hazards while working on site. Careful selection and use of adequate PPE should protect the respiratory system, skin, eyes, face, hands, feet, head, body and hearing of all personnel.

The appropriate level of protection is determined prior to the initial entry on site based on available information and preliminary monitoring of the site. Subsequent information may warrant changes in the original level selected. Appropriate equipment to protect personnel against exposure to known or anticipated chemical hazards has been divided into four categories (Levels A, B, C and D) according to the degree of protection afforded (highest protection to least protection).

The following subsections provide a general overview of the various levels of personal protection and their generic requirements associated with each (Level A, B, C and D), that are available for potential use during hazardous waste operations. Determination of the site specific levels of protection, and the rationale for selection is described in section 6.0 of this CHASP.

4.1 Level A Protection

The highest degree of protection is used in a Level A situation. It should be worn when the highest available level of respiratory, skin and eye protection is needed. This level of protection is placed in effect when there is no historic information about the site and it is assumed that the worst possible conditions exist.

4.1.1 Personal Protective Equipment

- a. Pressure demand, self-contained breathing apparatus, approved by the Occupational Safety and Health Administration (OSHA) and National Institute of Occupational Safety and Health (NIOSH).
- b. Fully encapsulating chemical-resistant suit.
- c. Coveralls*.
- d. Long cotton underwear*.
- e. Gloves (outer), chemical-resistant.
- f. Gloves (inner), chemical-resistant.

- g. Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, work over or under suit boot.)
 - h. Hard hat (under suit), as required based on potential for head injuries.
 - i. Disposable protective suit, gloves and boots* (worn over fully-encapsulating suit).
 - j. Two-way radio communications (intrinsically safe).
- *Optional

4.1.2 Criteria for Selection

Meeting any of the criteria listed below warrants use of Level A protection:

- a. The chemical substance(s) has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on:
 - (1) Measured (or potential for) high concentrations of atmospheric vapors, gases or particulates; or
 - (2) Site operations and work functions involving high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates.
- b. Extremely hazardous substances are known or suspected to be present and skin contact is possible.
- c. The potential exists for contact with substances that destroy skin.
- d. Operations must be conducted in confined, poorly ventilated areas until the absence of hazards requiring Level A protection is demonstrated.
- e. An oxygen deficient atmosphere where the oxygen level is less than 20.9 percent (%) by volume as measured with an oxygen meter. This condition, existing alone, could result in down grade to Level B PPE.
- f. Total atmospheric concentrations on a photoionization detector or other monitoring instrument indicate readings above 500 parts per million (ppm) of unidentified substances.

4.1.3 Limiting Criteria

Fully encapsulating suit material must be compatible with the substances involved.

4.1.4 Minimum Decontamination Procedure

- Station 1: Segregated equipment drop.
- Station 2: Outer garment, boots and gloves wash and rinse.
- Station 3: Outer boot and glove removal.
- Station 4: Oxygen tank change.
- Station 5: Boots, gloves and outer garment removal.
- Station 6: SCBA removal.
- Station 7: Field wash.

4.2 Level B Protection

Level B protection will be used by on-site field personnel if the conditions outlined in section 4.2.2 are encountered.

4.2.1 Personal Protective Equipment

- a. Pressure demand, self-contained breathing apparatus or cascade supplied air system (OSHA/NIOSH approved).
 - b. Chemical-resistant clothing (coveralls and long-sleeved jacketed, coveralls, hooded, one or two-piece chemical splash suit, disposable chemical-resistant coveralls).
 - c. Coveralls*.
 - d. Gloves (outer), chemical-resistant.
 - e. Gloves (inner), chemical-resistant.
 - f. Boots, chemical-resistant, steel toe and shank.
 - g. Boots (outer), chemical resistant (disposable*).
 - h. Hard hat must be worn in the vicinity of all heavy equipment and during situations or activities that may pose a potential for head injuries. Face shields must be worn where there is a splash hazard.
 - i. Two-way radio communications (intrinsically safe).
- *Optional

4.2.2 Criteria for Selection

Meeting any of the criteria listed below warrants use of Level B protection:

- a. The type(s) and atmospheric concentration(s) of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection than is required with Level A. These would be atmospheres:
 - (1) With concentrations immediately dangerous to life and health (IDLH); or
 - (2) Exceeding limits of protection afforded by a full-face air-purifying mask; or
 - (3) Containing substances for which air-purifying canisters do not exist or have low removal efficiency; and/or
 - (4) Containing substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.
- b. The atmosphere contains less than 20.9% oxygen.
- c. Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.
- d. Total atmospheric concentrations in the breathing zone of unidentified vapors or gases range from 50 ppm to 500 ppm on a photoionization detector or other monitoring instrument, and vapors are not suspected of containing high levels of chemicals toxic to skin.

4.2.3 Limiting Criteria

- a. Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through skin contact.
- b. Use only when it is highly unlikely that the work being done will generate high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.

4.2.4 Minimum Decontamination Procedure

- Station 1: Equipment drop.
- Station 2: Outer garment, boots and gloves wash and rinse.
- Station 3: Outer boot and glove removal.
- Station 4: Oxygen tank change.
- Station 5: Boots, gloves and outer garment removal.
- Station 6: SCBA removal.
- Station 7: Field wash.

4.3 Level C Protection

Level C protection will be used by on-site field personnel if the conditions outlined in section 4.3.2 are encountered.

4.3.1 Personal Protective Equipment

- a. Full-face, air purifying, canister-equipped respirator (Mine Safety and Health Administration (MSHA) and NIOSH approved).
- b. Chemical-resistant clothing (coveralls, hooded, two-piece chemical splash suit, chemical-resistant hood and apron, disposable chemical-resistant coveralls).
- c. Coveralls*.
- d. Gloves, chemical-resistant.
- e. Boots, steel toe and shank.
- f. Boots (outer), chemical resistant (disposable*).
- g. Hard hat must be worn in the vicinity of all heavy equipment and during situations or activities that may pose a potential for head injuries. Face shields must be worn where there is a splash hazard.
- h. Escape mask, as may be required based on site hazards.

*Optional

4.3.2 Criteria for Selection

Meeting any of the criteria listed below warrants use of Level C protection:

- a. Measured air concentrations of identified substances will be reduced by the respirator to, at or below the substance's exposure limit, and the concentration is below the assigned protection factor of the respirator.
- b. Atmospheric contaminant concentrations do not exceed IDLH levels.
- c. Atmospheric contaminants, liquid splashes or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.
- d. Job functions have been determined not to require self-contained breathing apparatus.
- e. Total atmospheric concentrations of unidentified vapors range from 5 ppm to 50 ppm above background on a photoionization detector or other monitoring instrument. If Total atmospheric concentrations are greater than ½ Permissible Exposure Limit (PEL) of the primary contaminants of concern (identified in section 6.0) respiratory protection shall be required (Level C, B, or A).
- f. Air will be monitored periodically.

- g. Cartridges are available and are approved by NIOSH and MSHA for the specific chemical(s) encountered.

4.3.3 Limiting Criteria

- a. Atmospheric concentration of chemicals must not exceed IDLH levels.
- b. The atmosphere must contain at least 20.9 percent oxygen.
- c. Must have sufficient information available regarding specific compounds and their concentrations likely to be encountered.
- d. The contaminant concentrations as measured using a photoionization detector do not exceed the assigned protection factor of the respirator.

4.3.4 Minimum Decontamination Procedure

- Station 1: Equipment drop.
- Station 2: Outer boot and glove removal.
- Station 3: Canister or mask change.
- Station 4: Boots, gloves and outer garment removal.
- Station 5: Face piece removal.
- Station 6: Field wash.

4.4 Level D Protection

Level D protection will be used by all personnel if the conditions outlined in section 4.4.2 are encountered.

4.4.1 Personal Protective Equipment

- a. General work clothes or coveralls.
- b. Gloves.
- c. Boots/shoes, leather or chemical-resistant, steel toe and shank.
- d. Boots (outer), chemical resistant (disposable*).
- e. Safety glasses or chemical splash goggles when there is a splash hazard.*
- f. Hard hat must be worn in the vicinity of all heavy equipment and during situations or activities that may pose a potential for head injuries. Face shields must be worn where there is a splash hazard.

*Optional

4.4.2 Criteria for Selection

Meeting any of the criteria listed below allows the use of Level D protection:

- a. No hazardous air pollutants have been measured.
- b. Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.
- c. Extensive information on suspected hazards/risks are known.

4.4.3 Limiting Criteria

- a. The atmosphere must contain at least 20.9 percent oxygen.

- b. Total atmospheric concentrations of unidentified vapors or gases in the breathing zone are below established concentration levels on a photoionization detector or other monitoring instrument.

4.4.4 Minimum Decontamination Procedure

- Station 1: Equipment drop.
- Station 2: Hand and face wash.

4.5 Duration of Work Period

The anticipated duration of the work period will be established prior to daily activities. The work will only be performed during daylight hours. Other factors that may affect the length of time personnel may work include:

- a. Air supply consumption (However, SCBA assisted work – Level A and Level B is not anticipated);
- b. Suit/ensemble, air purifying chemical cartridge, permeation and penetration by chemical contaminants; and
- c. Ambient temperature and weather conditions.
- d. Contractual requirements.

4.5.1 Air Supply Consumption

The duration of the air supply must be considered before any SCBA-assisted work activity commences (However, SCBA assisted work – Level A and Level B is not anticipated). Although the anticipated operating time of an SCBA is clearly indicated on the breathing apparatus the following variables should be considered and work actions and operating time adjusted accordingly:

- Work Rate: The actual in-use duration of SCBAs may be reduced by one-third to one-half during strenuous work, e.g. drum handling, major lifting or any task requiring repetitive speed of motion.
- Fitness: Well conditioned individuals generally utilize oxygen more efficiently and can extract more oxygen from a given volume of air than unfit individuals, thereby slightly increasing the SCBA operating time.
- Body Size: Larger individuals generally consume air at a higher rate than smaller individuals, thereby decreasing the SCBA operating time.
- Breathing Patterns: Quick, shallow or irregular breaths consume air more rapidly than deep, regular spaced breaths. Heat induced anxiety and lack of acclimatization may induce hyperventilation, resulting in decreased SCBA operating times.

It is not anticipated that site conditions warranting use of SCBAs will be encountered during the field activities.

4.5.2 Suit/Ensemble, Air Purifying Chemical Cartridge, Permeation and Penetration

The possibility of chemical permeation or penetration of chemical protective clothing (CPC) ensembles and air purifying respirators (APR) chemical cartridges during the work period is always a matter of concern and may limit work period duration. No single clothing material is an effective barrier to all chemicals or all combinations of chemicals, and no material is an effective barrier to prolonged chemical exposure. Manufacturer recommendations should be followed.

In addition, when performing work in Level C respiratory protection, care shall be taken to inspect the respirators prior to usage. The chemical cartridges should be changed, at a minimum, on a daily basis, or when the cartridge becomes dirty, damaged or when breakthrough is suspected.

4.5.3 Ambient Temperature

The ambient temperature has a major influence on work period duration as it affects both the worker and the protective integrity of ensembles (see section 11.4.1) as well as the operation of the monitoring equipment. When ambient temperatures rise or fall to a level which may hinder personnel performance or becomes a threat to personal safety, consideration should be given to stop work and recommence work when temperatures or conditions are less severe.

5.0 Ambient Air Monitoring

The presence of volatile organic compounds (VOCs) will be evaluated using a photoionization detector (PID). Air monitoring shall be required during all intrusive activities (drilling of soil borings) being conducted on site. Ambient air quality monitoring will be performed continuously in the Work/Exclusion Zone and the Contamination Reduction Zone (see section 7.0).

PID measurements shall be recorded hourly if levels are within 5 ppm of the background concentration. If concentrations remain greater than 5 ppm above background in the breathing zone, an upgrade in respiratory protection will be warranted. For PID readings above 5 ppm of background levels, readings shall be recorded in 15 minute intervals or whenever a new high PID reading is encountered. In addition, periodic air monitoring will be conducted in the Support Zone. Readings taken with a PID will be recorded every hour.

The PID used for ambient air monitoring shall be calibrated at the start and finish of each workday. Calibration will be performed using Isobutylene gas in accordance with the manufacturer's requirements.

If necessary, the level of personal protection required will be upgraded based upon ambient air monitoring results.

6.0 Determination of the Site-Specific Level of Hazard and Level of Protection

Categories of personnel protection required depend on the degree of hazard and probability of exposure by a route of entry into the body. For this site, the potential routes of entry are via inhalation, ingestion and dermal adsorption of contaminants released from drilling of soil borings, soil and groundwater investigation and sampling activities.

Based upon information on the site generated to date, it is anticipated that Level D will be required for site activities. The determination of Level D protection is based on the fact that field work will be performed in open, well-ventilated areas and that the potential for accidents and injuries due to obstructions caused by and/or magnified by the use of level A, B, or C protection (i.e., slip/trip hazards) is greater than the potential for problems associated with potential exposure from suspected contaminants using Level D protection. Should conditions change, re-evaluation of personnel protection will be conducted.

The following PPE are required for Level D:

- General work clothes or coveralls.
- Gloves. Disposable chemical resistant gloves (neoprene, nitrile, etc.) are required during soil and groundwater sampling or other direct contact. Otherwise during other activities such as soil excavation with heavy equipment, leather gloves may be worn due to no chemical hazards.
- Boots/shoes, leather or chemical-resistant, steel toe and shank.
- Boots (outer), chemical-resistant (disposable) are optional; and may be worn if site conditions are wet or muddy.
- Safety glasses or chemical splash goggles are required when there is a splash hazard or hazard from flying debris.
- Hard hat must be worn in the vicinity of all heavy equipment and during situations or activities that may pose a potential for head injuries (suspended loads). Face shields must be worn when there is a splash hazard.
- High-visibility vests must be worn when working in high traffic areas.

A PID will be used to monitor air quality throughout the course of field work.

If PID readings recorded within the breathing zone during site activity are sustained at levels of 50 ppm above background concentrations, activities will be halted and the Work/Exclusion Zone will be evacuated. Monitoring of the Work/Exclusion Zone will continue until readings fall within 5 ppm of the background concentration. If concentrations are sustained at 5 ppm above background in the breathing zone, consideration will be given to upgrading the level of protection to Level C. An upgrade to the appropriate level of protection for field personnel will be required before re-entering the Work/Exclusion Zone. The Site Health and Safety Officer will be responsible for requesting an upgrade in the level of personnel protection. The final decision will be made by the Health and Safety Manager in conjunction with management personnel at Sustainable Management LLC and the appropriate regulatory authorities. Use of 50 ppm as the criteria for respiratory protection upgrade to Level C is conservative for this site since the OSHA Permissible Exposure Limits and ACGIH Threshold Limit Values for Leaded Gasoline and Heating Oil are 300 ppm and 400 ppm, respectively.

In addition to potential chemical hazards, there also exist potentially greater physical hazards associated with activities at the site. The excavation equipment and trucks will be on the site during the soil excavation. Therefore, all personnel should always be aware of vehicular traffic while working at the site. Further, hard hats must be worn at all times around heavy equipment and/or in the vicinity of suspended loads. All work must be performed in strict accordance with OSHA regulations.

7.0 Designated Work Zone

Work zones will be determined prior to commencement of field activities. An area large enough to encompass the activity will be demarcated as the Work/Exclusion Zone. If necessary, the Work/Exclusion Zone will be demarcated with temporary barriers. Only qualified field personnel with the proper PPE and training will be allowed into the designated zone. Within the Work/Exclusion Zone, ambient air quality will be periodically monitored using a PID to determine any changes from background air quality. If subsequent measurements suggest a significant change in air quality, the work area will be immediately evacuated. An upgrade to the appropriate level of PPE for field personnel will be required before re-entering the Work/Exclusion Zone.

8.0 Decontamination Stations

Decontamination stations will be located within the Contaminant Reduction Zone to be used for the cleaning of all heavy equipment, vehicles, tools and supplies required for completion of field activities. Personnel decontamination procedures for the appropriate levels of protection are described in section 4.0.

9.0 Site Access Control

Appropriate traffic controls (traffic cones and other barricades) will be used in areas of vehicular and pedestrian traffic to provide safe work areas for the protection of both field workers and the public.

10.0 Personal Hygiene

The following personal hygiene rules must be followed while performing work at the site:

- Eating, drinking, chewing gum or tobacco, smoking, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.
- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.
- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- No excessive facial hair (i.e. beards), which interferes with a satisfactory fit of the mask-to-face seal, is allowed on personnel required to wear respiratory protective equipment.
- Contact with contaminated or suspected contaminated surfaces will be avoided. Whenever possible, walking through puddles, mud and discolored surfaces,

kneeling on the ground, leaning, sitting or placing equipment on containers or vehicles, or the ground will be avoided.

- Medicine and alcohol can increase the effects from exposure to toxic chemicals. Prescribed drugs will not be taken by personnel on site where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage intake will be prohibited during all on-site field activities.

11.0 Contingency Plan

The Contingency Plan in section 11.0 has been developed to identify precautionary measures, possible emergency conditions, and emergency procedures. The Contingency Plan shall be implemented by the Site Health and Safety Officer (SHSO).

11.1 Emergency Medical Care and Treatment

Site specific emergency medical care and treatment of field personnel, resulting from possible exposures to toxic substances and injuries due to accidents is provided in Appendix 2. The requirements include:

- a. Name, address and telephone number of the nearest medical treatment facility will be conspicuously posted. Directions for locating the facility, plus the travel time will be readily available.
- b. Names and telephone numbers of ambulance service, police and fire departments, and procedures for obtaining these services will be conspicuously posted.
- c. Procedure for prompt notification of the Site Health and Safety Officer.

Material Safety Data Sheets for site related suspected contaminants (Leaded Gasoline, Heating Oil) and materials to be brought on site for calibration and lab preservation purposes (Isobutylene Gas, Hydrochloric Acid, Nitric Acid) are provided (see Appendix 3).

In addition, the following emergency equipment will be available at the site at all times when the field activities are being performed:

1. First aid equipment will be available on site for minor injuries.
2. Readily available dry-chemical fire extinguisher.

11.2 Off-Site Emergency Medical Care

The Site Health and Safety Officer shall pre-arrange for access to emergency medical care services at a convenient and readily accessible medical facility and establish emergency routes. The Site Health and Safety Officer shall establish emergency communications with emergency response services.

11.3 Personnel Accidents

Bodily injuries which occur as a result of an accident during the operation at the site will be handled in the following manner:

- a. First aid equipment will be available on site for minor injuries. If the injuries are not considered minor, proceed to the next step.
- b. The local paramedic unit, local hospital and the Site Health and Safety Officer shall be notified of the nature of the emergency.
- c. The injured employee shall be transported by an emergency vehicle to the local hospital.
- d. Contact the Site Health and Safety Officer and Health and Safety Manager and management personnel for Sustainable Management LLC and subcontractors.
- e. A written report shall be prepared by the Site Health and Safety Officer detailing the events and actions taken during the emergency within 24 hours of the accident.
- f. The Site Health and Safety Officer will conduct a safety meeting with site personnel prior to continuing field activities.

11.4 Personnel Exposure

In the event that any person is splashed or otherwise excessively contaminated by chemicals, the following procedure will be undertaken:

- a. Disposable clothing contaminated with observable amounts of chemicals residue is to be removed and replaced immediately.
- b. In the event of direct skin contact in Level D, the affected area is to be washed immediately with soap and water, or other solutions as directed by medical personnel.
- c. The Site Health and Safety Officer or other individuals who hold a current first aid certificate will determine the immediate course of action to be undertaken. This may involve using the first aid kit.

11.4.1 Weather

Adverse weather conditions are an important consideration in planning and conducting site operations. Hot or cold weather can cause physical discomfort, loss of efficiency, and personal injury. Of particular importance is heat stress resulting when protective clothing decreases natural body ventilation. One or more of the following will help reduce heat stress:

- a. Provide plenty of liquids. To replace body fluids (water and electrolytes) lost because of sweating, use a 0.1 percent salt water solution, more heavily salted foods, or commercial mixes.
- b. Provide cooling devices to aid natural body ventilation. These devices, however add weight, and their use should be balanced against worker efficiency. Long cotton underwear helps absorb moisture and protect the skin from direct contact with heat absorbent protective clothing.
- c. Install mobile showers and/or hose down facilities to reduce body temperature and cool protective clothing.
- d. In extremely hot weather, conduct operations in the early morning or evening.
- e. Ensure that adequate shelter is available to protect personnel against heat, cold, rain, snow, etc.
- f. In hot weather, rotate shifts of workers wearing impervious clothing.

11.4.2 Heat Stress

If field operations are conducted in the warm summer months, heat related fatigue will be closely monitored. Monitoring of personnel wearing impervious clothing or wearing respiratory protection shall commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or as slow recovery rates are indicated. When temperatures exceed 85 degrees Fahrenheit, workers should be monitored for heat stress after every work period. The following screening mechanism will be used to monitor for heat stress:

Heart Rate (HR) will be periodically measured by the radial pulse for 30 seconds during a resting period. The HR should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33 percent. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent.

Heat related illnesses range from heat fatigue to heat stroke, the most serious. Heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing may have to be cut off. Less serious forms of heat stress require prompt attention or they may lead to heat stroke. Unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately. Heat-related problems can be categorized as:

Heat Rash:	Caused by continuous exposure to hot and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.
Heat Cramps:	Caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: muscle spasm and pain in the extremities and abdomen.
Heat Exhaustion:	Caused by increased stress on various organs to meet increased demands to cool the body. Signs: shallow breathing, pale, cool moist skin, profuse sweating, dizziness, and lassitude.
Heat Stroke:	The most severe form of heat stress. The body must be cooled immediately to prevent severe injury and/or death. Signs and symptoms are: red, hot, dry skin, no perspiration, nausea, dizziness and confusion, strong rapid pulse, coma.

Some of the symptoms of heat stress are: hot dry skin, fever, nausea, cramps, red or spotted skin, confusion, lightheadedness, delirium, rapid pulse, convulsions and unconsciousness. For workers suffering from heat stress, the following actions should be taken:

1. Remove the victim to a cool area.
2. Loosen clothing.
3. Thoroughly soak the victim in cool water or apply cold compresses.
4. Call for medical assistance.

11.4.3 Cold Stress

If field operations are conducted in the cold winter months, cold stress will be monitored. Two factors that influence the development of cold injury: ambient temperature and the velocity of the

wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit air with a wind of 15 miles per hour is equivalent in chilling effect to still air at -18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 miles per hour (mph) increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is soaked with perspiration.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite usually affects feet, hands, nose, and ears. Frostbite of the extremities can be categorized as:

Frost Nip or

Incipient Frostbite: Characterized by sudden blanching or whitening of skin.

Superficial Frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

Deep Frostbite: Tissues are cold, pale and solid; extremely serious injury.

Hypothermia: Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperatures. Its symptoms are usually exhibited in five stages: (1) shivering; (2) apathy, listlessness, sleepiness, and sometimes rapid cooling of the body temperature to less than 95 degrees Fahrenheit; (3) unconsciousness, glassy stare, slow pulse and slow respiratory rate; (4) freezing of the extremities; and finally, (5) death.

When the ambient temperature is 36 degrees Fahrenheit or below, workers who are immersed in water or whose clothing becomes wet should immediately change to dry clothing and be treated for hypothermia. For workers suffering from the symptoms of cold injury, the following actions should be taken:

1. Remove the victim to a warm area.
2. Wrap victim in a coat or blanket.
3. Call for medical assistance.

11.5 Fire

The telephone number of the local fire department will be posted along with other emergency numbers conspicuously on-site at all times (see Appendix 2). In the event of a fire occurring at the site, the following actions will be undertaken, and generally initiated by the Site Health and Safety Officer:

- a) Evacuate all unnecessary personnel from the area of the fire and site, if necessary.
- b) Contact the local fire and police departments informing them of the fire and any injuries if they have occurred.

- c) Contact the local hospital of the possibility of fire victims.
- d) Contact the Site Health and Safety Officer and Health and Safety Manager and management personnel for Sustainable Management LLC and subcontractors.
- e) The Site Health and Safety Officer will conduct a safety meeting with site personnel prior to continuing field activities.

11.6 Personnel Protective Equipment Failure

If any site worker experiences a failure or alteration of PPE that affects the protection factor, that person shall immediately leave the Work/Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced to the satisfaction of the Site Health and Safety Officer.

11.7 Spill Prevention and Containment

Onsite personnel shall be adequately trained in the operation and maintenance of equipment used on the site. Equipment shall be inspected on a daily basis to minimize the potential for spillage of equipment related fluids. Personnel shall also be adequately trained to recognize and respond to a spill situation. Absorbent materials will be maintained on-site for potential spill containment and mitigation.

12.0 Summary

This CHASP has been prepared for performing field activities (soil excavation at the site).

The appropriate level of protection is determined prior to the initial entry on site based on available information and preliminary monitoring of the site. Subsequent information may warrant changes in the original level selected. There are no known contaminants of concern at the site. During the soil excavation, Volatile Organic Compounds (VOCs) and metals as shown in Section 2.0 above will be considered contaminants for the site. Material Safety Data Sheets for site related suspected contaminants and materials brought on site are provided. The routes of potential exposure include inhalation, ingestion, and adsorption through dermal contact.

All proposed work will be completed in Level D Personal Protective Equipment (PPE). The determination of Level D protection is based on the fact that field work will be performed in open, well-ventilated areas and that the potential for accidents and injuries due to obstructions caused by and/or magnified by the use of level A, B, or C protection (i.e., slip/trip hazards) is greater than the potential for problems associated with potential exposure from contaminants using Level D protection. Level D PPE includes:

- General work clothes or coveralls;
- Gloves. Disposable chemical resistant gloves (neoprene, nitrile, etc.) are required during soil and groundwater sampling or other direct contact. Otherwise during other activities such as soil excavation with heavy equipment, leather gloves may be worn due to no chemical hazards.
- Boots/shoes, leather or chemical-resistant, steel toe and shank.
- Boots (outer), chemical-resistant (disposable) are optional; and may be worn if site conditions are wet or muddy.

- Safety glasses or chemical splash goggles are required when there is a splash hazard or hazard from flying debris.
- Hard hat must be worn in the vicinity of all heavy equipment and during situations or activities that may pose a potential for head injuries (suspended loads). Face shields must be worn when there is a splash hazard.

Minimum decontamination procedures for Level D PPE include equipment removal and hand and face wash.

Ambient air will be monitored using a photoionization detector (PID) during any intrusive field activities (drilling of soil borings). If necessary, the level of personal protection required will be upgraded based upon ambient air monitoring results. PID measurements shall be recorded every hour, at a minimum, if readings are within 5 ppm of background levels. If PID readings deviate from within 5 ppm of background, the readings shall be recorded every 15 minutes or whenever a new PID reading is encountered. If PID readings are sustained at levels of 50 ppm above background concentrations, activities will be halted and the Work Zone will be evacuated. Monitoring of the Work Zone will continue until PID readings fall within 5 ppm of the background concentration and consideration will be given to upgrading to Level C PPE (air-purifying respirators).

In addition to potential chemical hazards, there also exist potentially greater physical hazards associated with activities at the site. All personnel should always be aware of vehicular traffic.

Hard hats, hearing protection, gloves, and steel-toed safety boots will be required during intrusive activities.

Pursuant to 29 CFR 1910.120, each individual involved in field activities potentially exposing them to hazardous substances and/or situations have received 40-hours of OSHA HAZWOPER training as well as medical surveillance. The Health and Safety Manager and Site Health and Safety Officer shall be responsible for overall implementation and coordination of the Health and Safety Program for field personnel at the site. The Health and Safety Manager is Chunyuan Li (646-380-1939) of Sustainable Management LLC. The Site Health and Safety Officer (SHSO) is Chunyuan Li (646-380-1939) of Sustainable Management LLC. If the Site Health and Safety Officer must leave the project site, he may designate another qualified employee as an alternate Site Health and Safety Officer.

The anticipated duration of the work period will be established prior to daily activities. The work will only be performed during daylight hours. Ambient temperature and weather conditions should also be considered. When ambient temperatures rise or fall to a level which may hinder personnel performance or becomes a threat to personal safety, consideration should be given to stop work and recommence work when temperatures or conditions are less severe.

The following personal hygiene rules must be followed while performing work at the site:

- Eating, drinking, chewing gum or tobacco, smoking, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.
- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- No excessive facial hair (i.e. beards), which interferes with a satisfactory fit of the mask-to-face seal, is allowed on personnel required to wear respiratory protective equipment.
- Contact with contaminated or suspected contaminated surfaces will be avoided. Whenever possible, walking through puddles, mud and discolored surfaces, kneeling on the ground, leaning, sitting or placing equipment on containers or vehicles, or the ground will be avoided.
- Medicine and alcohol can increase the effects from exposure to toxic chemicals. Prescribed drugs will not be taken by personnel on site where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage intake will be prohibited during all on-site field activities.

Emergency equipment including first aid equipment and a dry-chemical fire extinguisher will be available on site.

Site specific emergency contacts including a route map to the hospital are provided.

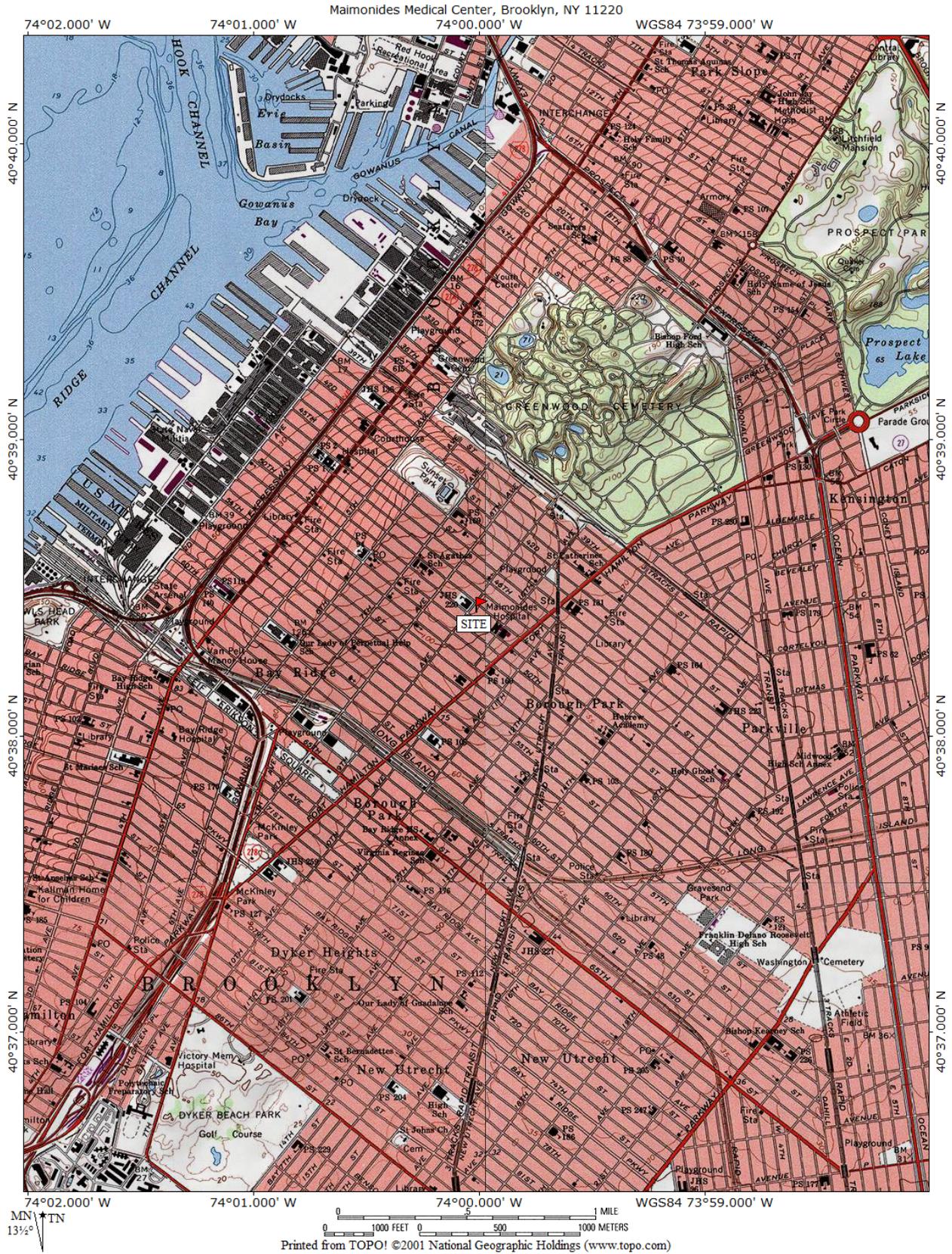


Figure 1 Site Location Map

<u>Existing Level of PPE</u>	<u>Monitoring Equipment</u>	<u>Concentration</u>	<u>Action</u>
Level D	Photoionization Detector	<5 ppm	Monitor once per 60 minutes
		5-50 ppm	Monitor once per 15 minutes
		> 50 ppm	Evacuate Work Zone Upgrade to Level C PPE

Appendix 1 Qualification



3980 Quebec St, 2nd Floor Denver, CO 80207-1633 800-711-2705

Student Affiliation:
Ethan C Eldon Associates, Inc
38229

Certificate of Completion

This is to certify that
Chunyuan Li
has been tested and successfully meets the training requirements for
40-Hour HAZWOPER
as per 29 CFR 1910.120(e)

Presented
Monday, August 15, 2011

Compliance Solutions Occupational Trainers, Inc.

Certificate Number: 754829713

Neval Gupta
Vice President

Jeffrey Kline
President/CEO



Student Affiliation:
Sustainable Management LLC
38220

Compliance Solutions
"Today's Training... Tomorrow's Solution"
3980 Quebec St., 2nd Floor, Denver CO 80207-1633 800-711-2706

Certificate of Completion

This is to certify that
Chunyuan Li
has been tested and successfully meets the training requirements for
8-Hour HAZWOPER Refresher
as per 29 CFR 1910.120(e)

Presented
Friday, June 28, 2013
Compliance Solutions Occupational Trainers, Inc.

Certificate Number: 754865206

(Signature)

Neval Gupta
Vice President

(Signature)

Jeffrey Kline
President



Student Affiliation:
Sustainable Management LLC
38229

Compliance Solutions
"Today's Training... Tomorrow's Solution"

3950 Quebec St., 2nd Floor, Denver CO 80207-1633 800-711-2706

Certificate of Completion

This is to certify that

Chunyuan Li

has been tested and successfully meets the training requirements for

***OSHA Site Supervisor
as per 29 CFR 1910.120***

Presented

Friday, June 14, 2013

Compliance Solutions Occupational Trainers, Inc.

Certificate Number: 754864778

Neval Gupta

**Neval Gupta
Vice President**

Jeffrey Kline

**Jeffrey Kline
President**

Appendix 2 Emergency Response Information

Emergency Telephone Numbers

Ambulance.....911

Police.....911

Non-emergency (66th Precinct at 5822 16th Avenue)..... (718)851-5611

Fire.....911

Maimonides Medical Center (718)283-7362

Alternate Hospital:

Maimonides Medical (347)750-6706

New York State Department of Environmental Conservation (NYSDEC).(718)482-4900

NYSDEC Spill Hotline.....(800)457-7362

NYSDOH Chemical Exposure Information Line.....(800)458-1158

New York City Department of Environmental Protection (NYCDEP).....(718)595-4820

NYCDEP Office of Environmental Planning and Assessment.....(718)595-4536

Sustainable Management LLC.....(646)380-1940

Ethan Eldon (cell) (emergency only)(516)220-0072

Chunyuan Li (cell) (emergency only)(646)981-8786

Hospital Location and Directions

Primary Hospital Location and Directions

Maimonides Medical Center

Emergency Service

4806 Fort Hamilton Parkway

Brooklyn, NY11219

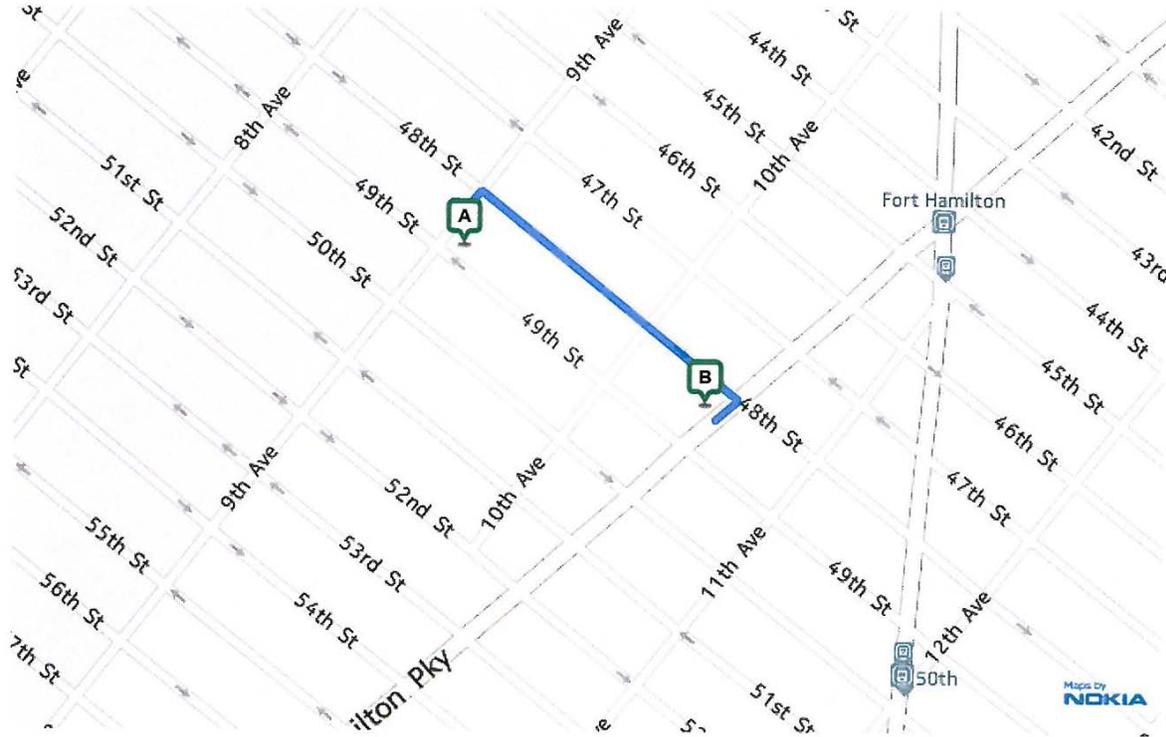
The hospital location map is attached. Directions are presented in the following:



A 903 49th St, Brooklyn, NY 11219-2923

B 4804 Fort Hamilton Pky, Brooklyn, NY 11219

Total Distance: 0.28 miles — Total Time: 1 min



A 903 49th St, Brooklyn, NY 11219-2923

1. Head toward 48th St on 9th Ave. Go for 154 ft.
2. Turn right onto 48th St. Go for 0.2 mi.
3. Turn right onto Fort Hamilton Pky. Go for 111 ft.
4. Your destination on Fort Hamilton Pky is on the right. The trip takes 0.3 mi and 1 min.

B 4804 Fort Hamilton Pky, Brooklyn, NY 11219

When using any driving directions or map, it is a good idea to double check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning

Alternate Hospital Location and Directions

Maimonides Medical

850 9th Avenue

Brooklyn, NY 11220

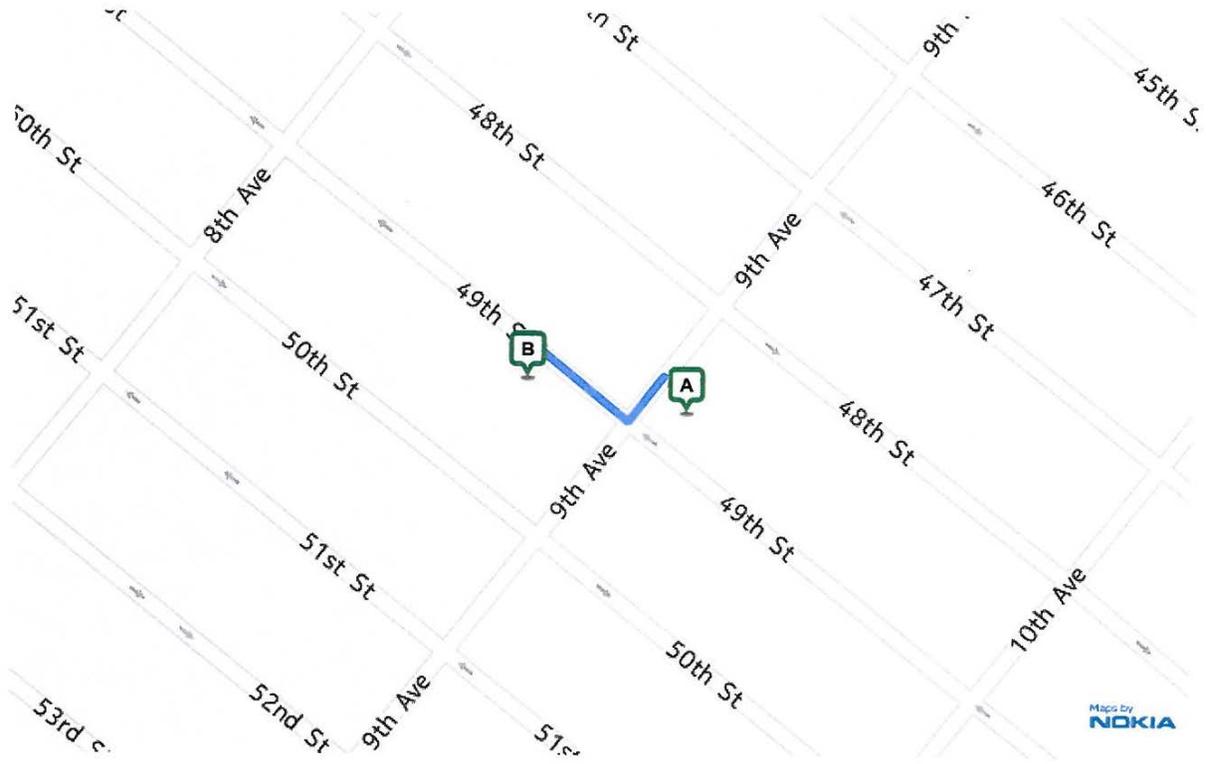
The hospital location map is attached. Directions are presented in the following:

YAHOO! MAPS

A 903 49th St, Brooklyn, NY 11219-2923

B 850 49th St, Brooklyn, NY 11220-2422

Total Distance: 0.06 miles — Total Time: less than 1 min



A 903 49th St, Brooklyn, NY 11219-2923

1. Head toward 49th St on 9th Ave. Go for 98 ft.
2. Turn right onto 49th St. Go for 200 ft.
3. Your destination on 49th St is on the left. The trip takes 298 ft and less than 1 min.

B 850 49th St, Brooklyn, NY 11220-2422

When using any driving directions or map, it is a good idea to double check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning

Appendix 3 Material Safety Data Sheets

MSDS Sheets Provided (in order)

1,4-Dioxane
MTBE
Benzene
Xylenes
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
1,2,4-Trimethylbenzene
Anthracene
Chrysene
Benzo(a)pyrene
Acenaphthene
Fluoranthene
Pyrene
Diesel Fuel
#2 Fuel Oil
#6 Fuel Oil
Hydraulic Oil
Naphthalene
Benzo(g,h,i)perylene
Phenanthrene
Isobutylene
Hydrochloric Acid
Nitric Acid
Alpha-BHC
Lindane
Beta-BHC
Aldrin
Heptachlor
Delta-BHC
Endosulfan I
Dieldrin
Endrin
4,4'-DDD
4,4'-DDE
Endosulfan II
Endrin Aldehyde
4,4'-DDT
Endosulfan Sulfate
Methoxychlor
Endrin Ketone
Chlordane
Camphechlor
Polychlorinated Biphenyls

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Copper
Iron
Lead
Manganese
Mercury
Nickel
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc



Material Safety Data Sheet

12601 Twinbrook Parkway
Rockville, MD 20852 USA

Telephone calls: (301) 881-0666
8:00am - 5:00pm EST Mon. - Fri.

Responsible Party: Reference Standards Technical Services

ATTENTION !

USP Reference Standards are sold for chemical test and assay purposes only, and NOT for human consumption. The information contained herein is applicable solely to the chemical substance when used as a USP Reference Standard and does not necessarily relate to any other use of the substance described, (i.e. at different concentrations, in drug dosage forms, or in bulk quantities). USP Reference Standards are intended for use by persons having technical skill and at their own discretion and risk. This information has been developed by USP staff from sources considered reliable but has not been independently verified by the USP. Therefore, the USP Convention cannot guarantee the accuracy of the information in these sources nor should the statements contained herein be considered an official expression. NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE is made with respect to the information contained herein.

RESIDUAL SOLVENT CLASS 2 - 1,4-DIOXANE

Catalog Number: 1601521

Package Size: See label

Revision Date:

October 7, 2003

This reference standard contains 1,4-dioxane in dimethyl sulfoxide (DMSO). The mixture has not been tested to determine specific physical hazards, but it is considered potentially combustible. DMSO is an irritant and is rapidly absorbed through the skin. It may carry dissolved chemicals into the body through this route. 1,4-Dioxane is an irritant and possible carcinogen.

SECTION 1 - IDENTIFICATION

Common Name: 1,4-Dioxane **Formula:** C₄H₈O₂ (1,4-Dioxane); C₂H₆OS (DMSO)
Synonym: Diethylene dioxide; diethylene ether; p-dioxane
Chemical Name: 1,4-Dioxane in dimethyl sulfoxide
CAS Number: 123-91-1 (1,4-Dioxane); 67-68-5 (DMSO) **RTECS Number:** JG8225000 (1,4-Dioxane); PV6210000 (DMSO)
Chemical Family: Heterocyclic compounds (1,4-Dioxane)
Therapeutic Category: Residual solvent

SECTION 2 - INGREDIENT INFORMATION

<u>Principle Components</u>	<u>Percent</u>	<u>Exposure Limits</u>
1,4-Dioxane	0.1900%	OSHA: TWA 100 ppm (skin) NIOSH: CL 1 ppm (30 min.); IDLH 500 ppm ACGIH: TWA 20 ppm (skin)
Dimethyl sulfoxide	99.81%	n/f

SECTION 3 - HEALTH HAZARD INFORMATION

Usual Adult Dose: n/f

RESIDUAL SOLVENT CLASS 2 - 1,4-DIOXANE

Catalog Number: 1601521

Package Size: See label

Revision Date:

October 7, 2003

Firefighting Procedures: As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.

SECTION 7 - PHYSICAL HAZARDS

Conditions to Avoid: Avoid exposure to light.

Incompatibilities: n/f

Decomposition Products: When heated to decomposition material emits toxic fumes. Emits toxic fumes under fire conditions.

Stable? Yes **Hazardous Polymerization?** No

SECTION 8 - HANDLING / SPILL / DISPOSAL MEASURES

Handling: As a general rule, when handling USP Reference Standards avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Wash thoroughly after handling.

Storage: Store in tight, light-resistant container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

Spill Response: Wear approved respiratory protection, chemically compatible gloves and protective clothing. Ventilate spill site. Wipe up spillage. Avoid breathing vapors. Place spillage in appropriately labelled container for disposal. Wash spill site. Place spillage and all contaminated cleanup materials in a thick plastic hazardous waste disposal bag or leakproof container and label it CAUTION: HAZARDOUS CHEMICAL WASTE.

Disposal: Place material in a thick plastic hazardous waste disposal bag or leakproof container and label it CAUTION: HAZARDOUS CHEMICAL WASTE. Dispose of waste in accordance with all applicable Federal, State and local laws.

SECTION 9 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory Protection: Use a NIOSH approved respirator, if it is determined to be necessary by an industrial hygiene survey involving air monitoring.

Ventilation: Recommended.

Gloves: Chemically compatible

Eye Protection: Safety Goggles

Protective Clothing: Protect exposed skin.

SECTION 10 - PHYSICAL AND CHEMICAL PROPERTIES

NOTE: The data reported below is general information, and is not specific to the USP Reference Standard Lot provided!

Appearance and Odor: Clear liquid.

Melting Point: n/f

Solubility in Water: n/f

Boiling Point: n/f

Specific Gravity: n/f

Vapor Pressure: n/f

Vapor Density: n/f

Evaporation Rate: n/f

Reactivity in Water: n/f

% Volatile by Volume: n/f

2-METHOXY-2-METHYL PROPANE

ICSC: 1164

2-METHOXY-2-METHYL PROPANE
 tert-Butyl methyl ether
 Methyl tert-butyl ether
 MTBE
 $(\text{CH}_3)_3\text{COCH}_3$
 Molecular mass: 88.2

CAS # 1634-04-4
 RTECS # KN5250000
 ICSC # 1164
 UN # 2398

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidants.	Water spray. Alcohol-resistant foam. Carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion.	Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
• INHALATION	Cough. Dizziness. Unconsciousness. Weakness.	Ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Dizziness. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe	Fireproof. Separated from strong oxidants, strong acids. Keep in a well-ventilated room.	UN Haz Class: 3 UN Pack Group: II	

place. Do NOT wash away into sewer. Use self-contained breathing apparatus in the case of large spills.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1164

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

2-METHOXY-2-METHYL PROPANE

ICSC: 1164

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: The vapour is heavier than air and may travel along the ground; distant ignition possible. The vapour mixes well with air, explosive mixtures are easily formed. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p>CHEMICAL DANGERS: Reacts violently with strong oxidants causing fire hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK:</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of high concentrations of vapour may cause irritation of respiratory tract. Exposure to high concentrations could cause lowering of consciousness.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</p>
	PHYSICAL PROPERTIES	<p>Boiling point: 55°C Melting point: -109°C Relative density (water = 1): 0.7 Solubility in water, g/100 ml: 4.8 Solubility in water: 6.9% by volume Vapour pressure, kPa at 25°C: 32.7</p>
ENVIRONMENTAL DATA		
NOTES		
<p>Other explosive limits: 1.6-8.4 volume %. Much less likely to form peroxides than other ethers.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-30G30</p>		
ADDITIONAL INFORMATION		

ICSC: 1164

2-METHOXY-2-METHYL PROPANE

© IPCS, CEC, 1993

**IMPORTANT
LEGAL
NOTICE:**

Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

International Chemical Safety Cards

BENZENE

ICSC: 0015

BENZENE
Cyclohexatriene
Benzol
C₆H₆
Molecular mass: 78.1

CAS # 71-43-2
RTECS # CY1400000
ICSC # 0015
UN # 1114
EC # 601-020-00-8

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion: see chemical dangers.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION	Dizziness. Drowsiness. Headache. Nausea. Shortness of breath. Convulsions. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	MAY BE ABSORBED! Dry skin (further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• EYES		face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Sore throat. Vomiting (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Fireproof. Separated from food and feedstuffs, oxidants and halogens.	Do not transport with food and feedstuffs. F symbol T symbol R: 45-11-48/23/24/25 S: 53-45 UN Hazard Class: 3 UN Packing Group: II
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0015		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

BENZENE

ICSC: 0015

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: The vapour is heavier than air and may travel along the ground; distant ignition possible.</p> <p>CHEMICAL DANGERS: Reacts violently with oxidants and halogens causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: 10 ppm; 32 mg/m³ (as TWA) A2 (ACGIH 1991-1992).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and through the skin.</p> <p>INHALATION RISK: A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersion, however, much faster.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure far above the occupational exposure limit may result in unconsciousness.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The liquid defats the skin. The substance may have effects on the blood forming organs, liver and immune system. This substance is carcinogenic to humans.</p>
PHYSICAL PROPERTIES	<p>Boiling point: 80°C Melting point: 6°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 25°C: 0.18</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: -11°C (c.c.)°C Auto-ignition temperature: about 500°C</p>

	Vapour pressure, kPa at 20°C: 10 Relative vapour density (air = 1): 2.7	Explosive limits, vol% in air: 1.2-8.0 Octanol/water partition coefficient as log Pow: 2.13
ENVIRONMENTAL DATA		
NOTES		
Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.		
Transport Emergency Card: TEC (R)-7 NFPA Code: H2; F3; R0;		
ADDITIONAL INFORMATION		
ICSC: 0015 BENZENE		
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IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

GENERAL CHEMICAL CORPORATION -- XYLENES (VARIOUS GRADES) -- 6810-01-031-9532

=====
Product Identification
=====

Product ID:XYLENES (VARIOUS GRADES)
MSDS Date:09/01/1986
FSC:6810
NIIN:01-031-9532
MSDS Number: BGFZY
=== Responsible Party ===
Company Name:GENERAL CHEMICAL CORPORATION
Address:90 E HALSEY RD
Box:395
City:PARSIPPANY
State:NJ
ZIP:07054
Country:US
Info Phone Num:800-631-8050
Emergency Phone Num:800-631-8050
CAGE:0AU44

=== Contractor Identification ===
Company Name:GENERAL CHEMICAL CORPORATION
Address:90 EAST HALSEY ROAD
Box:City:PARSIPPANY
State:NJ
ZIP:07054
Country:US
Phone:973-515-1840
CAGE:0AU44

=====
Composition/Information on Ingredients
=====

Ingred Name:XYLENES (O-,M-,P- ISOMERS) (SARA III)
CAS:1330-20-7
RTECS #:ZE2100000
Fraction by Wt: 100%
OSHA PEL:100 PPM/150 STEL
ACGIH TLV:100 PPM/150STEL;9192
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

=====
Hazards Identification
=====

LD50 LC50 Mixture:ORAL RAT LD50 IS 5000 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:INHALING CAUSES CNS DEPRESSION. MILD EXPOSURES CAUSE DIZZINESS, WEAKNESS, HEADACHE, NAUSEA. MORE SEVERE EXPOSURES MAY CAUSE RESPIRATORY DEPRESSION UNCONSCIOUSNESS, CONVULSIONS, AND DEATH. INGESTION CA USES BURNING SENSATION IN MOUTH AND STOMACH.CAUSES IRRITAION TO SKIN; MAY CAUSE DERMATITIS. EYE IRRITATION/CORNEAL BURNS
Explanation of Carcinogenicity:NONE OF THE COMPOUNDS IN THIS PRODUCT IS LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.
Effects of Overexposure:SEE HEALTH HAZARDS
Medical Cond Aggravated by Exposure:PERSONS WITH A HISTORY OF AILMENTS

OR WITH A PRE-EXISTING DISEASE INVOLVING THE EYES, SKIN, OR
RESPIRATORY TRACT MAY BE AT INCREASED RISK FROM EXPOSURE.

=====
===== First Aid Measures =====

First Aid:INHALATION:REMOVE TO FRESH AIR. RESUSCITATE IF NOT BREATHING.
GET MEDICAL ATTENTION. EYES:IMMEDIATELY FLUSH WITH PLENTY OF WATER
FOR 15 MINUTES HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.
SKIN:REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER. IF
IRRITATION PERSISTS, GET MEDICAL ADVICE. INGESTION:DO NOT INDUCE
VOMITING. GIVE NOTHING BY MOUTH IF UNCONSCIOUS. GET IMMEDIATE
MEDICAL ATTENTION.

=====
===== Fire Fighting Measures =====

Flash Point Method:CC
Flash Point:84.2F,29.0C
Autoignition Temp:Autoignition Temp Text:868F
Lower Limits:1
Upper Limits:7
Extinguishing Media:USE CARBON DIOXIDE, "ALCOHOL" FOAM, OR DRY
CHEMICAL.
Fire Fighting Procedures:FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA &
FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER
SPRAY TO COOL NEARBY CONTAINERS EXPOSED TO FIRE.
Unusual Fire/Explosion Hazard:VAPOR MAY TRAVEL A CONSIDERABLE DISTANCE
TO A SOURCE OF IGNITION AND FLASH BACK. EXPLOSION MAY RESULT IF
VAPORS ARE IGNITED IN A CONFINED AREA.

=====
===== Accidental Release Measures =====

Spill Release Procedures:SM SPL: TAKE UP WITH SAND, OR OTHER NONCOMB.
ABSORB MATL THEN FLUSH AREA WITH H*20. SM DRY SPL: SHOVEL INTO DRY
CONTRS, THEN FLUSH AREA W/H*20.LG SPLS:DIKE FAR AHEAD OF SPL FOR
LATER DISPOSAL. NO CONT ACT W/SPILLED MATL. STOP LK.ELIM IGN
SOURCES.
Neutralizing Agent:NOT APPLICABLE.

=====
===== Handling and Storage =====

Handling and Storage Precautions:CONTAINERS SHOULD BE GROUNDED WHEN
TRANSFERRING CONTENTS. KEEP AWAY FROM SPARKS, OPEN FLAMES AND
IGNITION SOURCES. USE WITH ADEQUATE VENTILATION.
Other Precautions:AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. REMOVE
CONTAMINATED CLOTHING, LAUNDRER BEFORE REUSE. WASH SKIN THOROUGHLY
WITH SOAP AND WATER AFTER CONTACT.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE HYDROCARBON VAPOR CANISTER OR SUPPLIED-AIR
RESPIRATORY PROTECTION IN CONFINED OR ENCLOSED SPACES IF NEEDED.
Ventilation:LOCAL EXHAUST: FACE VELOCITY >50 FPM. MECHANICAL: USE
EXPLOSION-PROOF EQUIPMENT. USE WITH ADEQUATE VENTILATION.
Protective Gloves:CHEMICAL RESISTANT
Eye Protection:SAFETY GOGGLES WITH OPTIONAL FACE SHIELD
Other Protective Equipment:EYE WASH STATION AND SAFETY SHOWER.
INDUSTRIAL-TYPE WORK CLOTHING AND APRON AS REQUIRED.

Work Hygienic Practices:OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES. DO NOT WEAR CONTAMINATED CLOTHING OR FOOTWEAR.

Supplemental Safety and Health
AVOID PROLONGED OR REPEATED EXPOSURE. DO NOT GET ON SKIN OR IN EYES. DO NOT BREATHE VAPORS OR MISTS.

===== Physical/Chemical Properties =====

HCC:F3
Boiling Pt:B.P. Text:279F,137C
Melt/Freeze Pt:M.P/F.P Text:118F,48C
Vapor Pres:7.9
Vapor Density:3.7
Spec Gravity:0.865
pH:7
Evaporation Rate & Reference:9.2 (ETHER=1)
Solubility in Water:NEGLIGIBLE
Appearance and Odor:CLEAR, COLORLESS LIQUID WITH CHARACTERISTIC AROMATIC ODOR.
Percent Volatiles by Volume:100

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS, INCLUDING HALOGENS, LIQUID AIR AND NITRO COMPOUNDS.
Hazardous Decomposition Products:SHOULD EXPECT AT LEAST CO2 AND TOXIC VAPORS AND GASES, SUCH AS CARBON MONOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL SHOULD BE MADE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.

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International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

<p>BENZ(a)ANTHRACENE 1,2-Benzoanthracene Benzo(a)anthracene 2,3-Benzphenanthrene Naphthanthracene $C_{18}H_{12}$ Molecular mass: 228.3</p> <p>CAS # 56-55-3 RTECS # CV9275000 ICSC # 0385 EC # 601-033-00-9</p>

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles, face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	

Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Well closed.	T symbol R: 45 S: 53-45
SEE IMPORTANT INFORMATION ON BACK		
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International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW-BROWN FLUORESCENT FLAKES OR POWDER.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS:</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is probably carcinogenic to humans.</p>
PHYSICAL PROPERTIES	Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274	Solubility in water: none Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61
ENVIRONMENTAL DATA	In the food chain important to humans, bioaccumulation takes place, specifically in seafood.	

NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name.

ADDITIONAL INFORMATION

ICSC: 0385

BENZ(a)ANTHRACENE

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**IMPORTANT
LEGAL
NOTICE:**

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International Chemical Safety Cards

BENZO(B)FLUORANTHENE

ICSC: 0720

BENZO(B)FLUORANTHENE
Benzo(e)acephenanthrylene
2,3-Benzofluoroanthene
C₂₀H₁₂
Molecular mass: 252.3

CAS # 205-99-2
RTECS # CU1400000
ICSC # 0720

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Wear protective gloves when inducing vomiting. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe	Provision to contain effluent from fire extinguishing. Tightly closed.	Unbreakable packaging; put breakable packaging into closed unbreakable container.	

place. Do NOT let this chemical enter the environment.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

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International Chemical Safety Cards

BENZO(B)FLUORANTHENE

ICSC: 0720

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Melting point: 168°C Solubility in water: none	Vapour pressure, Pa at 20°C: <10 Octanol/water partition coefficient as log Pow: 6.04
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.	
NOTES		
Depending on the degree of exposure, periodic medical examination is indicated. Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home.		
ADDITIONAL INFORMATION		
ICSC: 0720	BENZO(B)FLUORANTHENE	
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International Chemical Safety Cards

BENZO(K)FLUORANTHENE

ICSC: 0721

<p>BENZO(K)FLUOROANTHENE 11,12-Benzofluoroanthene Dibenzo(b,j,k)fluorene $C_{20}H_{12}$ Molecular mass: 252.3</p> <p>CAS # 207-08-9 RTECS # DF6350000 ICSC # 0721</p>
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TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• EYES		Safety goggles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Wear protective gloves when inducing vomiting. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical	Provision to contain effluent from fire extinguishing. Separated from strong oxidants. Tightly closed.		

enter the environment.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0721

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International Chemical Safety Cards

BENZO(K)FLUORANTHENE

ICSC: 0721

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: YELLOW CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts with strong oxidants.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 215.7°C	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.	
NOTES		
Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home.		
ADDITIONAL INFORMATION		
ICSC: 0721	BENZO(K)FLUORANTHENE	
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Material Safety Data Sheet

1,2,4-Trimethylbenzene, 98%

ACC# 73581

Section 1 - Chemical Product and Company Identification

MSDS Name: 1,2,4-Trimethylbenzene, 98%

Catalog Numbers: AC140090000, AC140090010, AC140090025, AC140095000

Synonyms: Asymmetrical trimethylbenzene; Benzene, 1,2,5-trimethyl-; psi-Cumene; Pseudocumene; Pseudocumol; as-Trimethylbenzene.

Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
95-63-6	1,2,4-Trimethylbenzene	98	202-436-9

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless clear liquid. Flash Point: 44 deg C.

Warning! Flammable liquid and vapor. Causes eye, skin, and respiratory tract irritation. Harmful if inhaled. May cause blood abnormalities. May cause central nervous system effects.

Target Organs: Blood, central nervous system, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation.

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system depression.

Inhalation: May cause drowsiness, unconsciousness, and central nervous system depression. Causes irritation of the mucous membrane and upper respiratory tract. Individuals exposed to a solvent containing a mixture of trimethylbenzenes have complained of nervousness, tension, anxiety, and asthmatic bronchitis. In addition, the peripheral blood showed a tendency to hypochromic anemia and a deviation from normal in the coagulability of the blood. Contamination of the solvent with benzene was probably responsible for the blood effects.

Chronic: Prolonged or repeated skin contact may cause dermatitis. Repeated inhalation

may cause chronic bronchitis. May cause anemia and other blood cell abnormalities. Prolonged exposure may produce a narcotic effect. Prolonged or repeated exposure may cause nausea, dizziness, and headache. Laboratory experiments have resulted in mutagenic effects.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.

Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained. Do NOT use straight streams of water.

Flash Point: 44 deg C (111.20 deg F)

Autoignition Temperature: 500 deg C (932.00 deg F)

Explosion Limits, Lower:0.9 vol %

Upper: 6.4 vol %

NFPA Rating: (estimated) Health: 1; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways.

Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor or mist.

Storage: Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2,4-Trimethylbenzene	25 ppm TWA (listed under Trimethyl benzene).	25 ppm TWA; 125 mg/m ³ TWA	none listed

OSHA Vacated PELs: 1,2,4-Trimethylbenzene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid

Appearance: colorless

Odor: aromatic odor

pH: Not available.

Vapor Pressure: 2.1 mm Hg @ 25 deg C

Vapor Density: 4.15 (air=1)

Evaporation Rate: Not available.

Viscosity: Not available.
Boiling Point: 168 deg C @ 760 mm Hg
Freezing/Melting Point: -43.8 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density: 0.88 g/cm³
Molecular Formula: C₉H₁₂
Molecular Weight: 120.19

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 95-63-6: DC3325000
LD50/LC50:
CAS# 95-63-6:
Inhalation, rat: LC50 = 18000 mg/m³/4H;
Oral, mouse: LD50 = 6900 mg/kg;
Oral, rat: LD50 = 5 gm/kg;

Carcinogenicity:
CAS# 95-63-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Workers exposed to a mixture of trimethylbenzenes at up to 60 ppm experienced CNS changes, asthmatic bronchitis, and blood dyscrasias. Contamination of the solvent with benzene was probably responsible for the blood abnormalities.

Teratogenicity: No information found

Reproductive Effects: No information found

Mutagenicity: Sister Chromatid Exchange: Intraperitoneal, mouse = 900 mg/kg.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 77.2 mg/L; 96 Hr; Flow-through at 25 C (pH 7.24) Estimated Koc value = 720. 1,2,4-trimethylbenzene will have low mobility in soil. Volatilization from moist and dry soil surfaces is expected to occur. 1,2,4-Trimethylbenzene

is expected to aerobically biodegrade in both soil and water. Anaerobic aquifer microcosms did not show significant biodegradation in comparison to poisoned controls. In water, 1,2,4-trimethylbenzene may adsorb to sediment or particulate matter.

Environmental: Bioconcentration in aquatic organisms is moderate to high based on BCF values of 31-275, measured in carp. 1,2,4-Trimethylbenzene is expected to photodegrade in natural waters. If released to the atmosphere, 1,2,4-trimethylbenzene will exist solely in the vapor phase in the ambient atmosphere. Vapor-phase 1,2,4-trimethylbenzene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals and nitrate radicals with half-lives of about 12 hours and 6-30 days, respectively.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	FLAMMABLE LIQUIDS, N.O.S. (1,2,4-Trimethylbenzene)	No information available.
Hazard Class:	3	
UN Number:	UN1993	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 95-63-6 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 95-63-6: Effective 4/29/83, Sunset 4/29/93

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 95-63-6: immediate, delayed, fire.

Section 313

This material contains 1,2,4-Trimethylbenzene (CAS# 95-63-6, 98%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 95-63-6 can be found on the following state right to know lists: California, (listed as Trimethyl benzene), New Jersey, Pennsylvania, Minnesota, (listed as Trimethyl benzene), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN N

Risk Phrases:

R 10 Flammable.

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 20 Harmful by inhalation.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 95-63-6: 3

Canada - DSL/NDSL

CAS# 95-63-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B3.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those

regulations.

Canadian Ingredient Disclosure List

CAS# 95-63-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS	Creation	Date:	5/19/1999
Revision	#4	Date:	3/22/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been

International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

ANTHRACENE
Anthracin
Paranaphthalene
Molecular mass: 178.2

CAS # 120-12-7
RTECS # CA9350000
ICSC # 0825

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• INHALATION	Cough. Laboured breathing. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
• EYES	Redness. Pain.	Safety goggles, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Separated from strong oxidants, strong acids. Tightly closed. Cool.		

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0825

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: WHITE CRYSTALS OR FLAKES.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: The substance decomposes on heating, on contact with sunlight, under influence of strong oxidants producing acrid, toxic fume, causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established. PDK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes, the skin, the respiratory tract and the gastrointestinal tract.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact may cause skin sensitization.</p>
	PHYSICAL PROPERTIES	<p>Boiling point: 342°C Melting point: 218°C Relative density (water = 1): 1.25 Solubility in water: none Relative vapour density (air = 1): 6.15</p>
ENVIRONMENTAL DATA	<p>This substance may be hazardous to the environment; special attention should be given to soil and air. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms and plants.</p>	
NOTES		
<p>Do NOT take working clothes home. Green oil, Tetraolive are trade names.</p> <p align="right">NFPA Code: H0; F1; R;</p>		
ADDITIONAL INFORMATION		
ICSC: 0825		ANTHRACENE
© IPCS, CEC, 1993		

MERCK FROSST CANADA INC -- CHRYSENE, MD-402 -- 6810-00N034847

=====
Product Identification
=====

Product ID:CHRYSENE, MD-402
MSDS Date:03/25/1986
FSC:6810
NIIN:00N034847
MSDS Number: BQFQC
=== Responsible Party ===
Company Name:MERCK FROSST CANADA INC
Box:899
City:POINT CLAIRE-DORVAL, QUEBEC, CANADA
Info Phone Num:800-325-9034;514-697-2823
Emergency Phone Num:800-325-9034;514-697-2823
CAGE:09578
=== Contractor Identification ===
Company Name:MERCK FROSST CANADA INC
Box:City:POINTE CLAIRE-DORVAL, QUEBEC, CANADA
State:PQ
Country:US
Phone:800-325-9034; 514-697-2823
CAGE:09578

=====
Composition/Information on Ingredients
=====

Ingred Name:CHRYSENE (PEL LIMIT FROM COAL TAR PITCH VOLITILES) (SARA
III)
CAS:218-01-9
RTECS #:GC0700000
Fraction by Wt: >99%
OSHA PEL:0.2 PPM
ACGIH TLV:A2 9394
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

=====
Hazards Identification
=====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:CANCER SUSPECT AGENT; IRRITATION,
PULMONARY EDEMA, SENSITIZER, DERMATITIS, DIZZINESS, NAUSEA,
CONVULSIONS, KIDNEY AND LIVER DAMAGE.
Explanation of Carcinogenicity:NOT RELEVANT
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====
First Aid Measures
=====

First Aid:SKIN: WASH WITH WATER. INHAL: REMOVE TO FRESH AIR, ARTIFICIAL
RESPIRATION OR OXYGEN IF NECESSARY. INGEST: GIVE WATER AND INDUCE
VOMITING. MEDICAL ASSISTANCE FOR GASTRIC LAVAGE. EYES: IMMEDIATELY FLUSH
WITH POTABLE WATER FOR A MINIMUM OF 15 MIN. SEEK ASSISTANCE FROM
MD .

=====
Fire Fighting Measures
=====

Extinguishing Media:CO*2, DRY CHEMICAL, ALCOHOL FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:CANCER SUSPECT.

===== Accidental Release Measures =====

Spill Release Procedures:PROVIDE ADEQUATE VENTILATION. CAREFULLY SCOOP
UP AND TRANSFER TO A CLOSED CONTAINER.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:ADEQUATE VENTILATION. PROTECT FROM
LIGHT. AVOID ALL CONTACT.
Other Precautions:NONE SPECIFIED BY MANUFACTURER.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED SCBA.
Ventilation:LOCAL EXHAUST: STRONG FUMEHOOD. SPECIAL: CANCER SUSPECT;
AVOID ALL CONTACT.
Protective Gloves:RUBBER GLOVES.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Other Protective Equipment:PROTECTIVE CLOTHING. PROVIDE SAFETY SHOWERS
AND EYEWASH STATION NEAR WORKPLACE.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
% VOLATILE: SUBLIMES.

===== Physical/Chemical Properties =====

HCC:N1
Boiling Pt:B.P. Text:838F,448C
Melt/Freeze Pt:M.P/F.P Text:489F,254C
Spec Gravity:1.27
Solubility in Water:<0.1 %
Appearance and Odor:WHITE-PALE YELLOW SOLID
Percent Volatiles by Volume:SUPDAT

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:CO/CO*2 ON COMBUSTION

===== Disposal Considerations =====

Waste Disposal Methods:VIA LICENSED DISPOSAL COMPANY. DISPOSE OF
ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

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Material Safety Data Sheet

Benzo[a]pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[a]pyrene, 98%

Catalog Numbers: AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000 AC377201000

Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.

Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown powder.

Danger! May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Cancer hazard. May cause allergic skin reaction. May cause heritable genetic damage.

Target Organs: Reproductive system, skin.

Potential Health Effects

Eye: May cause eye irritation.

Skin: May cause skin irritation. May be harmful if absorbed through the skin. May cause an allergic reaction in certain individuals.

Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.

Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.

Chronic: May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Flash Point: Not available.

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[a]pyrene	0.2 mg/m ³ TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m ³ TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m ³ IDLH (listed under Coal tar pitches).	0.2 mg/m ³ TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder

Appearance: yellow to brown

Odor: faint aromatic odor

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate:Not available.

Viscosity: Not available.

Boiling Point: 495 deg C @ 760 mm Hg

Freezing/Melting Point:175 - 179 deg C

Decomposition Temperature:Not available.

Solubility: 1.60x10⁻³ mg/l @25°C

Specific Gravity/Density:Not available.

Molecular Formula:C₂₀H₁₂

Molecular Weight:252.31

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Dust generation.

Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 50-32-8: DJ3675000
LD50/LC50:
Not available.

Carcinogenicity:

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found

Teratogenicity: No information found

Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.

Mutagenicity: Mutagenic effects have occurred in humans. Mutagenic effects have occurred in experimental animals.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
Hazard Class:		9
UN Number:		UN3077
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 50-32-8 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 50-32-8: immediate, delayed.

Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

- R 43 May cause sensitization by skin contact.
- R 45 May cause cancer.
- R 46 May cause heritable genetic damage.
- R 60 May impair fertility.
- R 61 May cause harm to the unborn child.
- R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

- S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S 53 Avoid exposure - obtain special instructions before use.
- S 60 This material and its container must be disposed of as hazardous waste.
- S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 50-32-8: No information available.

Canada - DSL/NDSL

CAS# 50-32-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997

Revision #7 Date: 6/30/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Acenaphthene, 99%

ACC# 07491

Section 1 - Chemical Product and Company Identification

MSDS Name: Acenaphthene, 99%

Catalog Numbers: AC201340000, AC201341000

Synonyms:

Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
83-32-9	Acenaphthene	99	201-469-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: brown powder and chunks.

Warning! Causes eye, skin, and respiratory tract irritation.

Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation. May be harmful if absorbed through the skin.

Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.

Inhalation: Causes respiratory tract irritation. May be harmful if inhaled.

Chronic: Not available.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Get medical aid. Wash mouth out with water.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing,

give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: 135 deg C (275.00 deg F)
Autoignition Temperature: Not available.
Explosion Limits, Lower:Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container.

Section 7 - Handling and Storage

Handling: Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes.
Storage: Avoid contact with skin and eyes. Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Acenaphthene	none listed	none listed	none listed

OSHA Vacated PELs: Acenaphthene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Powder and chunks

Appearance: brown

Odor: Not available.

pH: Not available.

Vapor Pressure: 10 mm Hg @ 131 deg C

Vapor Density: 5.32

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 279 deg C @ 760 mmHg

Freezing/Melting Point: 91 - 95 deg C

Decomposition Temperature: Not available.

Solubility: Not available.

Specific Gravity/Density: 1.1890g/cm³

Molecular Formula: C₁₂H₁₀

Molecular Weight: 154.21

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: High temperatures, incompatible materials.

Incompatibilities with Other Materials: Strong oxidizing agents, alkaline earth metals.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 83-32-9: AB1000000

LD50/LC50:

Not available.

Carcinogenicity:

CAS# 83-32-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.

Teratogenicity: No data available.

Reproductive Effects: No data available.

Mutagenicity: No data available.

Neurotoxicity: No data available.

Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 83-32-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 83-32-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 83-32-9: immediate.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 83-32-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 83-32-9: No information available.

Canada - DSL/NDSL

CAS# 83-32-9 is listed on Canada's DSL List.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 83-32-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 5/10/1999

Revision #2 Date: 10/08/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third

party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Fluoranthene, 98%

ACC# 80991

Section 1 - Chemical Product and Company Identification

MSDS Name: Fluoranthene, 98%

Catalog Numbers: AC119170000, AC119170250, AC119171000, AC119175000

Synonyms: 1,2-(1,8-Naphthalenediyl)benzene; 1,2-(1,8-Naphthylene)benzene; 1,2-Benzacenaphthene; Benzene, 1,2-(1,8-naphthylene)-; Benzo(j,k)fluorene; Benzo(jk)fluoranthene; Benzo(jk)fluorene

Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
206-44-0	Fluoranthene	98	205-912-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow needles.

Caution! Harmful. Causes eye and skin irritation and possible burns. May be harmful if absorbed through the skin. May be harmful if swallowed. May cause heart and liver injury.

Target Organs: Heart, liver, lungs.

Potential Health Effects

Eye: Causes eye irritation and possible burns.

Skin: May be harmful if absorbed through the skin. Causes severe skin irritation and possible burns.

Ingestion: May be harmful if swallowed. May cause rapid heartbeat and cardiac arrhythmias. May cause liver injury, pulmonary edema, and respiratory arrest. May cause gastrointestinal disturbances such as nausea.

Inhalation: May cause effects similar to those described for ingestion. May produce cardiac failure and pulmonary edema.

Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes.

Ingestion: Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

Flash Point: Not applicable.

Autoignition Temperature: Not applicable.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood. Do not breathe dust.

Storage: Keep containers tightly closed. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Fluoranthene	none listed	none listed	none listed

OSHA Vacated PELs: Fluoranthene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves and clothing to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Needles

Appearance: yellow

Odor: None reported.

pH: Not available.

Vapor Pressure: 0.01 mm Hg @ 20 deg C

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 384 deg C @ 760.00mmHg

Freezing/Melting Point: 107.00 - 110.00 deg C

Decomposition Temperature: Not available.

Solubility: insoluble

Specific Gravity/Density: 1.252 g/cm³

Molecular Formula: C₁₆H₁₀

Molecular Weight: 202.25

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, strong oxidants.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, acrid smoke and fumes.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 206-44-0: LL4025000

LD50/LC50:

CAS# 206-44-0:

Oral, rat: LD50 = 2 gm/kg;

Skin, rabbit: LD50 = 3180 mg/kg;

Carcinogenicity:

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: IARC Group 3: Limited or insufficient evidence for carcinogenicity in both animals and humans. Experimental tumorigenic data has been reported.

Teratogenicity: No information found

Reproductive Effects: No information found

Mutagenicity: Mutation in microorganisms: Salmonella typhimurium = 5ug/plate. Mutation in mammalian somatic cells: Human Lymphocyte = 2 umol/L.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Bluegill/Sunfish: 3980 um/L; 96 H; (not specified) No data available.

Environmental: Remains in the upper few cm of soil, but can be transported to groundwater. Biodegrades from soil in a few years. Will not volatilize from soil or water. Rapidly absorbed to sediment and particulates and will readily bioconcentrate. Unadsorbed substance in water will degrade by photolysis in a days to weeks. Stable in sediment for decades or more. In the atmosphere, photodegrades with half life of 4 - 5 days, but may transport long distances without settling or raining out.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 206-44-0: waste number U120.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information**US FEDERAL****TSCA**

CAS# 206-44-0 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 206-44-0: immediate.

Section 313

This material contains Fluoranthene (CAS# 206-44-0, 98%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 21/22 Harmful in contact with skin and if swallowed.

Safety Phrases:

S 22 Do not breathe dust.

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 206-44-0: No information available.

Canada - DSL/NDSL

CAS# 206-44-0 is listed on Canada's NDSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997

Revision #6 Date: 3/15/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Pyrene, ca 96%

ACC# 96675

Section 1 - Chemical Product and Company Identification

MSDS Name: Pyrene, ca 96%

Catalog Numbers: AC157650000, AC157651000, AC157655000

Synonyms: Benzo[def]phenanthrene

Company Identification:

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
129-00-0	Pyrene	ca. 96.0	204-927-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow powder.

Danger! Cancer hazard. May be fatal if inhaled. Causes respiratory tract irritation. Causes skin irritation. May be harmful if swallowed. May cause eye irritation. May cause cancer based on animal studies. The toxicological properties of this material have not been fully investigated.

Target Organs: None known.

Potential Health Effects

Eye: May cause eye irritation.

Skin: Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. Dermal applications may cause hyperemia (an excess of blood in a part), weight loss, and hematopoietic changes.

Ingestion: May cause digestive tract disturbances. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.

Inhalation: May be fatal if inhaled. Causes respiratory tract irritation. Inhalation of dust may cause respiratory tract irritation.

Chronic: May cause cancer according to animal studies. Chronic effects may include leukocytosis and lengthened chronaxy of the leg muscle flexors.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Use foam, dry chemical, or carbon dioxide.

Flash Point: 210 deg C (410.00 deg F)

Autoignition Temperature: Not available.

Explosion Limits, Lower:Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 1; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Pyrene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Powder

Appearance: yellow

Odor: None reported.

pH: Not available.

Vapor Pressure: < 1 mm Hg @20C

Vapor Density: Not available.

Evaporation Rate:Not available.

Viscosity: Not available.

Boiling Point: 404 deg C @ 760.00mmHg

Freezing/Melting Point:156 deg C

Decomposition Temperature:Not available.

Solubility: 1.271

Specific Gravity/Density:Not available.

Molecular Formula:C16H10

Molecular Weight:202.25

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, dust generation.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, acrid smoke and fumes.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 129-00-0: UR2450000; UR2450100

LD50/LC50:

CAS# 129-00-0:

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, rat: LC50 = 170 mg/m³;

Inhalation, rat: LC50 = 170 mg/m³;

Oral, mouse: LD50 = 800 mg/kg;

Oral, rat: LD50 = 2700 mg/kg;

Carcinogenicity:

CAS# 129-00-0:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found

Teratogenicity: TDLo(skin, mouse) = 10 gm/kg/3W-I; Skin and Appendages - tumors

Reproductive Effects: No information found

Mutagenicity: Mutation in microorganisms(Salmonella typhimurium) = 5

ug/plate
Unscheduled DNA synthesis(Human Fibroblast) = 100 mg/L
Sister chromatid

exchange(Human Lymphocyte) = 100 umol/L

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea Daphnia: EC50 = 1.8 mg/L; 48 Hr.; Unspecified No data available.

Environmental: If pyrene is released to soil, it will be expected to adsorb very strongly to the soil and will not be expected to leach to the groundwater. If released to water, pyrene will be expected to adsorb very strongly to sediments and particulate matter. It will not hydrolyze but may undergo slight to moderate bioconcentration.

Physical: No information available.

Other: Reported BCF: rainbow trout, 72; goldfish, 457; fathead minnow, 600-970. Based on these values, minimal to moderate bioconcentration of pyrene in aquatic organisms would be expected.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 129-00-0 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 129-00-0: 1000 lb TPQ (lower threshold); 10000 lb TPQ (upper threshold)

SARA Codes

CAS # 129-00-0: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 129-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations**European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

Risk Phrases:

R 45 May cause cancer.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 129-00-0: No information available.

Canada - DSL/NDSL

CAS# 129-00-0 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1A, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 129-00-0 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/21/1999

Revision #3 Date: 10/03/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

PHIBRO ENERGY USA, INC. -- DIESEL FUEL -- 9140-00-000-0184

=====
===== Product Identification =====

Product ID:DIESEL FUEL
MSDS Date:01/31/1994
FSC:9140
NIIN:00-000-0184
MSDS Number: BVGFN
=== Responsible Party ===
Company Name:PHIBRO ENERGY USA, INC.
Address:500 DALLAS AVE, SUITE 3200
City:HOUSTON
State:TX
ZIP:77002
Country:US
Info Phone Num:713-646-5135
Emergency Phone Num:713-923-6641, CHEMTREC 800-424-9300
Preparer's Name:SUE BOTTOM
CAGE:0V310
=== Contractor Identification ===
Company Name:PHIBRO ENERGY USA INC
Address:500 DALLAS AVE SUITE 3200
Box:City:HOUSTON
State:TX
ZIP:77002
Country:US
Phone:713-923-6641, CHEMTREC800-424-9300
CAGE:0V310

=====
===== Composition/Information on Ingredients =====

Ingred Name:PETROLEUM DISTILLATE, ALIPHATIC AND AROMATIC HYDROCARBONS
(VARYING FROM C9 TO C20), CONTAING ALSO INGREDIENT #2 TO 7.

Fraction by Wt: BALANCE
Other REC Limits:NONE SPECIFIED
OSHA PEL:400 PPM NAPHTHA TWA

Ingred Name:N-OCTANE
CAS:111-65-9
RTECS #:RG8400000
Fraction by Wt: <1-2%
Other REC Limits:NONE SPECIFIED
OSHA PEL:300 PPM TWA 1989
ACGIH TLV:300 PPM/375STEL;9394

Ingred Name:N-NONANE
CAS:111-84-2
RTECS #:RA6115000
Fraction by Wt: <1-3%
Other REC Limits:NONE SPECIFIED
OSHA PEL:200 PPM
ACGIH TLV:200 PPM; 9192

Ingred Name:NAPHTHALENE (SARA III)
CAS:91-20-3
RTECS #:QJ0525000

Fraction by Wt: <1-3%
Other REC Limits:NONE RECOMMENDED
OSHA PEL:10 PPM
ACGIH TLV:10 PPM/15 STEL; 9394
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

Ingred Name:HEXANE ISOMERS (OTHER THAN N-HEXANE)
Fraction by Wt: <1-3%
Other REC Limits:NONE RECOMMENDED
OSHA PEL:500 PPM
ACGIH TLV:500 PPM

Ingred Name:N-HEXANE
CAS:110-54-3
RTECS #:MN9275000
Fraction by Wt: <1-2%
Other REC Limits:NONE RECOMMENDED
OSHA PEL:50 PPM 1989
ACGIH TLV:50 PPM; 9394
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:N-HEPTANE
CAS:142-82-5
RTECS #:MI7700000
Fraction by Wt: <1-2%
Other REC Limits:NONE RECOMMENDED
OSHA PEL:400 PPM TWA 1989
ACGIH TLV:400 PPM/500STEL;9394

Ingred Name:HYDROGEN SULFIDE (SARA III)
CAS:7783-06-4
RTECS #:MX1225000
Other REC Limits:NONE RECOMMENDED
OSHA PEL:C, 20 PPM
ACGIH TLV:10 PPM/15 STEL; 9394
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

=====
===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE-INHALATION:CNS EFFECTS,
RESPIRATORY IRRITATION. EYES:SEVERE IRRITATION. INGESTION:HARMFUL
OR FATAL, IRRITATION OF GI TRACT. ASPIRATION INTO THE LUNGS CAN
CAUSE SEVERE CHEMICAL PNEUMONITIS, WHICH CAN BE FATAL.
SKIN:REPEATED EXPOSURE MAY CAUSE IRRITATION. CHRONIC:DERMATITIS.
TARGET ORGANS:SKIN, LUNG, CNS.
Explanation of Carcinogenicity:PER NIOSH BULLETIN 50 A POTENTIAL
OCCUPATIONAL CARCINOGENIC HAZARD EXISTS DUE TO HUMAN EXPOSURE TO
DIESEL EXHAUST.
Effects of Overexposure:EYE:IRRITATION, REDNESS, TEARING, BLURRED
VISION, CONJUNCTIVITIS. SKIN:IRRITATION, DRYNESS, REDNESS, ITCHING.
INHAL:HEADACHE, DIZZINESS, DROWZINESS, NAUSEA, VOMITNING, TREMORS,
CONVULSIONS, IRREGULAR H EART BEAT. INGESTION: G/I IRRITATION AND

SYMPTOMS SIMILAR TO INHALATION.

Medical Cond Aggravated by Exposure:EYE, SKIN, HEART, CNS, AND
RESPIRATORY DISORDERS MAY BE AGGARAVATED BY OVEREXPOSURE.

=====
===== First Aid Measures =====

First Aid:SKIN:REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER.
GET MEDICAL ATTENTION IF IRRITATION PERSISTS. INHALATION:REMOVE TO
FRESH AIR & RESTORE BREATHING IF NECESSARY. GET MEDICAL ATTENTION.
EYE:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES WHILE HOLDING
EYELIDS OPEN. GET MEDICAL ATTENTION. INGESTION:GET IMMEDIATE
MEDICAL ATTENTION. DO NOT INDUCE VOMITING. NOTHING BY MOUTH IF
UNCONSCIOUS.

=====
===== Fire Fighting Measures =====

Flash Point:125F,52C
Lower Limits:0.4%
Upper Limits:8.0%
Extinguishing Media:CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.
Fire Fighting Procedures:EVACUATE AREA. USE NIOSH APPROVED SCBA & FULL
PROTECTIVE EQUIPMENT TO FIGHT FIRE. USE WATER SPRAY TO COOL EXPOSED
CONTAINERS. DIRECT WATER SPRAY MAY SPREAD FIRE
Unusual Fire/Explosion Hazard:VAPORS ARE HEAVIER THAN AIR AND MAY
TRAVEL ALONG GROUND OR FLOOR, THEN 'FLASH BACK' FROM A DISTANT
IGNITION SOURCE. TOXIC FUMES & GASES ARE PRODUCED BY FIRE.

=====
===== Accidental Release Measures =====

Spill Release Procedures:EVACUATE AREA. WEAR PROTECTIVE EQUIPMENT. SHUT
OFF SOURCE IF POSSIBLE & CONTAIN SPILL. REMOVE IGNITION SOURCES.
KEEP OUT OF WATER RESOURCES AND SEWERS. ABSORB IN INERT MATERIAL OR
RECOVER BY PUMPING. TRANSFER TO DISPOSAL DRUMS.
Neutralizing Agent:NONE

=====
===== Handling and Storage =====

Handling and Storage Precautions:KEEP AWAY FROM HEAT, SPARKS, FLAME.
STORE IN WELL VENTILATED AREA. GROUND CONTAINERS DURING TRANSFER.
STORE IN CLOSED CONTAINER.
Other Precautions:EMPTY CONTAINERS RETAIN RESIDUE. DO NOT PRESSURIZE,
CUT, WELD OR EXPOSE TO HEAT, FLAME, STATIC ELECTRICITY, OR OTHER
SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:FOR CONCENTRATIONS EXCEEDING RECOMMENDED LEVEL,
USE NIOSH/MSHA APPROVED AIR PURIFYING RESPIRATOR. FOR SPILL OR IF
CONCENTRATION IS UNKNOWN, USE NIOSH/MSHA SUPPLIED AIR RESPIRATOR OR
SCBA.
Ventilation:GENERAL OR MECHANICAL
Protective Gloves:NEOPRENE OR NITRILE
Eye Protection:SAFETY GLASSES OR CHEMICAL SPLASH GOGGLE
Other Protective Equipment:PROTECTIVE GARMENTS TO PREVENT SKIN CONTACT.
Work Hygienic Practices:DO NOT EAT, DRINK OR SMOKE WHILE WORKING WITH
THIS PRODUCT.
Supplemental Safety and Health

DANGER! UNTREATED PRODUCT MAY CONTAIN OR RELEASE HYDROGEN SULFIDE. H2S IS A HIGHLY TOXIC AND FLAMMABLE GAS WHICH CAN BE FATAL IF INHALED AT CERTAIN CONCENTRATION.

===== Physical/Chemical Properties =====

HCC:F4
NRC/State Lic Num:NONE
Boiling Pt:B.P. Text:325F,163C
Vapor Pres:<0.1 PSI
Vapor Density:3-7
Spec Gravity:0.84 - 0.93
Viscosity:8 CST @ -4F
Solubility in Water:NEGLIGIBLE
Appearance and Odor:CLEAR TO STRAW COLORED LIQUID, KEROSENE ODOR.
Percent Volatiles by Volume:NEGLIG

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS, STRONG ACIDS, CAUSTICS AND HALOGENS.
Stability Condition to Avoid:OPEN FLAMES, SOURCES OF IGNITION, STATIC ELECTRICITY.
Hazardous Decomposition Products:CARBON MONOXIDE, CARBON DIOXIDE AND REACTIVE HYDROCARBONS (LDEHYDES, AROMATICS, ETC) COMPOUNDS.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

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MARATHON OIL CO -- #2 FUEL OIL -- 9140-00-247-4360

=====
Product Identification
=====

Product ID:#2 FUEL OIL
MSDS Date:05/16/1990
FSC:9140
NIIN:00-247-4360
MSDS Number: BPHHW
=== Responsible Party ===
Company Name:MARATHON OIL CO
Address:539 SOUTH MAIN STREET
City:FINDLEY
State:OH
ZIP:45840-3229
Country:US
Info Phone Num:419-422-2121
Emergency Phone Num:419-422-2121, CHEMTREC 800-424-9300
Preparer's Name:CRAIG M. PARKER
CAGE:16106
=== Contractor Identification ===
Company Name:MARATHON OIL CO
Address:539 SOUTH MAIN STREET
Box:City:FINDLEY
State:OH
ZIP:45840-3229
Country:US
Phone:419-422-2121, CHEMTREC 800-424-9300
CAGE:16106
Company Name:PAPCO OIL COMPANY LUBRICANTS
Address:4920 SOUTHERN BLVD.
Box:City:VIRGINIA BEACH
State:VA
ZIP:23462
Country:US
Phone:499-6977/872-0600
CAGE:2R096

=====
Composition/Information on Ingredients
=====

Ingred Name:SATURATED HYDROCARBONS
Fraction by Wt: 54-85%
Other REC Limits:NONE SPECIFIED

Ingred Name:UNSATURATED HYDROCARBONS
Fraction by Wt: 1-6%
Other REC Limits:NONE SPECIFIED

Ingred Name:AROMATIC HYDROCARBON
CAS:68333-88-0
Fraction by Wt: 15-45%
Other REC Limits:NONE SPECIFIED

=====
Hazards Identification
=====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:EYE-SLIGHT EYE IRRITATION. SKIN-SEVERE IRRITATION OR DERMATITIS. INGESTION-ASPIRATION (BREATHING) OF VOMITUS INTO LUNGS MUST BE AVOIDED AS EVEN SMALL QUANTITIES IN THE LUNGS CAN PRODUCE CHEMICAL PNEUMONITIS AND PULMONARY EDEMA/HEMORRHAGE.

Explanation of Carcinogenicity:NONE SPECIFIED BY MANUFACTURER.

Effects of Overexposure:SKIN-DEFATTING AND DRYING OF THE SKIN.

INHALATION-HIGH VAPOR CONCENTRATIONS MAY PRODUCE HEADACHE, GIDDINESS, VERTIGO AND ANESTHETIC STUPOR. INGESTION-MAY RESULT IN NAUSEA, VOMITING, DIARRHEA AND RESTLESSNESS.

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====
===== First Aid Measures =====

First Aid:SKIN: REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. INHALATION: REMOVE TO FRESH AIR & RESTORE BREATHING IF NECESSARY. GET MEDICAL ATTENTION. EYE : IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION. INGESTION: GET IMMEDIATE MEDICAL ATTENTION. DO NOT INDUCE VOMITING. NOTHING BY MOUTH IF UNCONSCIOUS.

=====
===== Fire Fighting Measures =====

Flash Point Method:TCC

Flash Point:130F,54C

Autoignition Temp:Autoignition Temp Text:494F

Lower Limits:0.7%

Upper Limits:5.0%

Extinguishing Media:USE HALON, CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.

FIRE FIGHTING SHOULD BE DONE ONLY BY ADEQUATELY TRAINED PERSONNEL.

Fire Fighting Procedures:AVOID USE OF SOLID WATER STREAMS. AVOID EXCESSIVE WATER SPRAY APPLICATION. WATER CAN BE USED TO COOL EXPOSED SURFACES.

Unusual Fire/Explosion Hazard:COMBUSTION OR HEAT OF FIRE MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS.

=====
===== Accidental Release Measures =====

Spill Release Procedures:KEEP PUBLIC AWAY. SHUT OFF SOURCE OF LEAK WITHOUT HAZARD. ELIMINATE IGNITION SOURCES. CONTAIN LIQUID WITH SAND OR SOIL. RECOVER AND RETURN FREE LIQUID TO SOURCE.USE SUITABLE SORBENT TO CLEAN UP RESIDUAL LIQUIDS.

=====
===== Handling and Storage =====

Handling and Storage Precautions:AVOID STORAGE NEAR OPEN FLAME OR OTHER SOURCES OF IGNITION, AND STRONG OXIDANTS. KEEP CONTAINERS CLOSED.

Other Precautions:EMPTY CONTAINERS RETAIN RESIDUE. DO NOT PRESSURIZE, CUT, WELD OR EXPOSE TO HEAT, FLAME, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:APPROVED ORGANIC VAPOR CHEMICAL CARTRIDGE OR SUPPLIED AIR RESPIRATOR SHOULD BE WORN WHEN EXCESSIVE VAPORS OR MISTS ARE GENERATED.

Ventilation:LOCAL GENERAL EXHAUST REQUIRED WHEN SPRAYING OR USING AT ELEVATED TEMPERATURES.
Protective Gloves:NEOPRENE, NITRILE, OR POLYVINYL ALCOHOL
Eye Protection:USE CHEMICAL SAFETY GOGGLES
Other Protective Equipment:EYE WASH STATION & SAFETY SHOWER. CHEMICALLY RESISTANT BOOTS AND APRONS RECOMMENDED.
Work Hygienic Practices:DO NOT TAKE INTERNALLY. AVOID SKIN/EYE CONTACT. WASH SKIN AFTER USING PRODUCT. DO NOT EAT, DRINK OR SMOKE IN WORK AREA.
Supplemental Safety and Health
WASH OR TAKE SHOWER IF GENERAL CONTACT OCCURS. REMOVE OIL-SOAKED CLOTHING AND LAUNDER BEFORE REUSE. DISCARD CONTAMINATED LEATHER GLOVES AND SHOES.

===== Physical/Chemical Properties =====

HCC:F4
Boiling Pt:B.P. Text:350F,177C
Vapor Pres:1-10 MMHG
Vapor Density:4-5
Spec Gravity:0.80
Solubility in Water:NEGLIGIBLE
Appearance and Odor:AMBER LIQUID, FUEL OIL ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZERS.
Stability Condition to Avoid:THIS MATERIAL IS STABLE AT 70F, 760 MMHG PRESSURE.
Hazardous Decomposition Products:CARBON MONOXIDE, ALHEHYDES, AROMATICS, OTHER HYDROCARBONS.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF CLEANUP MATERIALS IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

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MATERIAL SAFETY DATA SHEET
MOTIVA MSDS: 26200MT 08/10/99

FUEL OIL #6

TELEPHONE NUMBER:

24 HOUR EMERGENCY ASSISTANCE

GENERAL MSDS ASSISTANCE

EQUIVA SERVICES: 877-276-7283

877-276-7285

CHEMTREC: 800-424-9300

NAME AND ADDRESS:

MOTIVA ENTERPRISES LLC
PRODUCT STEWARDSHIP
P.O. BOX 674414
HOUSTON, TX 77267-4414

LEGEND:

N.D. - NOT DETERMINED

N.A. - NOT APPLICABLE

N.T- NOT TESTED

< - LESS THAN

> - GREATER THAN

1. NAME

MATERIAL IDENTITY

Product Code and Name:

26200 FUEL OIL #6

Chemical Name and/or Family or Description:

Fuel Oil

This Material Safety Data Sheet may be used for the following products for Hazard Communications purposes only; not intended to imply identical performance/technical specifications:

00753 FUEL OIL
00755 FUEL OIL
00821 FUEL OIL LSLA
00823 FUEL OIL PA
00840 BUNKER FUEL OIL
00841 FUEL OIL C HV
00847 FUEL OIL C HV
00864 FUEL OIL VLS
00867 FUEL OIL LSHP
00868 FUEL OIL C
00878 FUEL OIL CHV
00880 FUEL OIL PSP
00885 FUEL OIL HEAVY BKP
00887 FUEL OIL C
00891 FUEL OIL #6
00892 FUEL OIL C-IG

2. COMPOSITION/INFORMATION ON INGREDIENTS

THE CRITERIA FOR LISTING COMPONENTS IN THE COMPOSITION SECTION IS AS FOLLOWS:

CARCINOGENS ARE LISTED WHEN PRESENT AT 0.1 % OR GREATER; COMPONENTS WHICH ARE

OTHERWISE HAZARDOUS ACCORDING TO OSHA ARE LISTED WHEN PRESENT AT 1.0 % OR GREATER; NON-HAZARDOUS COMPONENTS ARE LISTED AT 3.0 % OR GREATER. THIS IS NOT

INTENDED TO BE A COMPLETE COMPOSITIONAL DISCLOSURE. REFER TO SECTION 14 FOR

APPLICABLE STATES' RIGHT TO KNOW AND OTHER REGULATORY INFORMATION.

Product and/or Component(s) Carcinogenic According to:

OSHA IARC NTP OTHER NONE
X

Composition: (Sequence Number and Chemical Name)

Seq. Chemical Name	CAS Number	Range in %
--------------------	------------	------------

01 * Blendstock of distillate and residual petroleum fractions to prescribed viscosity ranges.		100.00
--	--	--------

PRODUCT IS HAZARDOUS ACCORDING TO OSHA (1910.1200).

* COMPONENT IS HAZARDOUS ACCORDING TO OSHA.

Exposure Limits referenced by Sequence Number in the Composition Section
Seq. Limit

None

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Appearance:

Black liquid

Odor:

Oil-type odor

WARNING STATEMENT

WARNING ! FLAMMABLE HEADSPACE VAPORS MAY BE PRESENT
CONTAINS OR MAY RELEASE HYDROGEN SULFIDE GAS (H2S)
H2S GAS IS HARMFUL OR FATAL IF INHALED
H2S GAS IS IRRITATING TO EYES AND RESPIRATORY TRACT
H2S GAS MAY ACCUMULATE IN CONFINED SPACES
MAY CAUSE EYE IRRITATION
COMBUSTIBLE LIQUID AND VAPOR
USE ONLY AS A FUEL

ATTENTION ! CAUSE CONTAINS CATALYTICALLY CRACKED CLARIFIED OIL WHICH MAY CAUSE

CANCER AND BIRTH DEFECTS BASED ON ANIMAL DATA
CONTAINS POLYNUCLEAR AROMATIC HYDROCARBONS WHICH MAY CAUSE
CANCER BASED ON ANIMAL DATA

HMIS		NFPA	
Health: 2	Reactivity: 0	Health: 1	Reactivity: 0
Flammability: 2	Special : -	Flammability: 2	Special : -

POTENTIAL HEALTH EFFECTS

	EYE	SKIN	INHALATION	INGESTION
Primary Route of Exposure:	X	X	X	

EFFECTS OF OVEREXPOSURE

Acute:

Eyes:

May cause irritation, experienced as discomfort or pain, and seen as excess

redness and swelling of the eye, and possible injury to the cornea.

Skin:

Brief contact may cause slight irritation. Prolonged contact, as with clothing wetted with material, may cause more severe irritation and discomfort, seen as local redness and swelling.

Other than the potential skin irritation effects noted above, acute (short term) adverse effects are not expected from brief skin contact; see other effects, below, and Section 11 for information regarding potential long term effects.

Prolonged, widespread, or repeated skin contact may result in the absorption of potentially harmful amounts of material.

Inhalation:

Vapors or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness.

Contains or may release hydrogen sulfide (H₂S) gas. H₂S concentrations above permissible concentrations can cause irritation of the eyes and respiratory tract, headache, dizziness, nausea, vomiting, diarrhea, and pulmonary edema. At concentrations above 300 ppm, respiratory paralysis, causing unconsciousness and death, can occur

Prolonged or repeated overexposure may result in the absorption of potentially harmful amounts of material.

Ingestion:

If more than several mouthfuls are swallowed, abdominal discomfort, nausea, and diarrhea may occur.

Sensitization Properties:

Unknown.

Chronic:

Repeated skin contact may cause a persistent irritation or dermatitis.

Medical Conditions Aggravated by Exposure:

Because of its irritating properties, repeated skin contact may aggravate an existing dermatitis (skin condition).

Other Remarks:

Heating or calcining (in temperatures between 350 and 1800 F) or other processing may release particulate and/or gaseous polynuclear aromatic hydrocarbons (polycyclic aromatic hydrocarbons). These are also known as coal tar pitch volatiles. IARC has concluded that there is sufficient evidence for carcinogenicity for coal tar pitches in humans and laboratory animals. The ACGIH TLV/TWA is 0.2 mg/m³.

4. FIRST AID MEASURES

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Get medical attention.

Skin:

Wash skin with plenty of soap and water until all traces of material are removed. Remove and clean contaminated clothing (See Other Instructions). Destroy non-resistant footwear. Get medical attention if skin irritation persists or contact has been prolonged.

Ingestion:

If more than several mouthfuls of this material are swallowed, give two glasses of water (16 oz.). Get medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Other Instructions:

Remove and dry-clean or launder clothing soaked or soiled with this material before reuse. Dry cleaning of contaminated clothing may be more effective than normal laundering. Inform individuals responsible for cleaning of potential hazards associated with handling contaminated clothing.

Inhalation exposure may result in respiratory tract injury, the delayed onset of pulmonary edema, and may predispose patient to secondary respiratory infection. Persons exposed to high concentrations should be hospitalized for observation. Contact a Poison Center for additional treatment information.

5. FIRE-FIGHTING MEASURES

Ignition Temperature - AIT (degrees F):

Not determined.

Flash Point (degrees F):

150 (CC)

Flammable Limits (%):

Lower: Not determined.

Upper: Not determined.

Recommended Fire Extinguishing Agents And Special Procedures:

Use water spray, dry chemical, foam or carbon dioxide to extinguish flames.

Use water spray to cool fire-exposed containers.

Unusual or Explosive Hazards:

Vapor space in closed container can contain hydrogen sulfide (H₂S) in explosive concentrations. Hydrogen sulfide gas may be released when heated.

Toxic vapors formed on burning.

Special Protective Equipment for Firefighters:

Wear full protective clothing and positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES (Transportation Spills: CHEMTREC (800)424-9300)

Procedures in Case of Accidental Release, Breakage or Leakage:

Ventilate area. Avoid breathing vapor. Wear appropriate personal protective equipment, including appropriate respiratory protection. Contain spill if possible. Wipe up or absorb on suitable material and shovel up. Prevent entry into sewers and waterways. Avoid contact with skin, eyes or clothing.

7. HANDLING AND STORAGE

Precautions to be Taken in

Handling:

This product contains residual fuels which must be considered as a potential flammability risk. Light hydrocarbons may be released in the headspace vapors of bunker tanks, cargo tanks, and land based terminal storage tanks. The headspace vapors may be flammable at temperatures below the flashpoint of the liquid.

Storage:

Store away from heat and open flame. Periods of exposure to high temperatures should be minimized. Water contamination should be avoided.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Equipment (Type)

Eye/Face Protection:

Avoid eye contact. Chemical type goggles should be worn. Do not wear contact lenses.

Skin Protection:

Protective clothing such as coveralls or lab coats should be worn. Launder or dry-clean when soiled. Gloves and boots resistant to chemicals and petroleum distillates required.

Respiratory Protection:

When Hydrogen Sulfide (H₂S) concentrations are unknown or are equal to or greater than 10 ppm, (as in such activities as: loading; unloading; guaging; cleaning large spills or upon entry into tanks, vessels, or other confined spaces; and during rescue of individuals suspected to be overexposed to H₂S), use supplied-air (airline or self-contained breathing apparatus) respiratory protection (NIOSH/MSHA Approved). The respirators must be equipped with pressure-demand regulators and operated in the pressure-demand mode ONLY. If airline units are used, a 5-minute egress bottle MUST also be carried. GAS MASKS OR OTHER AIR-PURIFYING RESPIRATORS MUST NEVER BE USED FOR H₂S DUE TO POOR WARNING PROPERTIES OF THE GAS.

Ventilation:

Local exhaust ventilation recommended if generating vapor, dust, or mist. If exhaust ventilation is not available or inadequate, use MSHA or NIOSH approved respirator as appropriate.

Exposure Limit for Total Product:

None established for product.

Recommend coal tar pitch volatiles (benzene soluble fraction):

Coal tar pitch volatiles: OSHA PEL-TWA 0.2 mg/m³.

Hydrogen sulfide: OSHA PEL-TWA 10 ppm; STEL 15ppm.

ACGIH TLV-TWA 10 ppm; STEL 15 ppm.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Black liquid

Odor:

Oil-type odor
Boiling Point (degrees F):
Not determined.
Melting/Freezing point (degrees F):
Not applicable.
Specific Gravity (water=1):
.946
pH of undiluted product:
Not applicable.
Vapor Pressure:
Not determined.
Viscosity:
68 cSt at 50.0 C
VOC Content:
Not determined.
Vapor Density (air=1):
Not determined.
Solubility in Water (%):
Not determined.
Other: None

10. STABILITY AND REACTIVITY

This Material Reacts Violently With:

(If Others is checked below, see comments for details)

Air	Water	Heat	Strong Oxidizers	Others	None of These
-	-	-	X	-	-

Comments:

None

Products Evolved When Subjected to Heat or Combustion:

Toxic levels of carbon monoxide, carbon dioxide, irritating aldehydes and ketones. May evolve hydrogen sulfide, sulfur oxides and other sulfur containing compounds.

Hazardous Polymerizations: DO NOT OCCUR

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION (ANIMAL TOXICITY DATA)

Median Lethal Dose

Oral:

LD50 Believed to be > 5.00 g/kg (rat) practically non-toxic

Inhalation:

Not determined.

Dermal:

LD50 Believed to be > 2.00 g/kg (rabbit) practically non-toxic

Irritation Index, Estimation of Irritation (Species)

Skin:

(Draize) Believed to be > .50 - 3.00 /8.0 (rabbit) slightly irritating

Eyes:

(Draize) Believed to be > 25.00 - 50.00 /110 (rabbit) moderately irritating

Sensitization:

Not determined.

Other:

Repeated dermal application of Catalytically Cracked Clarified Oil to experimental animals has been reported to elicit skin cancer, mortality and

toxic effects towards the liver, thymus and bone marrow; the latter effect was accompanied by anemia. The kidney and adrenal glands have also been reported as target organs of this material. Dermal application of Catalytically Cracked Clarified Oil to preganant experimental animals has also been reported to elicit toxic effects towards the developing offspring

. Catalytically Cracked Clarified Oil has been reported as a genetic toxicant in experimental studies.

Middle distillates have caused skin irritation and skin cancer in laboratory animals when repeatedly applied and left in place between applications. Studies to further evaluate the carcinogenic potential of middle distillates are currently underway. Kidney damage has also been observed in laboratory animals exposed to middle distillates.

A similar product, Texaco Fuel Oil C, is mutagenic to bacteria in the Modified Ames Test.

12. DISPOSAL CONSIDERATIONS

Waste Disposal Methods

This product has been evaluated for RCRA characteristics and does not meet the criteria of a hazardous waste if discarded in its purchased form. Under RCRA, it is the responsibility of the user of the product to determine at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc. may render the resulting materials hazardous.

Remarks

None

13. TRANSPORT INFORMATION

Transportation

DOT:

Proper Shipping Name:

Fuel Oil

Hazard Class:

Combustible liquid (See 49CFR 172.101(d)(4))

Identification Number: NA 1993

Packing Group: III

Label Required:

None

Marine pollutant:

Not applicable

IMDG:

Proper Shipping Name:

Not evaluated

ICAO:

Proper Shipping Name:

Not evaluated

TDG:

Proper Shipping Name:
Not evaluated

14. REGULATORY INFORMATION

Federal Regulations:

SARA Title III:

Section 302/304 Extremely Hazardous Substances

Seq. Chemical Name	CAS Number	Range in %
--------------------	------------	------------

None

Section 302/304 Extremely Hazardous Substances (CONT)

Seq. TPQ	RQ
----------	----

None

Section 311 Hazardous Categorization:

Acute	Chronic	Fire	Pressure	Reactive	N/A
X	X	X			

Section 313 Toxic Chemical

Chemical Name	CAS Number	Concentration
---------------	------------	---------------

None

CERCLA 102(a)/DOT Hazardous Substances: (+ indicates DOT Hazardous Substance)

Seq. Chemical Name	CAS Number	Range in %
--------------------	------------	------------

None

CERCLA/DOT Hazardous Substances (Sequence Numbers and RQ's):

Seq. RQ

None

TSCA Inventory Status:

This product, or its components, are listed on or are exempt from the Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

Other:

None.

State Regulations:

California Proposition 65:

The following detectable components of this product are substances, or belong to classes of substances, known to the State of California to cause cancer and/or reproductive toxicity.

Chemical Name	CAS Number
---------------	------------

None

International Regulations:

WHMIS Classification:

Not determined

Canada Inventory Status:

Not determined.

EINECS Inventory Status:
Not determined.
Australia Inventory Status:
Not determined.
Japan Inventory Status:
Not determined.

15. ENVIRONMENTAL INFORMATION

Aquatic Toxicity:
Not determined.
Mobility:
Not determined.
Persistence and Biodegradability:
Not determined.
Potential to Bioaccumulate:
Not evaluated.
Remarks:
Not evaluated.

16. OTHER INFORMATION

THIS PRODUCT IS INTENDED FOR USE AS A FUEL ONLY.

Hazardous concentrations of hydrogen sulfide (H₂S) gas can accumulate in storage and rundown tanks, marine vessel compartments, sump pits or other confined spaces. When opening valves, hatches and dome covers, stand upwind, keep face as far from the opening as possible and avoid breathing any gases or vapors. When exposure concentrations are unknown and respiratory protection is not used, personal H₂S warning devices should be worn. These devices should not be relied on to warn of life threatening concentrations. H₂S fatigues the sense of smell rapidly. The rotten egg odor of H₂S disappears quickly, even though high concentrations are still present. The ACGIH TLV/TWA for H₂S is 10 ppm; the ACGIH STEL is 15 ppm. Texaco recommends that all exposures to this product be minimized by strictly adhering to recommended occupational controls procedures to avoid any potential adverse health effects.

The ash from combustion products will contain nickel, vanadium, and other potentially toxic heavy metal oxides. Take appropriate precautions to avoid contact with and inhalation of ash from combustion and exhaust spaces.

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT DATA. IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT

TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE

GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE

UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA,

IS THE PROPERTY OF EQUIVA SERVICES, LLC AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF EQUIVA SERVICES, LLC.

Date: 1999-08-10 New X Revised, Supersedes: 1999-01-04

Inquiries regarding MSDS should be directed to:

Equiva Services LLC
Manager Product Stewardship
P.O. Box 674414
Houston, TX 77267-4414

17. PRODUCT LABEL

Label Date: 1999-08-10

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS

AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

26200 FUEL OIL #6

WARNING STATEMENT

WARNING !

FLAMMABLE HEADSPACE VAPORS MAY BE PRESENT
CONTAINS OR MAY RELEASE HYDROGEN SULFIDE GAS (H₂S)
H₂S GAS IS HARMFUL OR FATAL IF INHALED
H₂S GAS IS IRRITATING TO EYES AND RESPIRATORY TRACT
H₂S GAS MAY ACCUMULATE IN CONFINED SPACES
MAY CAUSE EYE IRRITATION
COMBUSTIBLE LIQUID AND VAPOR
USE ONLY AS A FUEL

ATTENTION !
CAUSE

CONTAINS CATALYTICALLY CRACKED CLARIFIED OIL WHICH MAY
CANCER AND BIRTH DEFECTS BASED ON ANIMAL DATA
CONTAINS POLYNUCLEAR AROMATIC HYDROCARBONS WHICH MAY CAUSE
CANCER BASED ON ANIMAL DATA

PRECAUTIONARY MEASURES

-
- Keep away from heat, sparks or flame.
 - Use only with adequate ventilation.
 - H₂S gas deadens sense of smell. Do not depend on odor to detect presence of gas.
 - Use supplied air respiratory protection for cleaning large spills or upon entry into tanks, vessels, or other confined spaces.
 - Avoid breathing vapor, mist, or gas.
 - Avoid contact with eyes, skin, and clothing.
 - Rescue procedures should be attempted ONLY after notifying others of emergency and ONLY if appropriate personal equipment is available.
 - Keep container closed.

-Wash thoroughly after handling.

FIRST AID

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Get medical attention.

Skin Contact:

Wash skin with plenty of soap and water until all traces of material are removed. Remove and clean contaminated clothing (See Other Instructions). Destroy non-resistant footwear. Get medical attention if skin irritation persists or contact has been prolonged.

Ingestion:

If more than several mouthfuls of this material are swallowed, give two glasses of water (16 oz.). Get medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Note to Physician:

Inhalation exposure may result in respiratory tract injury, the delayed onset of pulmonary edema, and may predispose patient to secondary respiratory infection. Persons exposed to high concentrations should be hospitalized for observation. Contact a Poison Center for additional treatment information.

FIRE

In case of fire, use water spray, dry chemical, foam or carbon dioxide. Water may cause frothing. Use water spray to cool fire-exposed containers.

Chemical Name	CAS Number	Range in %
---------------	------------	------------

* Blendstock of distillate and residual petroleum fractions to prescribed viscosity ranges.		100.00
---	--	--------

PRODUCT IS HAZARDOUS ACCORDING TO OSHA (1910.1200).

* COMPONENT IS HAZARDOUS ACCORDING TO OSHA.

Pennsylvania Special Hazardous Substance(s)	CAS Number	Range in %
---	------------	------------

None

HMIS		NFPA	
Health: 2	Reactivity: 0	Health: 1	Reactivity: 0
Flammability: 2	Special : -	Flammability: 2	Special : -

Transportation

DOT:

Proper Shipping Name:

Fuel Oil

Hazard Class:

Combustible liquid (See 49CFR 172.101(d)(4))

Identification Number: NA 1993

Packing Group: III

Label Required:

None

Marine pollutant:

Not applicable

CAUTION: Misuse of empty containers can be hazardous. Empty containers can

be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flame or heat. Keep container closed and drum bungs in place.

Name and Address:

Motiva Enterprises LLC

P.O. Box 674414

Houston ,TX 77267-4414

TRANSPORTATION EMERGENCY: (877)276-7283

CHEMTREC: (800)424-9300

HEALTH EMERGENCY: (877)276-7283

}

MATERIAL SAFETY DATA SHEET
Revision Date: 09/29/2004

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: Shell™ Hydraulic Oil 46
MSDS NUMBER: 60170E - 3
PRODUCT CODE(S): 65237, 6523700055

MANUFACTURER ADDRESS: SOPUS Products, P.O. Box 4427, Houston, TX. 77210-4427

TELEPHONE NUMBERS

Spill Information: (877) 242-7400
Health Information: (877) 504-9351
MSDS Assistance Number: (877) 276-7285

SECTION 2 PRODUCT/INGREDIENTS

CAS#	CONCENTRATION	INGREDIENTS
		Hydraulic Oil
Blend	90 - 98.99 %weight	Highly refined petroleum oils
Mixture	1 - 2.99 %weight	Additives

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance & Odor: Amber, clear liquid. Mild odor.
Health Hazards: No known immediate health hazards. High-pressure injection under the skin may cause serious damage.
Physical Hazards: No known physical hazards.
NFPA Rating (Health, Fire, Reactivity): 0, 1, 0
Hazard Rating: Least - 0 Slight - 1 Moderate - 2 High - 3
Extreme - 4

Inhalation:

Inhalation of vapors (generated at high temperatures only) or oil mist may cause mild irritation of the nose, throat, and respiratory tract.

Eye Irritation:

Lubricating oils are generally considered no more than minimally irritating to the eyes.

Skin Contact:

May cause slight irritation of the skin. If irritation occurs, a temporary burning sensation and minor redness and/or swelling may result. Release of the material during high-pressure applications may result in injection under the skin causing possible extensive tissue damage which is difficult to heal. Other adverse effects not expected from brief skin contact.

Ingestion:

Lubricating oils are generally no more than slightly toxic if swallowed.

Signs and Symptoms:

Irritation as noted above. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection.

Aggravated Medical Conditions:

Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:

If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin:

Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If material is injected under the skin, transport to the nearest medical facility for additional treatment. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye:

Flush with water. If irritation occurs, get medical attention.

Ingestion:

Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. If vomiting occurs spontaneously, keep head below hips to prevent

aspiration.

Note to Physician:

In general, emesis induction is unnecessary in high viscosity, low volatility products such as oils and greases.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: 400 °F -440 °F/204.44 °C -226.67 °C [Cleveland
Open
Cup]

Extinguishing Media:

Material will float and can be re-ignited on surface of water.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:

May burn although not readily ignitable.

Wear appropriate personal protective equipment when cleaning up spills.
Refer
to Section 8.

Spill Management:

FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Reporting:

CERCLA: Product is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) petroleum exclusion. Releases to air, land, or water are not reportable under CERCLA (Superfund).

CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 1-800-424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:

Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet. Launder contaminated clothing before reuse. Properly dispose of contaminated leather articles such as shoes or belts that cannot be decontaminated. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking.

Storage:

Do not store in open or unlabeled containers. Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

Container Warnings:

Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Oil mist, mineral ACGIH TLV TWA: 5 mg/m3 STEL: 10 mg/m3
Oil mist, mineral OSHA PEL TWA: 5 mg/m3

EXPOSURE CONTROLS

Provide adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

PERSONAL PROTECTION

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation.

Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:

Chemical Goggles, or Safety Glasses

Skin Protection:

Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should

take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:
Neoprene, or Nitrile Rubber

Respiratory Protection:

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:

For Mist: Air Purifying, R or P style NIOSH approved respirator.

For Vapors: Air Purifying, R or P style prefilter & organic cartridge, NIOSH approved respirator. Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Amber, clear liquid. Mild odor.

Substance Chemical Family: Lubricants

API Gravity: 30 - 32.3

Appearance: Amber, clear liquid.

Flash Point: 400 °F - 440 °F [Cleveland Open Cup]

Pour Point: -10 °F - 0 °F

Specific Gravity: 0.8856

Viscosity: 30 cSt - 100 cSt @ 40 °C

SECTION 10 REACTIVITY AND STABILITY

Stability:

Material is stable under normal conditions.

Conditions to Avoid:

Avoid heat and open flames.

Materials to Avoid:

Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:

Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Aldehydes, Carbon Monoxide, Carbon Dioxide, Ketones, Methacrylate monomers and other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity
Dermal LD50 >5.0 g/kg(Rabbit) OSHA: Non-Toxic Based on components(s)
Oral LD50 >5.0 g/kg(Rat) OSHA: Non-Toxic Based on components(s)
Carcinogenicity Classification
Hydraulic Oil
NTP: No IARC: Not Reviewed ACGIH: No OSHA: No

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product. However, this product is an oil. It is persistent and does not readily biodegrade. However, it does not bioaccumulate.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:
Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

International Air Transport Association
Not regulated under IATA rules.

International Maritime Organization Classification
Not regulated under International Maritime Organization rules.

SECTION 15 REGULATORY INFORMATION

FEDERAL REGULATORY STATUS

OSHA Classification:

Product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200, because it carries the occupational exposure limit for mineral oil mist.

Ozone Depleting Substances (40 CFR 82 Clean Air Act):

This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:

There are no components in this product on the SARA 302 list.

SARA Hazard Categories (311/312):

Immediate Health:NO Delayed Health:NO Fire:NO Pressure:NO
Reactivity:NO

SARA Toxic Release Inventory (TRI) (313):

There are no components in this product on the SARA 313 list.

Toxic Substances Control Act (TSCA) Status:

All component(s) of this material is(are) listed on the EPA/TSCA Inventory of Chemical Substances.

Other Chemical Inventories:

Component(s) of this material is (are) listed on the Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Korean Inventory,

Philippines PICCS,

State Regulation

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also

be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

SECTION 16 OTHER INFORMATION

Revision#: 3

Revision Date: 09/29/2004

Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been reviewed to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-1998). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 65237, 6523700055

Shell™ Hydraulic Oil 46

ATTENTION!

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE OIL ACNE OR DERMATITIS.
HIGH-PRESSURE INJECTION UNDER SKIN MAY CAUSE SERIOUS DAMAGE.

Precautionary Measures:

Avoid prolonged or repeated contact with eyes, skin and clothing. Avoid breathing of vapors, fumes, or mist. Use only with adequate ventilation. Wash thoroughly after handling.

FIRST AID

Inhalation: If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin Contact: Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention. Do not reuse clothing until cleaned. If material is injected under the skin, transport to the nearest medical facility for additional treatment. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye Contact: Flush with water. If irritation occurs, get medical attention.

Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth.

FIRE

In case of fire, Material will float and can be re-ignited on surface of water.

SPILL OR LEAK

Dike and contain spill.

FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Highly refined petroleum oils, Blend; Additives, Mixture

NFPA Rating (Health, Fire, Reactivity): 0, 1, 0

TRANSPORTATION

US Department of Transportation Classification

This material is not subject to DOT regulations under 49 CFR Parts 171-180.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flames or heat. Keep container closed and drum bungs in place.

Name and Address

SOPUS Products
P.O. Box 4427
Houston, TX 77210-4427

ADMINISTRATIVE INFORMATION

MANUFACTURER ADDRESS: SOPUS Products, P.O. Box 4427, Houston, TX.
77210-4427

Company Product Stewardship & Regulatory Compliance Contact: Timothy W Childs
Phone Number: (713) 241-1524

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE
TO

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PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD
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IS THE PROPERTY OF SOPUS PRODUCTS AND IS NOT TO BE THE SUBJECT OF SALE OR
EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF SOPUS PRODUCTS.

43309-11719-100R-09/29/2004

MSDS Number: **N0090** * * * * * *Effective Date: 08/10/04* * * * * * *Supersedes: 11/02/01*

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

NAPHTHALENE

1. Product Identification

Synonyms: Naphthene; mothballs; tar camphor; naphthaliin; white-tar

CAS No.: 91-20-3

Molecular Weight: 128.16

Chemical Formula: C10H8

Product Codes:

J.T. Baker: 2718

Mallinckrodt: 6348

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Hazardous		
-----	-----	-----

Naphthalene	91-20-3	90 - 100%
Yes		

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN

REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 2 - Moderate

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. The predominant reaction is delayed intravascular hemolysis with symptoms of anemia, fever, jaundice, and kidney or liver damage.

Ingestion:

Toxic. Can cause headache, profuse perspiration, listlessness, dark urine, nausea, vomiting and disorientation. Intravascular hemolysis may also occur with symptoms similar to those noted for inhalation. Severe cases may produce coma with or without convulsions. Death may result from renal failure.

Skin Contact:

Can irritate the skin and, on prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis.

Eye Contact:

Vapors and solid causes irritation, redness and pain. Very high exposures can damage the nerves of the eye.

Chronic Exposure:

Has led to cataract formation in eyes. May cause skin allergy.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin, blood or vascular disorders or impaired respiratory function may be more susceptible to the effects of the substance. Particularly susceptible individuals are found in the general population, most commonly in dark skinned races.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: 87C (189F) CC

Autoignition temperature: 526C (979F)

Combustible. May be ignited by heat, sparks or flame. May burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases.

Explosion:

Explosive limits, volume % in air: lel: 0.9; uel: 5.9. Above flashpoint, vapor-air mixtures are explosive within flammable limits noted above. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire or explosion.

Fire Extinguishing Media:

Dry chemical, foam, water or carbon dioxide. Foam or direct water spray on molten naphthalene may cause extensive foaming. Molten naphthalene spatters in contact with water; apply water from as far a distance as possible.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Keep away from moisture and oxidizers. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):

10 ppm, 50 mg/m³.

- ACGIH Threshold Limit Value (TLV):

TWA= 10 ppm, 52 mg/m³

STEL= 15 ppm, 79 mg/m³.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White crystals.

Odor:

Strong coal tar odor (moth balls).

Solubility:

Insoluble in water.

Specific Gravity:

1.2

pH:

No information found.

% Volatiles by volume @ 21C (70F):

No information found.

Boiling Point:

218C (424F)

Melting Point:

80C (176F)

Vapor Density (Air=1):

4.4

Vapor Pressure (mm Hg):

1 @ 53C (127F)

Evaporation Rate (BuAc=1):

< 1

10. Stability and Reactivity**Stability:**

Stable at room temperature in sealed containers. Sublimes appreciably at temperatures above melting point.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizers, strong alkalis and strong mineral acids, mixtures of aluminum trichloride and benzoyl chloride. Reacts violently with chromic anhydride. Melted naphthalene will attack some forms of plastics, rubber, and coatings.

Conditions to Avoid:

Avoid heat, sparks, flames and other ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 490 mg/kg;

Inhalation rat LC50: 340 mg/m³, 1 hour;

Skin rabbit LD50: > 20 g/kg;

Irritation data: skin (open Draize) rabbit 495 mg, mild; eye (standard Draize) rabbit 100 mg, mild;

Investigated as a tumorigen, mutagen and reproductive effector.

Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
Naphthalene (91-20-3)	No	No	None

12. Ecological Information

Environmental Fate:

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NAPHTHALENE, REFINED

Hazard Class: 4.1

UN/NA: UN1334

Packing Group: III

Information reported for product/size: 1KG

International (Water, I.M.O.)

Proper Shipping Name: NAPHTHALENE, REFINED

Hazard Class: 4.1

UN/NA: UN1334

Packing Group: III

Information reported for product/size: 1KG

International (Air, I.C.A.O.)

Proper Shipping Name: NAPHTHALENE, REFINED

Hazard Class: 4.1

UN/NA: UN1334

Packing Group: III

Information reported for product/size: 1KG

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----
--
Ingredient TSCA EC Japan
Australia

Naphthalene (91-20-3) Yes Yes Yes Yes

-----\Chemical Inventory Status - Part 2\-----
--
Ingredient Korea --Canada-- DSL NDSL Phil.

Naphthalene (91-20-3) Yes Yes No Yes

-----\Federal, State & International Regulations - Part 1\-----
--
-SARA 302- -----SARA 313-----
--
Ingredient RQ TPQ List Chemical
Catg.

Naphthalene (91-20-3) No No Yes No

-----\Federal, State & International Regulations - Part 2\-----
--
Ingredient CERCLA -RCRA- -TSCA-
----- 261.33 8(d)

Naphthalene (91-20-3) 100 U165 No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: 2Z

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 2 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO

SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION.
MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM.
COMBUSTIBLE.

Label Precautions:

- Avoid contact with eyes, skin and clothing.
- Avoid prolonged or repeated contact with skin.
- Avoid breathing dust.
- Avoid breathing vapor.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep away from heat, sparks and flame.

Label First Aid:

In all cases call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

International Chemical Safety Cards

BENZO(G,H,I)PERYLENE

ICSC: 0739

<p>BENZO(G,H,I)PERYLENE 1,12-Benzoperylene C₂₂H₁₂ Molecular mass: 276.3</p> <p>CAS # 191-24-2 RTECS # DI6200500 ICSC # 0739</p>

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE			
• INHALATION			
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
• EYES			
• INGESTION		Do not eat, drink, or smoke during work.	
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing.		
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0739	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993		

International Chemical Safety Cards

BENZO(G,H,I)PERYLENE

ICSC: 0739

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: PALE YELLOW-GREEN CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
	PHYSICAL DANGERS: CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts with NO and NO ₂ to form nitro derivatives.	INHALATION RISK: No indication can be given about the rate in which a harmful concentration in the air is reached on evaporation of this substance at 20°C.
	OCCUPATIONAL EXPOSURE LIMITS (OELs):	EFFECTS OF SHORT-TERM EXPOSURE: EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Melting point: 278.3°C	
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.	
NOTES		
Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken.		
ADDITIONAL INFORMATION		
ICSC: 0739		BENZO(G,H,I)PERYLENE
© IPCS, CEC, 1993		
IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

Material Safety Data Sheet

Phenanthrene, 90%

ACC# 59921

Section 1 - Chemical Product and Company Identification

MSDS Name: Phenanthrene, 90%

Catalog Numbers: AC130100000, AC130100010, AC130102500

Synonyms:

Company Identification:

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
85-01-8	Phenanthrene	90.0	201-581-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: brown solid.

Caution! Powdered material may form explosive dust-air mixtures. May cause allergic skin reaction. May cause eye and skin irritation. May cause respiratory tract irritation. Cancer suspect agent.

Target Organs: None.

Potential Health Effects

Eye: May cause eye irritation.

Skin: May cause skin irritation. May cause photosensitive skin reactions in certain individuals.

Ingestion: May cause irritation of the digestive tract.

Inhalation: Inhalation of dust may cause respiratory tract irritation.

Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while

removing contaminated clothing and shoes.

Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dusts at sufficient concentrations can form explosive mixtures with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: Use water spray or dry chemical.

Flash Point: Not available.

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 1; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Phenanthrene	0.2 mg/m ³ TWA (as	0.1 mg/m ³ TWA	0.2 mg/m ³ TWA (as

	benzene soluble aerosol) (listed under Coal tar pitches).	(cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	benzene soluble fraction) (listed under Coal tar pitches).
--	---	---	--

OSHA Vacated PELs: Phenanthrene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: brown

Odor: none reported

pH: Not available.

Vapor Pressure: 1 mm Hg @116c

Vapor Density: Not available.

Evaporation Rate:Not available.

Viscosity: Not available.

Boiling Point: 340 deg C

Freezing/Melting Point:101 deg C

Decomposition Temperature:Not available.

Solubility: insoluble

Specific Gravity/Density:1.0630g/cm3

Molecular Formula:C14H10

Molecular Weight:178.23

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, dust generation, strong oxidants.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 85-01-8: SF7175000

LD50/LC50:

CAS# 85-01-8:

Oral, mouse: LD50 = 700 mg/kg;

Oral, rat: LD50 = 1.8 gm/kg;

Carcinogenicity:

CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No data available.

Teratogenicity: No data available.

Reproductive Effects: No data available.

Mutagenicity: No data available.

Neurotoxicity: No data available.

Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 85-01-8 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 85-01-8: immediate.

Section 313

This material contains Phenanthrene (CAS# 85-01-8, 90.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 85-01-8: No information available.

Canada - DSL/NDSL

CAS# 85-01-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/14/1998

Revision #3 Date: 10/03/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

ISOBUTENE
Isobutylene
2-Methylpropene
(cylinder)
 $C_4H_8/CH_2=C(CH_3)_2$
Molecular mass: 56.1

CAS # 115-11-7
RTECS # UD0890000
ICSC # 1027
UN # 1055
EC # 601-012-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Extremely flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidizing materials.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with sand, powder, carbon dioxide.
EXPLOSION	Gas/air mixtures are explosive. Risk of fire and explosion on contact with oxidants, halogens (see Chemical Dangers).	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.
EXPOSURE			
• INHALATION	Dizziness. Drowsiness. Dullness. Nausea. Unconsciousness. Vomiting.	Closed system and ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
• EYES	Frostbite.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION			

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Ventilation. Remove all sources of ignition. Do NOT wash away into sewer. NEVER direct water jet on liquid (extra personal protection: self-contained breathing apparatus).	Fireproof. Separated from incompatible substances (see Chemical Dangers). Cool.	F symbol F+ symbol R: 12 S: (2-)9-16-33 Note: C UN Hazard Class: 2.1
SEE IMPORTANT INFORMATION ON BACK		
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International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS COMPRESSED LIQUEFIED GAS OR COLOURLESS VOLATILE LIQUID, WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: The gas is heavier than air and may travel along the ground; distant ignition possible, and may accumulate in low ceiling spaces causing deficiency of oxygen. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p>CHEMICAL DANGERS: The substance can presumably form explosive peroxides. The substance is able to polymerize with fire or explosion hazard. Reacts violently with oxidants, chlorine, fluorine, nitrogen oxides, hydrogen chloride, hydrogen bromide, causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation.</p> <p>INHALATION RISK: On loss of containment this liquid evaporates very quickly causing supersaturation of the air with serious risk of suffocation when in confined areas. A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure may result in death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</p>
PHYSICAL PROPERTIES	Boiling point: -6.9°C Melting point: -140.3°C Relative density (water = 1): 0.59	Relative vapour density (air = 1): 1.94 Flash point: flammable°C Auto-ignition temperature: 465°C

	Solubility in water: practically insoluble Explosive limits, vol% in air: 1.8-9.6% Vapour pressure, kPa at 20°C: 1976
ENVIRONMENTAL DATA	
NOTES	
<p>Density of the liquid at boiling point: 0.605 kg/l. High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death. Check oxygen content before entering area. Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-502 NFPA Code: H 1; F 4; R 0;</p>	
ADDITIONAL INFORMATION	
ICSC: 1027	ISOBUTENE
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MSDS Number: **H3880** * * * * * *Effective Date: 01/19/06* * * * * * *Supersedes: 09/24/04*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

HYDROCHLORIC ACID, 33 - 40%

1. Product Identification

Synonyms: Muriatic acid; hydrogen chloride, aqueous

CAS No.: 7647-01-0

Molecular Weight: 36.46

Chemical Formula: HCl

Product Codes:

J.T. Baker: 5367, 5537, 5575, 5800, 5814, 5821, 5839, 5861, 5862, 5894, 5962, 5972, 5994, 6900, 7831, 9529, 9530, 9534, 9535, 9536, 9538, 9539, 9540, 9544, 9548

Mallinckrodt: 2062, 2515, 2612, 2624, 2626, 3861, 5583, 5587, H611, H613, H987, H992, H999, V078, V628

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Hazardous		
-----	-----	-----

Hydrogen Chloride	7647-01-0	33 - 40%
Yes		
Water	7732-18-5	60 - 67%
No		

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 2 - Moderate

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:

Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.

Ingestion:

Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea.

Swallowing may be fatal.

Skin Contact:

Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.

Eye Contact:

Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

Chronic Exposure:

Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion:

DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Extreme heat or contact with metals can release flammable hydrogen gas.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

If involved in a fire, use water spray. Neutralize with soda ash or slaked lime.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® or TEAM® 'Low Na+' acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never

add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

For Hydrochloric acid:

- OSHA Permissible Exposure Limit (PEL):

5 ppm (Ceiling)

- ACGIH Threshold Limit Value (TLV):

2 ppm (Ceiling), A4 Not classifiable as a human carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Colorless, fuming liquid.

Odor:

Pungent odor of hydrogen chloride.

Solubility:

Infinite in water with slight evolution of heat.

Density:

1.18

pH:

For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

53C (127F) Azeotrope (20.2%) boils at 109C (228F)

Melting Point:

-74C (-101F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

190 @ 25C (77F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Containers may burst when heated.

Hazardous Decomposition Products:

When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

A strong mineral acid, concentrated hydrochloric acid is incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.

Conditions to Avoid:

Heat, direct sunlight.

11. Toxicological Information

Inhalation rat LC50: 3124 ppm/1H; oral rabbit LD50: 900 mg/kg (Hydrochloric acid concentrated); investigated as a tumorigen, mutagen, reproductive effector.

-----\Cancer Lists\-----

Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
-----	-----	-----	-----
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.

Environmental Toxicity:

This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: HYDROCHLORIC ACID

Hazard Class: 8

UN/NA: UN1789

Packing Group: II

Information reported for product/size: 475LB

International (Water, I.M.O.)

Proper Shipping Name: HYDROCHLORIC ACID

Hazard Class: 8

UN/NA: UN1789

Packing Group: II

Information reported for product/size: 475LB

15. Regulatory Information

Risk and Safety Phrases:

Symbol: C

Risk: 34-37

Safety: (1/2-)26-45

-----\Chemical Inventory Status - Part 1\-----

--

Ingredient	TSCA	EC	Japan
Australia			

-

Hydrogen Chloride (7647-01-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

			--Canada--	
Ingredient	Korea	DSL	NDSL	Phil.
-----	-----	-----	-----	-----
Hydrogen Chloride (7647-01-0)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

	-SARA 302-		-----SARA 313-----	
Ingredient	RQ	TPQ	List	Chemical
Catg.				
-----	-----	-----	-----	-----
Hydrogen Chloride (7647-01-0)	5000	500*	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
-----	-----	-----	-----
Hydrogen Chloride (7647-01-0)	5000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2R

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**

Label Hazard Warning:

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.

Label Precautions:

Do not get in eyes, on skin, or on clothing.
 Do not breathe vapor or mist.

Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 16.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **N3660** * * * * * *Effective Date: 05/06/05* * * * * * *Supersedes: 07/02/02*

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

NITRIC ACID, 50-70%

1. Product Identification

Synonyms: Aqua Fortis; Azotic Acid; Nitric Acid 50%; Nitric Acid 65%; nitric acid 69-70%

CAS No.: 7697-37-2

Molecular Weight: 63.01

Chemical Formula: HNO₃

Product Codes:

J.T. Baker: 5371, 5796, 5801, 5826, 5856, 5876, 5896, 9597, 9598, 9600, 9601, 9602, 9603, 9604, 9606, 9607, 9608, 9610, 9616, 9617, 9670

Mallinckrodt: 1409, 2704, 2705, 2716, 6623, H862, H988, H993, H998, V077, V650

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Hazardous		
-----	-----	-----

Nitric Acid	7697-37-2	50 - 70%
Yes		
Water	7732-18-5	30 - 50%
No		

3. Hazards Identification

Emergency Overview

POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 3 - Severe (Oxidizer)

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White (Corrosive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison.

Inhalation:

Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract.

Ingestion:

Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract.

Skin Contact:

Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color.

Eye Contact:

Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

Chronic Exposure:

Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas.

Explosion:

Reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.

Fire Extinguishing Media:

Water spray may be used to keep fire exposed containers cool. Do not get water inside container.

Special Information:

Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

2 ppm (TWA), 4 ppm (STEL)

-ACGIH Threshold Limit Value (TLV):

2 ppm (TWA); 4 ppm (STEL)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials, such as activated charcoal. Canister-type respirators using sorbents are ineffective.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Colorless to yellowish liquid.

Odor:

Suffocating, acrid.

Solubility:

Infinitely soluble.

Specific Gravity:

1.41

pH:

1.0 (0.1M solution)

% Volatiles by volume @ 21C (70F):

100 (as water and acid)

Boiling Point:

122C (252F)

Melting Point:

-42C (-44F)

Vapor Density (Air=1):

2-3

Vapor Pressure (mm Hg):

48 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Containers may burst when heated.

Hazardous Decomposition Products:

When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Will react with water or steam to produce heat and toxic and corrosive fumes.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.

Conditions to Avoid:

Light and heat.

11. Toxicological Information

Nitric acid: Inhalation rat LC50: 244 ppm (NO2)/30M; Investigated as a mutagen, reproductive effector. Oral (human) LDLo: 430 mg/kg.

-----\Cancer Lists\-----

Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NITRIC ACID

Hazard Class: 8

UN/NA: UN2031

Packing Group: II

Information reported for product/size: 6.5GL

International (Water, I.M.O.)

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)

Hazard Class: 8

UN/NA: UN2031

Packing Group: II

Information reported for product/size: 6.5GL

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	
Australia				
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient Catg.	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
 Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2PE

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0** Other: **Oxidizer**

Label Hazard Warning:

POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

Label Precautions:

- Do not get in eyes, on skin, or on clothing.
- Do not breathe vapor or mist.
- Use only with adequate ventilation.
- Wash thoroughly after handling.

Keep from contact with clothing and other combustible materials.

Do not store near combustible materials.

Store in a tightly closed container.

Remove and wash contaminated clothing promptly.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

SUPELCO,INC. -- ALPHA-BHC,50 MG,R431020 -- 6810-00N010773

=====
Product Identification
=====

Product ID:ALPHA-BHC,50 MG,R431020

MSDS Date:03/10/1988

FSC:6810

NIIN:00N010773

MSDS Number: BHVJC

=== Responsible Party ===

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

City:BELLEFONTE

State:PA

ZIP:16823-0048

Info Phone Num:814-359-3441

Emergency Phone Num:814-359-3441

CAGE:HO582

=== Contractor Identification ===

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

Box:City:BELLEFONTE

State:PA

ZIP:16823-0048

Phone:814-359-3441

CAGE:HO582

Company Name:SIGMA-ALDRICH INC.

Address:3050 SPRUCE STREET

Box:14508

City:ST. LOUIS

State:MO

ZIP:63103

Country:US

Phone:314-771-5765/414-273-3850X5996

CAGE:54968

=====
Composition/Information on Ingredients
=====

Ingred Name:ALPHA-BHC (SARA III)

CAS:319-84-6

RTECS #:GV3500000

Other REC Limits:N/K

EPA Rpt Qty:10 LBS

DOT Rpt Qty:10 LBS

=====
Hazards Identification
=====

LD50 LC50 Mixture:LD50 RAT ORAL 500 MG/KG

Routes of Entry: Inhalation:YES Skin:UNKNOWN Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:YES OSHA:NO

Health Hazards Acute and Chronic:HARMFUL IF INHALED OR SWALLOWED.

Explanation of Carcinogenicity:ALPHA-HEXACHLOROCYCLOHEXANE (BENZENE
HEXACHLORIDE):SUFFICIENT EVIDENCE FOR CARCINOGENICITY IN ANIMALS
(IARC 1987).

Effects of Overexposure:EYES/SKIN:N/K .INGESTION:HARMFUL IF
SWALLOWED.INHALATION:HARMFUL IF INHALED.

Medical Cond Aggravated by Exposure:N/K

===== First Aid Measures =====

First Aid:EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH LARGE VOLUMES OF WATER.INGESTION:NEVER GIVE ANYTHING BY MOUTH TO UNCONSCIOUS PERSON.NEVER TRY TO MAKE UNCONSCIOUS PERSON VOMIT.INHALATION: IMMEDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.CONTACT PHYSICIAN.

===== Fire Fighting Measures =====

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:TOXIC CHLORIDE VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

===== Accidental Release Measures =====

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL.AVOID GENERATING DUST.
Neutralizing Agent:N/K

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RECOMMENDED
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/INGESTION .

===== Physical/Chemical Properties =====

Melt/Freeze Pt:M.P/F.P Text:159C,318F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:WHITE SOLID.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH
FEDERAL, STATE AND LOCAL REGULATIONS .

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assume responsibility for the suitability of this information to their
particular situation.

International Chemical Safety Cards

LINDANE

ICSC: 0053

<p>LINDANE gamma-1,2,3,4,5,6-Hexachlorocyclohexane gamma-BHC gamma-HCH C₆H₆Cl₆ Molecular mass: 290.8</p> <p>CAS # 58-89-9 RTECS # GV4900000 ICSC # 0053 UN # 2761 EC # 602-043-00-6</p>

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Risk of fire and explosion if formulations contain flammable/explosive solvents.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• INHALATION	Convulsions. Cough. Dizziness. Headache. Nausea. Weakness. Tremors. Paresthesias. Symptoms may be delayed (see Notes).	Avoid inhalation of fine dust and mist. Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• EYES	Redness.	Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily

			possible), then take to a doctor.
• INGESTION	Abdominal pain. Diarrhoea (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Give plenty of water to drink. Rest. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Do NOT wash away into sewer. Sweep spilled substance into non-metallic sealable containers, then remove to safe place (extra personal protection: P3 filter respirator for toxic particles).	Provision to contain effluent from fire extinguishing. Separated from bases, food and feedstuffs and metals.	Do not transport with food and feedstuffs. T symbol N symbol R: 23/24/25-36/38-50/53 S: (1/2-)13-45-60-61 UN Hazard Class: 6.1 UN Packing Group: III Severe marine pollutant.	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0053	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993		

International Chemical Safety Cards

LINDANE

ICSC: 0053

I M P O R T A N T D A	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS, WHITE CRYSTALLINE POWDER.</p> <p>CHEMICAL DANGERS: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes including phosgene and hydrogen chloride. The substance decomposes on contact with alkalis producing trichlorobenzene, or on contact with powdered iron, aluminum and zinc.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: ppm; 0.5 mg/m³ (as TWA) (skin) (ACGIH 1994-1995). MAK: ppm; 0.5 mg/m³; skin (1992).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and through the skin, and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system, resulting in convulsions and respiratory failure and collapse. Exposure may result in death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may</p>
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T A	have effects on the liver and kidneys.
PHYSICAL PROPERTIES	Boiling point: 323°C Melting point: 113°C Relative density (water = 1): 1.87 Solubility in water: none Vapour pressure, Pa at 20°C: 0.0012 Octanol/water partition coefficient as log Pow: 3.61- 3.72
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish. It is strongly advised not to let the chemical enter into the environment, especially in soil, because it persists in the environment. &FIG13
NOTES	
Depending on the degree of exposure, periodic medical examination is indicated. Carrier solvents used in commercial formulations may change physical and toxicological properties. The relation between odour and the occupational exposure limit cannot be indicated. Do NOT take working clothes home. Gammexane, Tri-6, Lindafor, Lindatox, Agrocide, Isotox, Esoderm, Aparasin are trade names. <div style="text-align: right;">Transport Emergency Card: TEC (R)-61G53c NFPA Code: H2; F0; R0</div>	
ADDITIONAL INFORMATION	
ICSC: 0053	LINDANE
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SUPELCO,INC. -- BETA-BHC,50MG.CATALOG NO 48494 -- 6810-00N010746

=====
Product Identification
=====

Product ID:BETA-BHC,50MG.CATALOG NO 48494

MSDS Date:03/10/1988

FSC:6810

NIIN:00N010746

MSDS Number: BHHGD

=== Responsible Party ===

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

City:BELLEFONTE

State:PA

ZIP:16823-0048

Info Phone Num:814-359-3441

Emergency Phone Num:814-359-3441

CAGE:HO582

=== Contractor Identification ===

Company Name:SIGMA-ALDRICH INC.

Address:3050 SPRUCE STREET

Box:14508

City:ST. LOUIS

State:MO

ZIP:63103

Country:US

Phone:314-771-5765/414-273-3850X5996

CAGE:54968

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

Box:City:BELLEFONTE

State:PA

ZIP:16823-0048

Phone:814-359-3441

CAGE:HO582

=====
Composition/Information on Ingredients
=====

Ingred Name:BETA-BHC (SARA III)

CAS:319-85-7

RTECS #:GV4375000

Fraction by Wt:

Other REC Limits:

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

=====
Hazards Identification
=====

LD50 LC50 Mixture:LD50 6000 MG/KG ORAL RAT

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:YES IARC:NO OSHA:NO

Health Hazards Acute and Chronic:SEE SIGNS & SYMPTOMS OF OVEREXPOSURE.

Explanation of Carcinogenicity:BHC (BETA ISOMER):NTP ANTICIPATED HUMAN

CARC(MSOURCE LIST C)REPORTED ANIMAL CARCINOGEN (MFR).

Effects of Overexposure:HARMFUL IF INHALED,HARMFUL IF

SWALLOWED.REPORTED ANIMAL CARCINOGEN(MFR).

Medical Cond Aggravated by Exposure:

===== First Aid Measures =====

First Aid:EYES:FLUSH WITH PLENTY OF POTABLE WATER FOR AT LEAST 15 MINUTES,THEN OBTAIN PROMPT MEDICAL ATTENTIONSKIN:FLUSH SKIN WITH LARGE VOLUMES OF WATER.INHALATION;IMMEDIATELY MOVE TO FRESH AIR.GIVE OXYG EN IF BREATHING IS LABORED,CONTACT A PHYSICIAN.INGESTION;NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON,NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT(MFR).CALL MD IMMEDIATELY (CPN).

===== Fire Fighting Measures =====

Flash Point:
Lower Limits:
Upper Limits:
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:WEAR SCBA WHEN FIGHTING A CHEMICAL FIRE (MFR).USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT
Unusual Fire/Explosion Hazard:THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.CHLORIDES(MFR).HCL,PHOSGENE

===== Accidental Release Measures =====

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL,AVOID GENERATING DUST.
Neutralizing Agent:N/K

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:WEAR NIOSH/OSHA APPROVED RESPIRATORY PROTECTION (MFR).NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN
Ventilation:USE ONLY IN WELL VENTILATED AREA.
Protective Gloves:WEAR GLOVES.RUBBER
Eye Protection:CHEMICAL WORKERS GOGGLES
Other Protective Equipment:EYE WASH AND SAFETY SHOWER
Work Hygienic Practices:OBSERVE GOOD WORK HYGIENIC PRACTICES
Supplemental Safety and Health

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:N/A MFR
Melt/Freeze Pt:M.P/F.P Text:593 F;312 C
Decomp Temp:Decomp Text:N/K FPM
Vapor Pres:N/A MFR
Vapor Density:N/A MFR
Spec Gravity:N/A MFR
pH:
Evaporation Rate & Reference:N/A MFR

Solubility in Water:N/A MFR
Appearance and Odor:WHITE SOLID
Percent Volatiles by Volume:N/AMFR
Corrosion Rate:

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES(MFR),HCL,PHOSGENE
Conditions to Avoid Polymerization:WILL NOT OCCUR.

===== Disposal Considerations =====

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL,STATE,OR
LOCAL REGULATIONS.

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of Defense. The United States of America in no manner whatsoever,
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assume responsibility for the suitability of this information to their
particular situation.

International Chemical Safety Cards

ALDRIN

ICSC: 0774

<p>ALDRIN HHDN 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro,endo,exo-1,4:5.8-dimethanonaphthalene $C_{12}H_8Cl_6$ Molecular mass: 364.9</p> <p>CAS # 309-00-2 RTECS # IO2100000 ICSC # 0774 UN # 2761 EC # 602-048-00-3</p>
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TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION	(see Ingestion).	Ventilation (not if powder).	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	MAY BE ABSORBED! See Ingestion.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Dizziness. Headache. Nausea. Vomiting. Weakness. Muscle twitching.	Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do not let this chemical enter water courses or sewers (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs. Cool. Dry.	Do not transport with food and feedstuffs. T symbol R: 24/25-40-48 S: 22-36/37-44 UN Hazard Class: 6.1 Severe marine pollutant.
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0774		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

ALDRIN

ICSC: 0774

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating producing toxic and corrosive fumes (chlorine fumes, hydrogen chloride.) Reacts with acids, oxidants, active metals, phenols, acid catalysts. Can be corrosive due to the slow evolution of hydrogen chloride in storage.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV : ppm; 0.25 mg/m³ (as TWA) (skin) (ACGIH 1991-1992).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance may cause effects on the central nervous system, resulting in convulsions.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance accumulates in the human body. Aldrin may be present in human placental tissues and blood.</p>
PHYSICAL PROPERTIES	<p>Boiling point at 0.267 kPa: 145°C Melting point: 104°C Relative density (water = 1): 1.54</p>	<p>Solubility in water: none Vapour pressure, Pa at 20°C: 0.0086 Octanol/water partition coefficient as log Pow: 7.4</p>
ENVIRONMENTAL DATA	<p>Aldrin persists in soils: 50% disappear after 4 to 7 years. This substance may be hazardous to the environment; special attention should be given to fish and birds. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms.</p>	
NOTES		

Other melting points: 40-60°C (technical grade). Technical aldrin is a tan to dark brown waxy solid. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. The recommendations on this Card also apply to ICSC # 0787 (dieldrin). Aldrine, Aldrex, Aldrite, Aldrosol, Drinox, Seedrin, Octalene are trade names.

Transport Emergency Card: TEC (R)-61G53b
NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

ICSC: 0774

ALDRIN

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International Chemical Safety Cards

HEPTACHLOR

ICSC: 0743

<p>HEPTACHLOR 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene $C_{10}H_5Cl_7$ Molecular mass: 373.35</p> <p>CAS # 76-44-8 RTECS # PC0700000 ICSC # 0743 UN # 2761 EC # 602-046-00-2</p>			
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TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST! PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• INHALATION	Irritation from dust.	Breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	MAY BE ABSORBED!	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs, strong bases. Cool. Dry.	Do not transport with food and feedstuffs. T symbol R: 24/25-33-40 S: 36/37-44 UN Hazard Class: 6.1 UN Packing Group: II Severe marine pollutant.
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0743		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

HEPTACHLOR

ICSC: 0743

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: WHITE CRYSTALS WITH MILD ODOUR OF CAMPHOR.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating producing toxic fumes: chlorine, hydrogen chloride. Reacts with strong oxidants.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: ppm; 0.5 mg/m³ (as TWA) (skin) (ACGIH 1991-1992). TLV (as STEL): ppm; 2 mg/m³ (ACGIH 1991-1992). PDK: 0.01 mg/m³ (USSR 1977).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of dusts from powder concentrates, through the skin especially from liquid formulations, and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of dust may cause irritation.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans. Heptachlor epoxide has been found in human milk in areas with high heptachlor exposure in the population.</p>
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ENVIRONMENTAL DATA	<p>Heptachlor is persistent and rather immobile in soil. This substance may be hazardous to the environment; special attention should be given to marine crustacea and young fish which are very sensitive. In the food chain important to humans, bioaccumulation takes place, specifically in fish and birds. It is strongly advised not to let the chemical enter into the environment.</p>
NOTES	
<p>The technical grade is a waxy solid containing ca. 72% heptachlor and 28% related compounds. All uses of this compound are increasingly restricted. Safe and equally effective alternatives should be preferred. Other melting points: 46-74°C for the technical product. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Aahepta, Agroceres, Basaklor, Heptagran, Heptamul, Rhodiachlor, Velsicol 104, Drinox, among others are trade names.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-61G53b</p>	
ADDITIONAL INFORMATION	
ICSC: 0743	HEPTACHLOR

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OCCUPATIONAL HEALTH SERVICES INC -- DELTA-BHC, OH506310 -- 6840-00N072216

=====
Product Identification
=====

Product ID:DELTA-BHC, OH506310
MSDS Date:12/03/1990
FSC:6840
NIIN:00N072216
MSDS Number: CBXSM
=== Responsible Party ===
Company Name:OCCUPATIONAL HEALTH SERVICES INC
Address:11 WEST 42ND ST 12TH FLOOR
City:NEW YORK
State:NY
ZIP:10036
Country:US
Info Phone Num:800-445-6737
Emergency Phone Num:615-386-2000
CAGE:DO501
=== Contractor Identification ===
Company Name:OCCUPATIONAL HEA & SAFETY,FORD MOTOR CO
Address:900 PARKLANE TOWERS WEST
City:DEARBORNE
State:MI
ZIP:48126
Phone:800-959-3673
CAGE:DO501
Company Name:OCCUPATIONAL HEALTH SERVICES INC
Address:11 W 42ND ST 12 THE FLOOR
City:NEW YORK
State:NY
ZIP:10036
Country:US
Phone:212-789-3535
CAGE:0G9K0

=====
Composition/Information on Ingredients
=====

Ingred Name:CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, DELTA-ISOMER;
(DELTA-HEXACHLOROHEXANE) (CERCLA)
CAS:319-86-8
RTECS #:GV4550000
Fraction by Wt: 100%
OSHA PEL:N/K
ACGIH TLV:N/K
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:FIRST AID PROC:SALINE, OCCAS LIFTING UPPER & LOWER LIDS,
UNTIL NO EVID OF CHEM REMAINS (AT LEAST 15-20 MIN). GET (ING 3)
RTECS #:9999999ZZ

Ingred Name:ING 2: MED ATTN IMMED. INGEST: REMOVE BY IPECAC EMESIS OR
GIVE ACTIVATED CHARCOAL FOLLOWED BY GASTRIC LAVAGE (ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3: W/2-4 LITERS OF TAP WATER. FOLLOW W/SALINE

CATHARTIC. DO NOT GIVE FATS OR OILS. INTESTINAL LAVAGE WITH (ING 5)
RTECS #:9999999ZZ

Inged Name:ING 4: MANNITOL (200 ML) BY STOMACH TUBE IS ALSO USEFUL.
MAINTAIN RESPIRATION, GIVE OXYGEN IF RESPIRATION IS (ING 6)
RTECS #:9999999ZZ

Inged Name:ING 5: DEPRESSED. GASTRIC LAVAGE SHOULD BE PERFORMED BY
QUALIFIED MED PERS. GET MED ATTN IMMED.
RTECS #:9999999ZZ

Inged Name:SPILL PROC: & COVER. MOVE CNTNRS FROM SPILL AREA. FOR
LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISP. (ING 8)
RTECS #:9999999ZZ

Inged Name:ING 7: KEEP UNNEC PEOPLE AWAY. ISOLATE HAZ AREA & DENY
ENTRY. VENT CLSD SPACES BEFORE ENTERING. RQ: 1 LB. SARA (ING 9)
RTECS #:9999999ZZ

Inged Name:ING 8:304 REQS RELS EQUAL TO/GREATER THAN RQ FOR THIS
SUBSTANCE BE IMMED REPORTED TO LOC EMER PLANNING COMMITTEE(ING 10)
RTECS #:9999999ZZ

Inged Name:ING 9: & STATE EMER RESPONSE COMMISSION. IF RELS IS
REPORTABLE UNDER CERCLA 103, NRC MUST BE NOTIFIED IMMED AT (ING 11)
RTECS #:9999999ZZ

Inged Name:ING 10: 800-424-8802.
RTECS #:9999999ZZ

Inged Name:RESP PROT: RANKED IN ORDER FROM MINIMUM TO MAX RESP PROT:
CHEM CARTRIDGE RESP W/ORG VAP CARTRIDGE(S) W/DUST & (ING 13)
RTECS #:9999999ZZ

Inged Name:ING 12: MIST FILTER, INCL PESTICIDE RESPS MEETING THESE
REQS. POWERED AIR-PURIFYING RESP W/ORG VAP CARTRIDGE & (ING 14)
RTECS #:9999999ZZ

Inged Name:ING 13: HIGH EFFICIENCY PARTICULATE FILTER W/FULL FACEPIECE
INCL PESTICIDE RESPS MEETING THESE REQ. TYPE 'C' (ING 15)
RTECS #:9999999ZZ

Inged Name:ING 14: SUPPLIED-AIR RESP W/FULL FACEPIECE OPERATED IN
PRESS-DEMAND OR OTHER POS PRESS MODE OR W/FULL FACEPIECE (ING 16)
RTECS #:9999999ZZ

Inged Name:ING 15: HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.
SCBA W/FULL FACEPIECE OPERATED IN PRESS- (ING 17)
RTECS #:9999999ZZ

Inged Name:ING 16: DEMAND OR OTHER POSITIVE PRESSURE MODE.
RTECS #:9999999ZZ

===== Hazards Identification =====

LD50 LC50 Mixture:LD50: (ORAL, RAT) 750 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE: INHALATION: MAY CAUSE
IRRITATION. SKIN: MAY CAUSE IRRITATION. EYES: MAY CAUSE IRRITATION.
INGEST: LETHAL DOSE IN RATS WAS 750 MG/KG; SYMPTOMS WERE NOT
REPORTED. CHRONIC: INHALATION/SKIN/EYES: N O DATA AVAILABLE.
INGESTION: CHANGES HAVE BEEN REPORTED IN THE KIDNEYS,
LIVER,PANCREAS, TESTES, LUNGS (EFTS OF OVEREXP)

Explanation of Carcinogenicity:NOT RELEVANT

Effects of Overexposure:HLTH HAZ: AND NASAL MUCOUS MEMBRANES OF ANIMALS
FOLLOWING SUFFICIENTLY HIGH REPEATED ABSORPTION OF
HEXACHLOROCYCLOHEXANE OR ONE IF ITS ISOMERS. A MIXTURE OF THE DELTA
ISOMER AND OTHER ISOMERS OF HEXAC HLOROCYCLOHEXANE HAVE PRODUCED
LIVER TUMORS IN MICE.

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.C

=====
===== First Aid Measures =====

First Aid:INHAL: REMOVE FROM EXPOS AREA TO FRESH AIR IMMED. IF BRTHG
HAS STOPPED, PERFORM ARTF RESP. KEEP PERSON WARM & AT REST. TREAT
SYMP & SUPPORTIVELY. GET MED ATTN IMMED. SKIN: REMOVE CONTAMD CLTHG
& SHOES IMMED. WASH AFFECTED AREA W/SOAP OR MILD DETERGENT & LG
AMTS OF WATER UNTIL NO EVID OF CHEM REMAINS (AT LEAST 15-20 MIN).
GET MED ATTN IMMED. EYES: WASH IMMED W/LG AMTS OF WATER OR NORMAL
(ING 2)

=====
===== Fire Fighting Measures =====

Extinguishing Media:DRY CHEM, CARBON DIOXIDE, HALON, WATER SPRAY OR
STANDARD FOAM. FOR LARGER FIRES USE WATER SPRAY, FOG OR STANDARD
FOAM.
Fire Fighting Procedures:USE NIOSH APPRVD SCBA & FULL PROT EQUIP . MOVE
CNTNRS FROM FIRE AREA IF POSS. FIGHT FIRE FROM MAX DIST. STAY AWAY
FROM STORAGE TANK ENDS. DIKE (SUPDAT)
Unusual Fire/Explosion Hazard:NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO
HEAT OR FLAME.

=====
===== Accidental Release Measures =====

Spill Release Procedures:DO NOT TOUCH SPILLED MATL. STOP LEAK IF W/OUT
RISK. USE WATER SPRAY TO REDUCE VAPS. FOR SM SPILLS, TAKE UP W/SAND
OR OTHER ABSORB MATL & PLACE INTO CNTNRS FOR LATER DISP. FOR SMALL
DRY SPILLS, W/CLEAN SHOVEL PLACE MATL INTO CLEAN, DRY CNTNRS (ING
7)

Neutralizing Agent:NONE LISTED BY MANUFACTURER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:STORE I/A/W 40 CFR 165 RECOMMENDED
PROCEDURES FOR DISPOSAL & STORAGE OF PESTICIDES & PESTICIDE
CONTAINERS. STORE AWAY FROM INCOMPATIBLE SUBSTANCES.
Other Precautions:MAY BURN BUT DOES NOT IGNITE READILY. CONTAINERS MAY
EXPLODE IN HEAT OF FIRE.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:SPECIFIC RESP SELECTED MUST BE BASED ON CONTAM
LEVELS FOUND IN WORK PLACE, MUST NOT EXCEED WORKING LIMS OF RESP &

BE NIOSH APPROVD. FOLLOWING RESPS ARE RECOM BASED ON DATA FOUND IN PHYSICAL DATA, HLTH EFTS & TOX SECTIONS. THEY ARE (ING 12)
Ventilation:PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:ANSI APPRVD CHEM WORKERS GOGGLES .
Other Protective Equipment:ANSI APPRVD EYE WASH & DELUGE SHOWER. APPROP PROT IMPERVIOUS CLTHG & EQUIP TO PVNT POSS OF SKIN CNTCT W/SUBSTANCE.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
FIRE FIGHT PROC: FIRE CONTROL WATER FOR LATER DISP. DO NOT SCATTER MATL. USE AGENTS SUITABLE FOR TYPE OF FIRE. COOL CNTNRS W/FLOODING AMTS OF WATER. AVOID BRTHG VAPS OR DUSTS; KEEP UPWIND. MATL TO AVO ID: DIMETHYLFORMAHIDE: POSS DANGEROUS REACTION.

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:140F,60C
Melt/Freeze Pt:M.P/F.P Text:>286F,>141C
Vapor Pres:0.02 @ 20C
Solubility in Water:10 PPM
Appearance and Odor:COLORLESS PLATES.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
ALKALIES, ALUMINUM, IRON, ZINC: MAY DECOMPOSE. N,N-DIMETHYLACETAMIDE: EXOTHERMIC, POSSIBLE VIOLENT REACTION. (SUPDAT)
Stability Condition to Avoid:STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.
Hazardous Decomposition Products:THERMAL DECOMP PRODUCTS MAY INCLUDE HIGHLY TOXIC FUMES OF PHOSGENE, TOX & CORR FUMES OF CHLORIDES & OXIDES OF CARBON.

===== Disposal Considerations =====

Waste Disposal Methods:OBSERVE ALL FED, STATE & LOCAL REGS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE CNTCT THE DISTRICT DIRECTOR OF THE EPA. DISP MUST BE I/A/W 40 CFR 165 RECOMMENDED PROCEDURES FOR DISP & STORAGE OF PESTICIDES & PESTICIDE CNTNRS.

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POLYSCIENCE -- ENDOSULFAN, 510C-14 -- 6810-00N047405

=====
===== Product Identification =====

Product ID:ENDOSULFAN, 510C-14
MSDS Date:04/01/1992
FSC:6810
NIIN:00N047405
MSDS Number: BVBVK
=== Responsible Party ===
Company Name:POLYSCIENCE
Address:7800 MERRIMAC AVE
City:NILES
State:IL
ZIP:60648
Country:US
Info Phone Num:321-965-0611
Emergency Phone Num:321-965-0611
CAGE:IO526
=== Contractor Identification ===
Company Name:POLYSCIENCE
Address:7800 MERRIMAC AVE
Box:City:NILES
State:IL
ZIP:60714
Country:US
Phone:708-965-0611
CAGE:IO526
Company Name:POLYSCIENCE CORP
Address:7800 N MERRIMAC AVE
Box:48312
City:NILES
State:IL
ZIP:60714-3426
Country:US
Phone:708-965-0611
CAGE:58378

=====
===== Composition/Information on Ingredients =====

Ingred Name:5-NORBORNENE-2,3-DIMETHANOL, 1,4,5,6,7,7-HEXACHLORO-,
CYCLIC SULFITE; (ENDOSULFAN) (SARA III)
CAS:115-29-7
RTECS #:RB9275000
Fraction by Wt: 96.0%
OSHA PEL:0.1 MG/M3
ACGIH TLV:0.1 MG/M3
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:OTHER PREC:INSPECTED REGULARLY FOR LEAKS, AND DISCARDED IF
ANY HOLES ARE FOUND.
RTECS #:9999999ZZ
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:VENT:STORAGE LOCATIONS WHERE DUST OR VAPOR ARE EMITTED.

RTECS #:9999999ZZ
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:HYGIENE PRACT:BODY. LAUNDRER ALL CLTHG AFTER EACH USE.
CHANGE CLTHG IMMED IF MATL IS SPILLED HEAVILY UPON CLOTHING.

RTECS #:9999999ZZ
Other REC Limits:NONE RECOMMENDED
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:EYE PROT: LENGTH FACESHIELD .
RTECS #:9999999ZZ
Other REC Limits:NONE RECOMMENDED

=====
===== Hazards Identification =====

LD50 LC50 Mixture:LD50:(ORAL,RAT) 18 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:INGEST:DANGER POIS-MAY BE FATAL IF
SWALLOWED. DO NOT STORE NEAR FEED/FOOD PRODS. EYE:MOD IRRITATING.
DO NOT GET IN EYES. SKIN CONT:WARNING-DO NOT GET ON SKIN/ON CLTHG.
SKIN ABSORP:MAY BE FATAL IF ABSORBED THRU SKIN. INHAL:MAY BE
FATAL. DO NOT BREATHE DUST/VAP. INGEST, INHALED/ABSORBED THRU
INTACT SKIN (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ:SUBSTANCE ACTS AS CNS STIMULANT & MAY
CAUSE HDCH, NAUS &/OR DIARR, WEAK & IN MORE SEV CASES, CONVULS &
RESP DEPRESS. MOD IRRIT TO SKIN & EYES. NOTE TO MD:ACTIVE INGRED IS
A CNS STIMULANT & MAY CAUSE CONVULS, & RESP DEPRESS. CONSULT
RECOMM TRTMT FOR CHLORINATED HYDROCARBON PESTICIDE POISONING.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====
===== First Aid Measures =====

First Aid:INGEST:HAVE VICTIM DRINK 1-2 GLASSES OF WATER & INDUCE VOMIT
BY TOUCHING BACK OF THROAT W/FINGER/BLUNT OBJECT. RPT UNTIL VOMIT
IS CLEAR. DO NOT INDUCE VOMIT/GIVE ANYTHING BY MOUTH TO AN UNCON
PERSON. HAVE VICTIM LIE DOWN & KEEP QUIET. EYES:FLUSH FOR @ LST 15
MINS W/PLENTY OF WATER, LIFTING UPPER & LOWER LIDS OCCASNL.
SKIN:REMOVE CONTAMD CLTHG & WASH ALL EXPOSED/AFFECTED SKIN/CLTHG
SURF (SUPDAT)

=====
===== Fire Fighting Measures =====

Extinguishing Media:WATER FOG, FOAM, CO*2 AND DRY CHEMICAL.
Fire Fighting Procedures:ISOLATE FIRE AREA.USE NIOSH/MSHA APPROVED SCBA
& FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:TOX GASES ARE EVOLVED WHEN MATL IS
OVERHEATED. DO NOT BREATHE SMOKE/VAPS GENERATED. IF WATER MUST BE
USED, USE SOFT STREAM FOGGERS TO MIN SPREAD OF (SUPDAT)

=====
===== Accidental Release Measures =====

Spill Release Procedures:ISOLATE & POST SPILL AREA. EPA REPORTABLE
QTY-1LB. WEAR PRESCRIBED PROT CLTHG. CAREFULLY SCOOP UP INTO DRUM

FOR REUSE/DISP. CAREFULLY SWEEP UP RESIDUAL. USE SWEEPING CMPD TO MINIMIZE DUSTING. FOLLOWIN G CLEAN UP OF SPILL, WASH CONTAMD AREA W/ (SUPDAT)

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:DO NOT CUT/WELD CNTNRS. DO NOT REUSE CNTNRS EXCEPT FOR THIODAN. SMKNG MATLS CARRIED BY WORKERS SHOULD BE PROT FROM CONTAM.

Other Precautions:SMKNG, EAT & DRINK SHOULD NOT BE PERMITTED WHERE PROD IS HNDLD/STORED. WASH PROT CLTHG AFTER EACH USE/IF GROSS CONTAM (SPILLS) OCCUR. INSIDE OF RUBBER GLOVES SHOULD BE FLUSHED & TURNED INSIDE OUT TO D RY. GLOVES SHOULD BE (ING 2)

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:FOR FIRES: NIOSH/MSHA APPRVD SCBA ONLY SUCH AS A SCOTT AIR PAK. FOR DUST/VAP EXPOS USE NIOSH/MSHA APPROVED HALF-MASK.

Ventilation:THORO VENT ALL TRANSPORT VEHICLES PRIOR TO UNLOADING. STORE IN VENTD AREA. USE LOC EXHST VENT @ ALL PROCESS/ (ING 3)

Protective Gloves:RUBBER GLOVES.

Eye Protection:ANSI APPVD CHEM WORK GOGG W/FULL (ING 5)

Other Protective Equipment:PROT CLTHG SHOULD INCL:RUBBER BOOTS, COATS & LIQ PROOF HAT. FOR NORMAL PROCESSING, CLTHG COVERALLS, CAPS, WORKSHOES.

Work Hygienic Practices:WASH EXPOS SKIN SURFS PRIOR TO SMKNG/EAT/DRINK. WORKERS SHOULD SHOWER @ END OF EACH WORKDAY, WASH HAIR & ENTIRE(ING 4)

Supplemental Safety and Health

EXPLO HAZ:CONTAM. CONT FMC FOR EMER ADVICE & DECONTAM PROCS. FIRST AID PROC:THORO W/SOAP & WATER. INHAL:REMOVE TO FRESH AIR. SUPPORT BRTHG(ARTF RESP). SPILL PROC:DETERGENT/ WATER/3-5% CAUSTIC SO LN. COLLECT ALL WASH WATER IN CNTNRS FOR DISP. WASTE DISP METH:NOT CONTAM WATER BY CLEANING OF EQUIP/DISP OF WASTES.

=====
===== Physical/Chemical Properties =====

HCC:T3

Boiling Pt:B.P. Text:DECOMP>250C

Melt/Freeze Pt:M.P/F.P Text:70-100

Vapor Pres:1X10⁻⁵ @25

Vapor Density:14.3

Spec Gravity:1.74 @ 20C

Evaporation Rate & Reference:NOT KNOWN

Solubility in Water:PRACITICALLY INSOL

Appearance and Odor:SHARP, ACRID-SULFUR DIOXIDE LIKE ODOR, TAN TO BROWN FLAKED SOLID

=====
===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

MOISTURE, BASE AND ACID, AND IS SLOWLY DECOMPOSED BY HYDROLYSIS TO FORM ENDSULFAN ALCOHOL AND SULFUR DIOXIDE.

Stability Condition to Avoid:STABLE UNDER NORM STOR CONDTNS.

Hazardous Decomposition Products:UPON BURNING, MAY YIELD HYDROGEN

CHLORIDE, SULFUR OXIDES, CARBON DIOXIDE & CARBON MONOXIDE GASES.

===== Disposal Considerations =====

Waste Disposal Methods:DISP OF I/A/W FED, STATE & LOC REGS. DISP OF
WASTE IN INCIN/LANDFILL APPRVD FOR PEST HAZ MATLS. PERFORATE/CRUSH
CNTNRS BEFORE DISP. DO NOT RE-USE CNTNRS. TOX TO FISH, BIRDS &
OTHER WILDLIFE. KEE P OUT OF SEWERS/ANY BODIES OF WATER. DO(SUPDAT)

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International Chemical Safety Cards

DIELDRIN

ICSC: 0787

<p>DIELDRIN HEOD 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro,endo,exo-1,4:5,8-dimethanonaphthalene C₁₂H₈Cl₆O Molecular mass: 381</p> <p>CAS # 60-57-1 RTECS # IO1750000 ICSC # 0787 UN # 2761 EC # 602-049-00-9</p>

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION	(see Ingestion).	Ventilation (not if powder).	Fresh air, rest. Refer for medical attention.
• SKIN	MAY BE ABSORBED! See Ingestion.	Protective gloves. Rubber boots.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Convulsions. Dizziness. Headache. Nausea. Vomiting. Weakness.	Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs. Cool. Dry.	Do not transport with food and feedstuffs. T+ symbol R: 25-27-40-48 S: 22-36/37-45 UN Hazard Class: 6.1 UN Packing Group: I Marine pollutant.
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0787		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

DIELDRIN

ICSC: 0787

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating producing toxic and corrosive fumes (chlorine fumes, hydrogen chloride). Reacts with oxidants, concentrated mineral acids, acid acatalysts, metals (copper, iron). Attacks metal due to the slow formation of hydrogen chloride in storage.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV (as TWA): ppm; 0.25 mg/m³ (skin) (ACGIH 1991-1992).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance may cause effects on the central nervous system, resulting in convulsions. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may be found in the human placenta.</p>
PHYSICAL PROPERTIES	Melting point: 175-176°C Relative density (water = 1): 1.62 Solubility in water: None	Vapour pressure, Pa at 20°C: 0.0004 Octanol/water partition coefficient as log Pow: 6.2
ENVIRONMENTAL DATA	Dieldrin persists in the environment: 50% disappear after 4 to 7 years. This substance may be hazardous to the environment; special attention should be given to birds and water organisms. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms.	
NOTES		

Technical dieldrin (95%) consists of light tan flakes with a mild odour. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. The recommendations on this Card also apply to ICSC # 0774 (aldrin). Alvit, Octalox, Quintox, Illoxol, Panoram D-31, Dielrite, Dorytox, Compound 497 are trade names.

Transport Emergency Card: TEC (R)-61G53b

ADDITIONAL INFORMATION

ICSC: 0787

DIELDRIN

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LEGAL
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POLYSCIENCE -- ENDRIN, 510C-4 -- 6810-00N047396

=====
Product Identification
=====

Product ID:ENDRIN, 510C-4
MSDS Date:03/01/1992
FSC:6810
NIIN:00N047396
MSDS Number: BSTJG
=== Responsible Party ===
Company Name:POLYSCIENCE
Address:7800 MERRIMAC AVE
City:NILES
State:IL
ZIP:60648
Country:US
Info Phone Num:321-965-0611
Emergency Phone Num:321-965-0611
CAGE:IO526
=== Contractor Identification ===
Company Name:POLYSCIENCE
Address:7800 MERRIMAC AVE
Box:City:NILES
State:IL
ZIP:60714
Country:US
Phone:708-965-0611
CAGE:IO526
Company Name:POLYSCIENCE CORP
Address:7800 N MERRIMAC AVE
Box:48312
City:NILES
State:IL
ZIP:60714-3426
Country:US
Phone:708-965-0611
CAGE:58378

=====
Composition/Information on Ingredients
=====

Ingred Name:1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXACHLORO-6,
7-EPOXY-1, 4,4A,5,6,7,8,8A- OCTAHYDRO-, ENDO, ENDO-; (ING 2)
CAS:72-20-8
RTECS #:IO1575000
OSHA PEL:N/K
ACGIH TLV:N/K
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:ING 1: (ENDRIN) (MFR CAS # 105208-85-3)
RTECS #:9999999ZZ

=====
Hazards Identification
=====

LD50 LC50 Mixture:LD50:(ORAL,RAT)3 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:ACUTE: MAY BE FATAL IF INHALED, SWALLOWED/ABSORBED THRU SKIN. READILY ABSORBED THRU SKIN. EXPOSURE CAN CAUSE: WEAKNESS, NAUSEA, TWITCHING AND TINGLING OF LIMBS, DEAFNESS AND METAL CONFUSION, CONVULSIONS, SOMETIMES ACCOMPANIED BY VIOLENT MUSCULAR CONTRACTIONS AND PERIODS OF UNCONSCIOUSNESS MAY ALSO OCCUR. (EFFECTS OF OVEREXPOSURE)

Explanation of Carcinogenicity:NOT RELEVANT

Effects of Overexposure:HEALTH HAZARD: CHRONIC: CONTAINS A RADIOACTIVE ISOTOPE WHICH MAY PRODUCE CANCER AND GENETIC MUTATION. TARGET ORGAN(S): NERVES, LIVER.

Medical Condition Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

===== First Aid Measures =====

First Aid:SKIN: OBTAIN MEDICAL ATTENTION IMMEDIATELY. INGEST: WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN. INHALATION: REMOVE TO FRESH AIR. IF BREATHING BECOMES DIFFICULT, CALL A PHYSICIAN. EYES: FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING EYELIDS WITH FINGERS. CALL A PHYSICIAN.

===== Fire Fighting Measures =====

Extinguishing Media:USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.

Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT.

Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

===== Accidental Release Measures =====

Spill Release Procedures:EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS & HEAVY RUBBER GLOVES. COVER WITH AN ACTIVATED CARBON ADSORBENT, TAKE UP & PLACE IN CLOSED CONTAINERS. TRANSPORT OUTDOORS. VENT AREA & WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE. HANDLE AS A RADIOACTIVE SPILL.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:DO NOT BREATHE VAPOR. RADIOACTIVE MATERIAL. CAN CAUSE DEPRESSION.

Other Precautions:VERY TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED. IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN. KEEP AWAY FROM SOURCES OF IGNITION. NO SMOKING.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED SCBA SHOULD BE WORN.

Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.

Protective Gloves:HEAVY RUBBER GLOVES.

Eye Protection:ANSI APPROVED CHEMICAL WORK GOGGLES (SUPPLY)

Other Protective Equipment:NONE SPECIFIED BY MANUFACTURER.

Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.

Supplemental Safety and Health

EYE PROTECTION: WITH FULL LENGTH FACESHIELD.

===== Physical/Chemical Properties =====

HCC:T2

Appearance and Odor:NONE SPECIFIED BY MANUFACTURER.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZING AGENTS, ACIDS.

Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomposition Products:TOXIC FUME OF: CARBON MONOXIDE, CARBON
DIOXIDE. HYDROGEN CHLORIDE GAS.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF SPILLED MATERIAL AS RADIOACTIVE
WASTE. CONSULT LOCAL, STATE AND FEDERAL REGULATIONS ON DISPOSAL OF
RADIOACTIVE WASTE. OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

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assume responsibility for the suitability of this information to their
particular situation.

CHEM SERVICE INC -- F94S 4.4'-DDD 100UG/ML IN METHANOL -- 6550-00F041387

=====
Product Identification
=====

Product ID:F94S 4.4'-DDD 100UG/ML IN METHANOL
MSDS Date:12/07/1992
FSC:6550
NIIN:00F041387
MSDS Number: BXNQS
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US

Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-386-2100/215-692-3026
CAGE:84898

=== Contractor Identification ===

Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone:610-692-3026
CAGE:8Y898

=====
Composition/Information on Ingredients
=====

Ingred Name:METHANOL (METHYL ALCOHOL), COLUMBIAN SPIRITS *95-2*
CAS:67-56-1
RTECS #:PC1400000
Other REC Limits:200 PPM
OSHA PEL:260 MG/CUM
ACGIH TLV:262 MG/CUM (SKIN)
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

Ingred Name:4,4'-DDD (ANIMAL CARCINOGEN BY IARC - GROUP 2B) *95-2*
CAS:72-54-8
RTECS #:KI0700000
Other REC Limits:1 MG/CUM
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

=====
===== Hazards Identification =====

LD50 LC50 Mixture:ORAL LD50(RAT/MOUSE): 5628 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:YES OSHA:NO
Health Hazards Acute and Chronic:MAY BE FATAL IF ABSORBED THROUGH THE
SKIN, INHALED/IF SWALLOWED. EYES: MAY CAUSE INJURY/BLINDNESS.
EXPOSURE CAN CAUSE LIVER/KIDNEY DAMAGE & CARDIOVASCULAR SYSTEM
INJURY.
Explanation of Carcinogenicity:SEE INGREDIENTS.
Effects of Overexposure:GASTROINTESTINAL DISTURBANCES, CONVULSIONS

=====
===== First Aid Measures =====

First Aid:EYES: FLUSH CONTINUOUSLY W/WATER FOR 15-20 MINS. SKIN: FLUSH
W/WATER FOR 15-20 MINS, IF NO BURNS HAVE OCCURED-USE SOAP & WATER
TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. ADMINISTER OXYGEN/CPR
IF NEC ESSARY. OBTAIN MEDICAL ATTENTION IN ALLCASES. AN ANTIDOTE IS
A SUBSTANCE INTENDED TO COUNTERACT THE EFFECT OF A POISON. IT
SHOULD BE ADMINISTERED ONLY BY A PHYSICIAN/TRAINED EMERGENCY
PERSONNEL.

=====
===== Fire Fighting Measures =====

Flash Point:51.8F
Lower Limits:6
Upper Limits:36
Extinguishing Media:CO2, DRY CHEMICAL POWDER.
Fire Fighting Procedures:DON'T USE WATER.
Unusual Fire/Explosion Hazard:FLAMMABLE CHEMICAL.

=====
===== Accidental Release Measures =====

Spill Release Procedures:EVACUATE AREA. WEAR OSHA REGULATED EQUIPMENT.
VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP &
PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH
CONTAMINATED SURFACES TO REM OVE ANY RESIDUES.

=====
===== Handling and Storage =====

Handling and Storage Precautions:STORE IN A COOL, DRY PLACE. STORE ONLY
W/COMPATIBLE CHEMICALS. KEEP TIGHTLY CLOSED. MATERIAL IS
HYGROSCOPIC.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATHE
VAPORS. PRODUCT IS FOR LABORATORY USE ONLY. PRODUCTS MAY NOT BE
USED AS DRUGS, COSMETICS, AGRICULTURAL/PESTICIDAL PRODUCTS, FOOD
ADDITIVES/AS HOUSE HOLD CHEMICALS.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE APPROPRIATE OSHA/MSHA APPROVED SAFETY
EQUIPMENT.
Ventilation:THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Protective Gloves:RECOMMENDED
Eye Protection:EYE SHIELDS
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE
REUSE. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY.

Supplemental Safety and Health

INFORMATION IS FOR THE SOLVENT METHYL ALCOHOL. ALL CHEMICALS SHOULD BE
CONSIDERED HAZARDOUS-AVOID DIRECT PHYSICAL CONTACT.

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:148.28F
Melt/Freeze Pt:M.P/F.P Text:-144.4F
Vapor Pres:96
Vapor Density:1.11
Solubility in Water:MISCIBLE
Appearance and Odor:COLORLESS LIQUID

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, STRONG OXIDIZING AGENTS, STRONG REDUCING AGENTS, ACTIVE
METALS; SODIUM. REACTS W/ACID HALIDES & ANHYDRIDES
Stability Condition to Avoid:MOISTURE
Hazardous Decomposition Products:TOXIC FUMES

===== Disposal Considerations =====

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN
AFTERBURNER & SCRUBBER IN ACCORDANCE W/LOCAL, STATE & FEDERAL
REGULATIONS.

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particular situation.

CHEM SERVICE INC -- F93S 4.4-DDE 100 UG/ML IN METHANOL -- 6810-00F046766

=====
Product Identification
=====

Product ID:F93S 4.4-DDE 100 UG/ML IN METHANOL
MSDS Date:11/13/1991
FSC:6810
NIIN:00F046766
MSDS Number: BYNLX
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US

Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-386-2100/215-692-3026
CAGE:84898

=== Contractor Identification ===

Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone:610-692-3026
CAGE:8Y898

=====
Composition/Information on Ingredients
=====

Ingred Name:1,1-DICHLORO-2,2-BIS(P-CHLOROPHENYL)ETHYLENE (ANIMAL
CARCINOGEN BY IARC GROUP 2B) *96-1*
CAS:72-55-9
RTECS #:KV9450000
Other REC Limits:1 MG/CUM
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:METHANOL (METHYL ALCOHOL), COLUMBIAN SPIRITS *95-4*
CAS:67-56-1
RTECS #:PC1400000
Other REC Limits:200 PPM
OSHA PEL:200 PPM
ACGIH TLV:200 PPM
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

=====
===== Hazards Identification =====

LD50 LC50 Mixture:ORAL LD50(RAT/MOUSE): 5628 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:MAY BE FATAL IF ABSORBED THROUGH THE
SKIN, INHALATION/INGESTED. EYES: VAPORS/DUST CAN CAUSE INJURY.
EXPOSURE CAN CAUSE LIVER & KIDNEY DAMAGE. CAN CAUSE CARDIOVASCULAR
SYSTEM INJURY.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:BLINDNESS, GI DISTURBANCES, CONVULSIONS.

=====
===== First Aid Measures =====

First Aid:EYES: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS OCCUR, USE
SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE
OXYGEN IF VICTIM IS HAVING TROUBLE BREATHING. GIVE ARTIFICIAL
RESPIRATION IF V ICTIM HAS STOPPED BREATHING. GIVE CPR IF VICTIM IS
IN CARDIAC ARREST. CONTINUE LIFE SUPPORTING MEASURES UNTIL MEDICAL
ASSISTANCE HAS ARRIVED. OBTAIN MEDICAL ATTENTION IN ALL CASES. (SEE
SUPP)

=====
===== Fire Fighting Measures =====

Flash Point:51.8F
Lower Limits:6
Upper Limits:36
Extinguishing Media:CO2/DRY CHEMICAL POWDER.
Fire Fighting Procedures:DON'T USE WATER!
Unusual Fire/Explosion Hazard:FLAMMABLE CHEMICAL.

=====
===== Accidental Release Measures =====

Spill Release Procedures:EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED
EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE MATERIAL. SWEEP UP
& PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH
CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

=====
===== Handling and Storage =====

Handling and Storage Precautions:HANDLE ONLY IN A CHEMICAL HOOD. USE
APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT. STORE IN A COOL
DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS.
Other Precautions:KEEP TIGHTLY CLOSED. AVOID CONTACT W/SKIN, EYES &
CLOTHING. DON'T BREATHE VAPORS. CONTACT LENSES SHOULDN'T BE WORN IN
THE LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS-AVOID
DIRECT PHYSICAL CONTACT! FOR LABORATORY USE ONLY!

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE CHEMICAL HOOD.
Eye Protection:SAFETY SHIELDS
Other Protective Equipment:APPROPRIATE SAFETY EQUIPMENT.
Work Hygienic Practices:DON'T WEAR SHOES/CLOTHING UNTIL ABSOLUTELY FREE
OF ALL CHEMICAL ODORS.
Supplemental Safety and Health

PRODUCT MAY NOT BE USED AS DRUGS/COSMETICS/AGRICULTURAL/PESTICIDAL PRODUCTS/FOOD ADDITIVES/AS HOUSEHOLD CHEMICALS. PERSONS NOT PROPERLY TRAINED SHOULDN'T HANDLE THIS CHEMICAL. FIRST AID: AN ANTIDOTE I S A SUBSTANCE INTENDED TO COUNTERACT THE EFFECT OF A POSION. IT SHOULDN'T BE GIVEN ONLY BY A PHYSICIAN/TRAINED PERSONNEL

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:148.28F
Melt/Freeze Pt:M.P/F.P Text:-144.4F
Vapor Pres:96
Vapor Density:1.11
Solubility in Water:MISCIBLE
Appearance and Odor:COLORLESS LIQUID

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS & STRONG OXIDIZING AGENTS, STRONG REDUCING AGENTS, ACTIVE METALS, SODIUM.
Stability Condition to Avoid:COMPATIBLE CHEMICALS
Hazardous Decomposition Products:ACID HALIDES & ANHYDRIDES, TOXIC FUMES.

===== Disposal Considerations =====

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.

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SUPELCO,INC. -- ENDOSULFAN II (BETA) 25 MG,48578 -- 6810-00N010649

=====
Product Identification
=====

Product ID:ENDOSULFAN II (BETA) 25 MG,48578

MSDS Date:05/16/1985

FSC:6810

NIIN:00N010649

MSDS Number: BHYRD

=== Responsible Party ===

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

City:BELLEFONTE

State:PA

ZIP:16823-0048

Info Phone Num:814-359-3441

Emergency Phone Num:814-359-3441

CAGE:HO582

=== Contractor Identification ===

Company Name:SIGMA-ALDRICH INC.

Address:3050 SPRUCE STREET

Box:14508

City:ST. LOUIS

State:MO

ZIP:63103

Country:US

Phone:314-771-5765/414-273-3850X5996

CAGE:54968

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

Box:City:BELLEFONTE

State:PA

ZIP:16823-0048

Phone:814-359-3441

CAGE:HO582

=====
Composition/Information on Ingredients
=====

Ingred Name:BETA - ENDOSULFAN (SARA III)

CAS:33213-65-9

RTECS #:RB9875200

Other REC Limits:N/K

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

=====
Hazards Identification
=====

LD50 LC50 Mixture:LD50 RAT ORAL 249 MG/KG.

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:HARMFUL IF INHALED OR SWALLOWED.

Explanation of Carcinogenicity:NONE

Effects of Overexposure:EYES/SKIN:N/K .INGESTION/INHALATION:HARMFUL.

Medical Cond Aggravated by Exposure:N/K

=====
First Aid Measures
=====

First Aid:EYES:FLUSH W/ H*2O FOR AT LEAST 15 MIN.SKIN:FLUSH W/ LARGE VOLUMES OF WATER.INGESTION:NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT.INHALATION:IMM EDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.CONTACT MD.

=====
===== Fire Fighting Measures =====

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:TOXIC VAPORS OF CHLORIDES AND SO*X ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

=====
===== Accidental Release Measures =====

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL.AVOID GENERATING DUST.
Neutralizing Agent:N/K

=====
===== Handling and Storage =====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.
Other Precautions:AVOID EYE OR SKIN CONTACT.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RECOMMENDED
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/SKIN/INGESTION .

=====
===== Physical/Chemical Properties =====

Melt/Freeze Pt:M.P/F.P Text:208C,406F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:GRAYISH-WHITE POWDER.

=====
===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES AND SO*X.

=====
===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS .

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assume responsibility for the suitability of this information to their
particular situation.

SUPELCO INC -- ENDRIN ALDEHYDE, 48723 -- 6640-00N059189

=====
Product Identification
=====

Product ID: ENDRIN ALDEHYDE, 48723
MSDS Date: 01/04/1990
FSC: 6640
NIIN: 00N059189
MSDS Number: BXGNS
=== Responsible Party ===
Company Name: SUPELCO INC
Address: SUPELCO PARK
City: BELLEFONTE
State: PA
ZIP: 16823-0048
Country: US
Info Phone Num: 814-359-3441
Emergency Phone Num: 814-359-3441
CAGE: 54968
=== Contractor Identification ===
Company Name: SIGMA-ALDRICH INC.
Address: 3050 SPRUCE STREET
Box: 14508
City: ST. LOUIS
State: MO
ZIP: 63103
Country: US
Phone: 314-771-5765/414-273-3850X5996
CAGE: 54968

=====
Composition/Information on Ingredients
=====

Ingred Name: ENDRIN ALDEHYDE (CERCLA)
CAS: 7421-93-4
Fraction by Wt: 0.002%
OSHA PEL: N/K
ACGIH TLV: N/K
EPA Rpt Qty: 1 LB
DOT Rpt Qty: 1 LB

Ingred Name: METHYL ALCOHOL; (METHANOL) (SARA 313) (CERCLA).
LD50: (ORAL, RAT) 5628 MG/KG.
CAS: 67-56-1
RTECS #: PC1400000
Fraction by Wt: 99.998%
OSHA PEL: 200 PPM, S
ACGIH TLV: 200 PPM; 250 STEL, S
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

=====
Fire Fighting Measures
=====

Flash Point: 50.0F, 10.0C
Lower Limits: 6%
Upper Limits: 36.5%
Extinguishing Media: CO*2, DRY CHEMICAL, ALCOHOL FOAM.
Fire Fighting Procedures: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE

EQUIPMENT .

===== Exposure Controls/Personal Protection =====

Supplemental Safety and Health

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:149F,65C
Melt/Freeze Pt:M.P/F.P Text:-144F,-98C
Vapor Pres:100
Vapor Density:1.1
Spec Gravity:0.79 (H*20=1)
Evaporation Rate & Reference:>1 (ETHER=1)
Solubility in Water:100%
Appearance and Odor:CLEAR, COLORLESS LIQUID.
Percent Volatiles by Volume:100

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS, CHROMIC ANHYDRIDE, LEAD PERCHLORATE, PERCHLORIC
ACIDS.

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particular situation.

SUPELCO INC -- 4,4'-DDT 20UG/ML 1ML, 48678 -- 6850-00N021852

===== Product Identification =====

Product ID:4,4'-DDT 20UG/ML 1ML, 48678

MSDS Date:09/13/1991

FSC:6850

NIIN:00N021852

MSDS Number: BLRZG

=== Responsible Party ===

Company Name:SUPELCO INC

Address:SUPELCO PARK

City:BELLEFONTE

State:PA

ZIP:16823-0048

Country:US

Info Phone Num:814-359-3441

Emergency Phone Num:814-359-3441

CAGE:54968

=== Contractor Identification ===

Company Name:SIGMA-ALDRICH INC.

Address:3050 SPRUCE STREET

Box:14508

City:ST. LOUIS

State:MO

ZIP:63103

Country:US

Phone:314-771-5765/414-273-3850X5996

CAGE:54968

===== Composition/Information on Ingredients =====

Ingred Name:DDT (DICHLORODIPHENYLTRICHLOROETHANE) (SARA III)

CAS:50-29-3

RTECS #:KJ3325000

Fraction by Wt: 0.02%

OSHA PEL:S, 1 MG/M3

ACGIH TLV:1 MG/M3; 9192

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

Ingred Name:METHYL ALCOHOL (METHANOL) (SARA III)

CAS:67-56-1

RTECS #:PC1400000

Fraction by Wt: 99.98%

OSHA PEL:S,200PPM/250STEL

ACGIH TLV:S,200PPM/250STEL; 93

EPA Rpt Qty:5000 LBS

DOT Rpt Qty:5000 LBS

===== Hazards Identification =====

LD50 LC50 Mixture:SEE INGREDIENTS 1 & 2.

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO

Health Hazards Acute and Chronic:HARMFUL IF INHALED. MAY BE FATAL IF

SWALLOWED. CONTAINS LOW CONCENTRATIONS OF MATLS KNOWN TO STATE OF

CALIF TO CAUSE CANCER. HEADACHE, NAUSEA, GASTROINTESTINAL
DISTURBANCES, BLINDNESS.
Explanation of Carcinogenicity:4,4-DDT:GROUP 2B(IARC), GROUP 2(NTP).
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====
===== First Aid Measures =====

First Aid:EYES:FLUSH W/H2O FOR @ LST 15 MIN. CALL MD. SKIN:FLUSH W/LG
VOLS OF H2O. INHAL:IMMED MOVE TO FRESH AIR. IF BRTHG STOPS, GIVE
ARTF RESP. CALL MD. INGEST:NEVER GIVE ANYTHING BY MOUTH TO UNCON
PERS. NEVE R TRY TO MAKE UNCON PERS VOMIT. GIVE 2 TABLESPOONS OF
BAKING SODA IN GLASS OF H2O, PRESS FINGERS TO BACK OF TONGUE TO
INDUCE VOMIT. IMMED CALL MD.

=====
===== Fire Fighting Measures =====

Flash Point:50.0F,10.0C
Lower Limits:6%
Upper Limits:36.5%
Extinguishing Media:CO2, DRY CHEMICAL, ALCOHOL FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA & FULL
PROTECTIVE EQUIPMENT .

=====
===== Accidental Release Measures =====

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL. VENTILATE
AREA. ELIMINATE ALL IGNITION SOURCES.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:STORE IN SEALED CNTNR IN COOL, DRY
LOCATION. KEEP AWAY FROM OXIDIZERS. KEEP AWAY FROM IGNITION
SOURCES.
Other Precautions:AVOID EYE/SKIN CONTACT. AVOID BREATHING VAPORS. SUBJ
TO REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:WEAR NIOSH/MSHA APPROVED FACE MASK WITH ORGANIC
VAPOR CANISTER.
Ventilation:USE ONLY IN WELL VENTILATED AREA.
Protective Gloves:WEAR RUBBER GLOVES.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

=====
===== Physical/Chemical Properties =====

HCC:F5
Boiling Pt:B.P. Text:149F,65C
Melt/Freeze Pt:M.P/F.P Text:-144F,-98C
Vapor Pres:100 MM
Vapor Density:1.1
Spec Gravity:0.79

Evaporation Rate & Reference:>1 (ETHER=1)
Solubility in Water:100
Appearance and Odor:CLEAR COLORLESS LIQUID
Percent Volatiles by Volume:100

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS, CHRONIC ANHYDRIDE, LEAD PERCHLORATE, PERCHLORIC
ACIDS.

===== Disposal Considerations =====

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL, STATE &
LOCAL REGULATIONS.

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assume responsibility for the suitability of this information to their
particular situation.

SUPELCO,INC. -- ENDOSULFAN SULFATE 0.1 G,48580 -- 6810-00N010650

=====
Product Identification
=====

Product ID:ENDOSULFAN SULFATE 0.1 G,48580

MSDS Date:03/10/1988

FSC:6810

NIIN:00N010650

MSDS Number: BHYRF

=== Responsible Party ===

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

City:BELLEFONTE

State:PA

ZIP:16823-0048

Info Phone Num:814-359-3441

Emergency Phone Num:814-359-3441

CAGE:HO582

=== Contractor Identification ===

Company Name:SIGMA-ALDRICH INC.

Address:3050 SPRUCE STREET

Box:14508

City:ST. LOUIS

State:MO

ZIP:63103

Country:US

Phone:314-771-5765/414-273-3850X5996

CAGE:54968

Company Name:SUPELCO,INC.

Address:SUPELCO PARK

Box:City:BELLEFONTE

State:PA

ZIP:16823-0048

Phone:814-359-3441

CAGE:HO582

=====
Composition/Information on Ingredients
=====

Ingred Name:ENDOSULFAN SULFATE (SARA III)

CAS:1031-07-8

RTECS #:RB9150000

Other REC Limits:N/K

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

=====
Hazards Identification
=====

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:HARMFUL IF INHALED OR SWALLOWED.

Explanation of Carcinogenicity:REPORTED ANIMAL CARCINOGEN (MFR).

Effects of Overexposure:EYES/SKIN:N/K .INGESTION/INHALATION:HARMFUL.

Medical Cond Aggravated by Exposure:N/K

=====
First Aid Measures
=====

First Aid:EYES:FLUSH W/ H*20 FOR AT LEAST 15 MIN.SKIN:FLUSH W/ LARGE

VOLUMES OF WATER.INGESTION:CALL MD IMMEDIATELY
.INHALATION:IMMEDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING
IS LABORED.CONTACT MD .

=====
Fire Fighting Measures
=====

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:WATER,CO*2,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:TOXIC VAPORS OF CHLORIDES AND SO*X ARE
FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

=====
Accidental Release Measures
=====

Spill Release Procedures:TAKE UP WITH ABSORBENT MATERIAL.AVOID
GENERATING DUST.
Neutralizing Agent:N/K

=====
Handling and Storage
=====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY
LOCATION.AVOID GENERATING DUST.
Other Precautions:AVOID EYE OR SKIN CONTACT.REPORTED CANCER HAZARD
(MFR).

=====
Exposure Controls/Personal Protection
=====

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR
EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR
CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RECOMMENDED
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/SKIN/INGESTION .

=====
Physical/Chemical Properties
=====

Decomp Temp:Decomp Text:N/K
Appearance and Odor:N/K

=====
Stability and Reactivity Data
=====

Stability Indicator/Materials to Avoid:YES
Hazardous Decomposition Products:CHLORIDES AND SO*X.

=====
Disposal Considerations
=====

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH
FEDERAL,STATE AND LOCAL REGULATIONS .

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POLYSCIENCE -- METHOXYCHLOR, 510C-8 -- 6810-00N047399

=====
Product Identification
=====

Product ID:METHOXYCHLOR, 510C-8

MSDS Date:03/01/1992

FSC:6810

NIIN:00N047399

MSDS Number: BVHSJ

=== Responsible Party ===

Company Name:POLYSCIENCE

Address:7800 MERRIMAC AVE

City:NILES

State:IL

ZIP:60648

Country:US

Info Phone Num:321-965-0611

Emergency Phone Num:321-965-0611

CAGE:IO526

=== Contractor Identification ===

Company Name:POLYSCIENCE

Address:7800 MERRIMAC AVE

Box:City:NILES

State:IL

ZIP:60714

Country:US

Phone:708-965-0611

CAGE:IO526

Company Name:POLYSCIENCE CORP

Address:7800 N MERRIMAC AVE

Box:48312

City:NILES

State:IL

ZIP:60714-3426

Country:US

Phone:708-965-0611

CAGE:58378

=====
Composition/Information on Ingredients
=====

Ingred Name:ETHANE, 1,1,1-TRICHLORO-2,2-BIS (P-METHOXYPHENYL)-;
(METHOXYCHLOR) (SARA III)

CAS:72-43-5

RTECS #:KJ3675000

OSHA PEL:15 MG/M3 TDUST

ACGIH TLV:10 MG/M3

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

=====
Hazards Identification
=====

LD50 LC50 Mixture:LD50:(ORAL,RAT)5 GM/KG.

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:ACUTE:HARMFUL IF SWALLOWED, INHALED OR
ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION. CHRONIC:OVEREXPOSURE

MAY CAUSE REPRODUCTIVE DISORDER(S) BASED ON TESTS W/LABORATORY

ANIMALS. LABORATORY EXPERIMENTS HAVE SHOWN MUTAGENIC EFFECTS.
TARGET ORGAN(S):CENTRAL NERVOUS SYSTEM, KIDNEYS. TARGET ORGAN
DATA:EFTS (EFTS OF OVEREXP)

Explanation of Carcinogenicity:NOT RELEVANT

Effects of Overexposure:HLTH HAZ:ON FERTILITY (POST-IMPLANTATION
MORTALITY; LITTER SIZE). EFTS ON EMBRYO/FETUS (FETOTOXICITY).
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM).

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====
First Aid Measures
=====

First Aid:EYES:IMMED FLUSH W/COPIOUS AMTS OF WATER FOR AT LST 15 MINS.
ASSURE ADEQ FLUSHING BY SEPARATING EYELIDS W/FINGERS. SKIN:IMMED
FLUSH W/COPIOUS AMTS OF WATER FOR AT LST 15 MINS WHILE REMOVING
CONTAM CLT HG & SHOES. WASH CONTAM CLTHG BEFORE REUSE. INHAL:REMOVE
TO FRESH AIR. IF NOT BRTHG GIVE ARTF RESP. IF BRTHG IS DFCLT, GIVE
OXYGEN. INGEST:WASH OUT MOUTH W/WATER PROVIDED PERS IS CONSCIOUS.
CALL MD.

=====
Fire Fighting Measures
=====

Extinguishing Media:WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR
APPROPRIATE FOAM.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE
EQUIPMENT .
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

=====
Accidental Release Measures
=====

Spill Release Procedures:WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS &
HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN A BAG & HOLD FOR WASTE
DISPOSAL. AVOID RAISING DUST. VENTILATE AREA & WASH SPILL SITE
AFTER MATERIAL PICKUP IS COM PLETE.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
Handling and Storage
=====

Handling and Storage Precautions:AVOID INHALATION. DO NOT GET IN EYES,
ON SKIN, ON CLOTHING. AVOID PROLONGED OR REPEATED EXPOSURE. HARMFUL
SOLID. POSSIBLE MUTAGEN. REPRO HAZARD.
Other Precautions:KEEP CNTNR TIGHTLY CLOSED. STORE IN COOL, DRY PLACE.
HARMFUL BY INHAL, IN CONT W/SKIN & IF SWALLOWED. POSS RISK OF
IRREVERSIBLE EFTS. IF YOU FEEL UNWELL, SEEK MED ADVICE (SHOW LBL
WHERE POSS). DO NOT BREATHE FUMES.

=====
Exposure Controls/Personal Protection
=====

Respiratory Protection:WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves:CHEMICAL-RESISTANT GLOVES.
Eye Protection:ANSI APPRVD CHEM WORKER GOGGLES (SUPP)
Other Protective Equipment:WEAR SUITABLE PROTECTIVE CLOTHING. EMERG EYE
WASH AND DELUGE SHOWER WHICH MEETS ANSI DESIGN CRITERIA .
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
EYE PROT: WITH FULL LENGTH FACESHIELD .

===== Physical/Chemical Properties =====

HCC:T2

Appearance and Odor:NONE SPECIFIED BY MANUFACTURER.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZING AGENTS.

Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomposition Products:TOXIC FUMES OF: CARBON MONOXIDE,
CARBON DIOXIDE, HYDROGEN CHLORIDE GAS.

===== Disposal Considerations =====

Waste Disposal Methods:DISSOLVE OR MIX MATERIAL W/COMBUSTIBLE SOLVENT &
BURN IN CHEMICAL INCINERATOR EQUIPPED W/AFTERBURNER & SCRUBBER.
OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

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assume responsibility for the suitability of this information to their
particular situation.

ULTRA SCIENTIFIC

-- ENDRIN KETONE

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MSDS Safety Information
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FSC: 6810
MSDS Date: 05/03/1991
MSDS Num: BVNWX
LIIN: 00N050439
Product ID: ENDRIN KETONE
MFN: 01
Responsible Party
Cage: 0MU35
Name: ULTRA SCIENTIFIC
Address: 250 SMITH ST
City: NORTH KINGSTOWN RI 02852
Info Phone Number: 401-294-9400
Emergency Phone Number: 401-294-9400
Published: Y

=====
Contractor Summary
=====

Cage: 0MU35
Name: ULTRA SCIENTIFIC
Address: 250 SMITH STREET
City: NORTH KINGSTOWN RI 02852-5000
Phone: 401-294-9400

=====
Ingredients
=====

Cas: 53494-70-5
RTECS #: PC8600000
Name: 2,5,7-METHENO-3H-CYCLOPENTA[A]PENTALEN-3-ONE-3B, 4,5,6,6,6A-HEXACHLOR
ODECAHYDRO-, (2-ALPHA, 3A-BETA, 3B-BETA,
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Name: ING 1:4-BETA, 5-BETA, 6A-BETA, 7-ALPHA, 7A-ALPHA, 7A-BETA, 8R*)-
% Wt: N/K (F)

=====
Health Hazards Data
=====

LD50 LC50 Mixture: SEE INGREDIENTS.
Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: YES
Carcinogenicity Inds - NTP: NO
IARC: NO
OSHA: NO
Effects of Exposure: ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS - DIRECT
PHYSICAL CONTACT SHOULD BE AVOIDED.
Explanation Of Carcinogenicity: NOT RELEVANT
Signs And Symptions Of Overexposure: NONE SPECIFIED BY MANUFACTURER.
Medical Cond Aggravated By Exposure: NONE SPECIFIED BY MANUFACTURER.
First Aid: INGEST:CALL MD IMMEDIATELY (FP N). EYE:FLUSH W/COPIOUS AMOUNTS OF
WATER FOR AT LEAST 15 MINUTES. SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER.
INHAL:REMOVE TO FRESH AIR - GIVE OXYGEN, IF NECESSARY. CONTACT M D.

Handling and Disposal

=====
Spill Release Procedures: DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER. OBSERVE ALL FEDERAL, STATE & LOCAL LAWS CONCERNING DISPOSAL.

Handling And Storage Precautions: AVOID CONTACT W/EYES, SKIN OR CLOTHING. KEEP

TIGHTLY CLOSED & STORE IN A COOL, DRY PLACE, UNLESS OTHERWISE INSTRUCTED ON THE PRODUCT LABEL.

Other Precautions: THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

=====
Fire and Explosion Hazard Information

Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL POWDER OR WATER SPRAY.

Fire Fighting Procedures: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard: NONE SPECIFIED BY MANUFACTURER.

=====
Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE

OF CONCERN (FP N).

Ventilation: NONE SPECIFIED BY MANUFACTURER.

Protective Gloves: IMPERVIOUS GLOVES (FP N).

Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).

Other Protective Equipment: USE APPROPRIATE NIOSH/MSHA APPROVED SAFETY EQUIPMENT.

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Supplemental Safety and Health: NONE SPECIFIED BY MANUFACTURER.

=====
Physical/Chemical Properties

B.P. Text: >536F,>280C

Appearance and Odor: CRYSTALLINE SOLID.

=====
Reactivity Data

Stability Indicator: YES

Stability Condition To Avoid: NONE SPECIFIED BY MANUFACTURER.

Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomposition Products: CO, CO*2, HCL.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization: NOT RELEVANT

=====
Toxicological Information

=====
Ecological Information

MSDS Transport Information

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Regulatory Information

=====
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Other Information

=====
=====

HAZCOM Label

=====
=====

Product ID: ENDRIN KETONE
Cage: 0MU35
Company Name: ULTRA SCIENTIFIC
Street: 250 SMITH STREET
City: NORTH KINGSTOWN RI
Zipcode: 02852-5000
Health Emergency Phone: 401-294-9400
Label Required IND: Y
Date Of Label Review: 07/14/1994
Status Code: C
Label Date: 07/14/1994
Origination Code: G
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: CAUTION
Respiratory Protection IND: YES
Health Hazard: Slight
Contact Hazard: Slight
Fire Hazard: None
Reactivity Hazard: None
Hazard And Precautions: ACUTE:ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS -
DIRECT PHYSICAL CONTACT SHOULD BE AVOIDED. CHRONIC:NONE LISTED BY
MANUFACTURER.

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International Chemical Safety Cards

CHLORDANE

ICSC: 0740

<p>CHLORDANE 1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene $C_{10}H_6Cl_8$ Molecular mass: 409.8</p> <p>CAS # 57-74-9 RTECS # PB9800000 ICSC # 0740 UN # 2996 EC # 602-047-00-8</p>			
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TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Alcohol-resistant foam, powder, carbon dioxide.
EXPLOSION	Above 56°C explosive vapour/air mixtures may be formed. Explosion hazard will depend on the solvent used or on the characteristics of the dust.	Above 56°C closed system, ventilation.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• INHALATION	(see Ingestion).	Breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Safety goggles or face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Convulsions. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs, strong bases. Cool. Dry.	Do not transport with food and feedstuffs. Xn symbol R: 21/22-40 S: 36/37 UN Hazard Class: 6.1 UN Packing Group: III Severe marine pollutant.
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0740 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993		

International Chemical Safety Cards

CHLORDANE

ICSC: 0740

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: LIGHT YELLOW TO AMBER VISCOUS LIQUID.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating and/or on burning and on contact with bases producing toxic fumes: chlorine fumes, hydrogen chloride, phosgene. Attacks plastic, rubber and coating.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: ppm; 0.5 mg/m³ (as TWA) (skin) (ACGIH 1991-1992). PDK: 0.01 mg/m³ C (USSR 1977).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of dusts from powder concentrates, through the skin especially from liquid formulations, and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of dust may cause irritation. Exposure at high levels may result in disorientation, tremors, convulsions, respiratory failure and death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
PHYSICAL PROPERTIES	Boiling point at 1.33 kPa: 175°C Relative density (water = 1): 1.59-1.63 Solubility in water: None	Vapour pressure, Pa at 25°C: 0.0013 Octanol/water partition coefficient as log Pow: 2.78
ENVIRONMENTAL DATA	Chlordane is persistent and rather immobile in soil. This substance may be hazardous to the environment; special attention should be given to fish in tropical areas. It is strongly advised not to let the chemical enter into the environment.	

NOTES

The commercial product (technical chlordane) is a mixture containing 60 to 75% of the pure compound and 25 to 40% of related compounds. The chlorine content is 64-67%. Other melting points: cis-isomer: 106-107°C; trans-isomer: 104-105°C. All uses of this substance are increasingly restricted. Safe and equally effective alternatives should be prepared. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Aspon Chlordane, Belt, Corodane, Niran, Velsicol 1068, Toxichlor, Octachlor, Ortho-klor, Synklor, Topiclor, Toxichlor are trade names. Also consult ICSC # 0743 on heptachlor.

Transport Emergency Card: TEC (R)-61G57c

ADDITIONAL INFORMATION

ICSC: 0740

CHLORDANE

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**IMPORTANT
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International Chemical Safety Cards

CAMPHECHLOR

ICSC: 0843

<p>CAMPHECHLOR Toxaphene Chlorinated camphene Polychlorocamphene C₁₀H₁₀Cl₈ (approx.) Molecular mass: 413.8 (average)</p> <p>CAS # 8001-35-2 RTECS # XW5250000 ICSC # 0843 UN # 2761 EC # 602-044-00-1</p>
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TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Foam, powder, carbon dioxide.
EXPLOSION	Risk of fire and explosion if formulations contain flammable/explosive solvents.		
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Safety spectacles, or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Dizziness. Nausea. Vomiting.	Do not eat, drink, or smoke	Give a slurry of activated

	Convulsions.	during work. Wash hands before eating.	charcoal in water to drink. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Rest. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Do NOT wash away into sewer. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place (extra personal protection: chemical protection suit including self-contained breathing apparatus).	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs and incompatible materials (see Chemical Dangers). Keep in the dark.	Do not transport with food and feedstuffs. T symbol R: 21-25-37/38-40 S: (1/2-)36/37-45 UN Hazard Class: 6.1 UN Packing Group: III	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0843		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

International Chemical Safety Cards

CAMPHECHLOR

ICSC: 0843

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: YELLOW TO AMBER WAXY SOLID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating above 155°C, on burning and/or under influence of alkali, strong sunlight, and catalysts like iron producing toxic fumes including hydrogen chloride. Attacks many metals in presence of water.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: 0.5 mg/m³ (as TWA) (skin) (ACGIH 1995-1996). TLV (as STEL): ppm; 1 mg/m³ (skin) (ACGIH 1995-1996).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body through the skin and by ingestion.</p> <p>INHALATION RISK:</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates mildly the skin. The substance may cause effects on the central nervous system , resulting in convulsions. Exposure at high level may result in death.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
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PHYSICAL PROPERTIES	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">Melting point: 65-90°C</td> <td style="width: 50%; border: none;">Vapour pressure, Pa at 20°C: negligible</td> </tr> <tr> <td style="border: none;">Relative density (water = 1): 1.6</td> <td style="border: none;">Octanol/water partition coefficient as log</td> </tr> <tr> <td style="border: none;">Solubility in water: none</td> <td style="border: none;">Pow: 2.47 - 5</td> </tr> </table>	Melting point: 65-90°C	Vapour pressure, Pa at 20°C: negligible	Relative density (water = 1): 1.6	Octanol/water partition coefficient as log	Solubility in water: none	Pow: 2.47 - 5
Melting point: 65-90°C	Vapour pressure, Pa at 20°C: negligible						
Relative density (water = 1): 1.6	Octanol/water partition coefficient as log						
Solubility in water: none	Pow: 2.47 - 5						
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to birds. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic species. Avoid release to the environment in circumstances different to normal use.						
NOTES							
<p>Campechlor is a reaction mixture of chlorinated camphenes containing 67-69% chlorine. Use of this organochlorine pesticide should be discouraged, except where there is no adequate alternative. Depending on the degree of exposure, periodic medical examination is indicated. If the substance is formulated with solvent(s) also consult the card(s) (ICSC) of the solvent(s). Carrier solvents used in commercial formulations may change physical and toxicological properties. Alltox, Chem-Phene, Crestoxo, Estonox, Fasco-Terpene, Geniphene, Gy-Phene, Hercules 3956, Penphene, Phenacide, Phenatox, Strobane-T, Toxakil are trade names.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-61G41c</p>							
ADDITIONAL INFORMATION							
ICSC: 0843	CAMPHECHLOR						
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AEROVOC INC. -- P103F337,POLYCHLORINATED BIPHENYLS (PCBS) -- 5910-00-086-2688

=====
===== Product Identification =====

Product ID:P103F337,POLYCHLORINATED BIPHENYLS (PCBS)

MSDS Date:10/15/1985

FSC:5910

NIIN:00-086-2688

MSDS Number: BCYGD

=== Responsible Party ===

Company Name:AEROVOC INC.

Address:740 BELLEVILLE AVE

City:NEW BEDFORD

State:MA

ZIP:02745

Country:US

Info Phone Num:508-994-9607

Emergency Phone Num:508-994-9607

Preparer's Name:JOHN H. CRADDOCK

CAGE:K0040

=== Contractor Identification ===

Company Name:AEROVOC INC.

Address:740 BELLEVILLE AVE

Box:City:NEW BEDFORD

State:MA

ZIP:02745

Country:US

Phone:508-994-9607

CAGE:K0040

Company Name:AEROVOX INC.

Address:740 BELLEVILLE AVE

Box:City:NEW BEDFORD

State:MA

ZIP:02745-6010

Country:US

Phone:508-994-9661 / 508-994-9635

CAGE:00656

Company Name:MONSANTO COMPANY

Address:800 N LINDBERGH BLVD

Box:City:SAINT LOUIS

State:MO

ZIP:63167

Country:US

Phone:314-694-6661 OR 800-332-3111

CAGE:76541

=====
===== Composition/Information on Ingredients =====

Ingred Name:POLYCHLORINATED BIPHENYLS (PCBS) (SARA III)

CAS:1336-36-3

RTECS #:TQ1350000

Fraction by Wt: >99.9%

Other REC Limits:NONE RECOMMENDED

OSHA PEL:0.5 MG/M3 SKIN

ACGIH TLV:0.5 MG/M3 SKIN

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

=====
===== Hazards Identification =====

LD50 LC50 Mixture:ORAL LD50(RAT);8.65GM/KG(42%CHLORINATED)
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:ACUTE: EYES: IRRITATING. SKIN: DRYING,
CRACKING, CHLORACNE. INHALATION: MAY CAUSE LIVER INJURY. INGESTION:
SLIGHTLY TOXIC. LD50 ORAL RATS: 8.65 GM/KG FOR 42% CHLORINATED AND
11.9 GM/KG FOR 50% CHLORINATED. CHRONIC: TESTS HAVE NOT
DEMONSTRATED CHRONIC HUMAN ILLNESSES SUCH AS
CANCER/NEUROLOGICAL/CARDIOVASCULAR EFFECTS.
Explanation of Carcinogenicity:NTP: LISTED AC. ANTICIPATED TO BE
CARCINOGENS. IARC: LISTED 2A. PROBABLY CARCINOGENIC TO HUMANS.
OSHA; NOT LISTED.
Effects of Overexposure:EYES: IRRITATION. SKIN: DRYING,CHLORACNE.
INHALATION: MAY CAUSE LIVER INJURY. INGESTION: SLIGHTLY TOXIC.
NUMEROUS EPIDEMIOLOGICAL STUDIES OF HUMANS HAVE NOT DEMONSTRATED
ANY STATISTICALLY SIGNIFICANT CAUSAL RELATIONSHIP BETWEEN PCB
EXPOSURE AND CHRONIC HUMAN ILLNESSES SUCH AS
CANCER/NEUROLOGICAL/CARDIOVASCULAR EFFECTS.
Medical Cond Aggravated by Exposure:PCBS CAN CAUSE DERMATOLOGICAL
SYMPTOMS; HOWEVER THESE ARE REVERSIBLE UPON REMOVAL OF EXPOSURE
SOURCE.

=====
===== First Aid Measures =====

First Aid:EYES: FLUSH WITH LARGE AMOUNTS OF WATER.PETROLATUM-BASED
OPHTHALMIC OINTMENT MAY BE APPLIED FOR IRRITATION. SKIN: REMOVE
CONTAMINATED CLOTHING. WASH SKIN WITH SOAP AND WATER. HOT PCBS MAY
CAUSE BURNS. INHALATION: MOVE TO FRESH AIR.IF IRRITATION
PERSISTS,GET MEDICAL ATTENTION. INGESTION: GET MEDICAL ATTENTION.DO
NOT INDUCE VOMITING OR GIVE OILY LAXITIVES.FOR LARGE AMOUNTS
GASTRIC LAVAGE SUGGESTED.

=====
===== Fire Fighting Measures =====

Flash Point:383F,195C
Extinguishing Media:NONE SPECIFIED BY MANUFACTURER.
Fire Fighting Procedures:STANDARD FIRE FIGHTING WEARING APPAREL AND
SCAB SHOULD BE WORN WHEN FIGHTING FIRES INVOLVING FIRES INVOLVING
EXPOSURE TO CHEMICAL COMBUSTION PRODUCTS.
Unusual Fire/Explosion Hazard:AT TEMPERATURE IN RANGE OF 600-650C IN
PRESENCE OF EXCESS OXYGEN PCBS MAY FORM POLYCHLORINATED
DIBENZOFURANS (PCDFS).

=====
===== Accidental Release Measures =====

Spill Release Procedures:VENTILATE AREA. PREVENT LOSS TO SEWER SYSTEMS,
NAVIGABLE WATERWAYS AND STREAMS. CONTAIN SPILL WITH DIKE. PUMP
LIQUID TO SUITABLE WASTE CONTAINER. ABSORB RESIDUAL SPILL WITH
ABSORBENTS SUCH AS SAND, VE RMICULITE. ISOLATE AREA AND NOTIFY
AUTHORITIES.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:STORAGE MUST FOLLOW RCRA REQUIREMENTS.
AVOID PROLONGED BREATHING OF VAPORS OR MISTS. AVOID CONTACT WITH
EYES OR PROLONGED CONTACT WITH SKIN.

Other Precautions:FEDERAL REGULATIONS UNDER THE TOXIC SUBSTANCES
CONTROL ACT REQUIRE PCBs AND PCB ITEMS TO BE MARKED. CHECK FEDERAL
REGULATIONS FOR DETAILS.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE NIOSH/MSHA APPROVED EQUIPMENT WHEN AIRBORNE
EXPOSURE LIMITS ARE EXCEEDED. FULL FACEPIECE EQUIPMENT RECOMMENDED.
HIGH AIRBORNE CONCENTRATIONS MAY REQUIRE USE OF SCBA OR SUPPLIED
AIR RESPIRATOR.

Ventilation:RECOMMEND LOCAL MECHANICAL EXHAUST VENTILATION AT SOURCES
OF AIR CONTAMINATION SUCH AS OPEN PROCESS EQUIPMENT.

Protective Gloves:WEAR APPROPRIATE PROTECTIVE GLOVES.

Eye Protection:WEAR CHEMICAL SPLASH GOGGLES, FACESHIELD.

Other Protective Equipment:WEAR PROTECTIVE CLOTHING THAT PROVIDE A
BARRIER TO PREVENT SKIN CONTACT. PROVIDE EYE WASH STATION AND
SAFETY SHOWER.

Work Hygienic Practices:WASH AFTER HANDLING AND BEFORE
EATING, DRINKING, SMOKING. LAUNDRY CONTAMINATED CLOTHING/PROTECTIVE
EQUIPMENT BEFORE REUSE.

Supplemental Safety and Health

IF A PCB TRANSFORMER IS INVOLVED IN A FIRE-RELATED INCIDENT, THE OWNER
OF THE TRANSFORMER MAY BE REQUIRED TO REPORT THE INCIDENT. CONSULT
AND FOLLOW APPROPRIATE FEDERAL, STATE, AND LOCAL REGULATIONS.

===== Physical/Chemical Properties =====

HCC:T6

Boiling Pt:B.P. Text:644F,340C

Vapor Pres:0.005

Spec Gravity:1.2-1.6

Appearance and Odor:LIGHT STRAW-COLOR LIQUID, AROMATIC ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZERS.

Stability Condition to Avoid:FLAMES, HOT SURFACES.

Hazardous Decomposition Products:DURING FIRES, PCBs MAY PRODUCE BOTH
CHLORINATED DIOXINS (PCDDs) AND FURANS (PCDFs).

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL OF PCB AND PCB ITEMS IS REGULATED BY
GOVERNMENT. WASTES AND ITEMS CONTAINING PCBs (E.G., WIPING CLOTHS,
ABSORBENT MATERIAL, CLOTHING, ETC.) SHOULD BE PLACED IN PROPER
CONTAINERS FOR DISPOSAL BASED ON LOCAL, STATE AND FEDERAL
REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):
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expressly or implied, warrants this information to be accurate and



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Antimony MSDS

Section 1: Chemical Product and Company Identification

Product Name: Antimony

Catalog Codes: SLA1453, SLA4462

CAS#: 7440-36-0

RTECS: CC4025000

TSCA: TSCA 8(b) inventory: Antimony

CI#: Not available.

Synonym: Stibium

Chemical Name: Not available.

Chemical Formula: Sb

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Antimony	7440-36-0	100

Toxicological Data on Ingredients: Antimony: ORAL (LD50): Acute: 7000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In

case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 121.75 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 1635°C (2975°F)

Melting Point: 630°C (1166°F)

Critical Temperature: Not available.

Specific Gravity: 6.691 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 7000 mg/kg [Rat].

Chronic Effects on Humans: Causes damage to the following organs: blood, kidneys, lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Antimony powder UNNA: UN2871 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Antimony Massachusetts RTK: Antimony TSCA 8(b) inventory: Antimony

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 11:19 AM

Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. **MUTAGENIC EFFECTS:** Not available.

TERATOGENIC EFFECTS: Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:**WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information**References:**

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérigènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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Barium



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ONLINE

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer/Supplier:

ESPI Metals

1050 Benson Way, Ashland, OR 97520

Toll Free (800) 638-2581 * Fax (541) 488-8313

E-Mail: sales@espimetals.com

Product Name: Barium

Formula: Ba

CAS Number: 7440-39-3

II. HAZARDOUS INGREDIENTS

Hazardous Component: Barium

Percent (%): 0-100

OSHA/PEL: 0.5 mg/m³ACGIH/TLV: 0.5 mg/m³

HMIS Ratings:

Health: 2

Flammability: 3

Reactivity: 3

III. PHYSICAL DATA

Boiling Point: 1640 °C

Melting Point: 725 °C

What's New?

Indium Ready-To-Ship (RTS) For time critical situations and applications where standard sizes will meet project requirements, take advantage of our Ready-To-Ship (RTS) Indium by clicking here: [Indium Ready-To-Ship](#)



Contact

ESPI Metals

1050 Benson Way
Ashland, Oregon 97520

541.488.8311 telephone
800.638.2581 toll-free

541.488.8313 fax
800.488.0060 toll-free fax

sales@espimetals.com

Precious Metal Prices

Oct 17, 2013 at 11:12 New York			
	Price	Change	High
Gold	▲ 1320.00	+37.30	1324.40
Silver	▲ 21.83	+0.41	22.31
Platinum	▲ 1426.00	+32.00	1437.00
Palladium	▲ 729.00	+14.00	738.00

Specific Gravity: 3.51 @ 20 °C
Solubility in H₂O: Reacts violently
Appearance and Odor: Silver gray metal, no odor.

Conversion Tool

Try our **conversion tools** by clicking [here](#).

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Flammability: Highly flammable

Autoignition Temperature: N/E

Explosive Limits: Lower: N/E **Upper:** N/E

Extinguishing Media: FLAMMABLE SOLID!! Use dry chemical/dolomite (powdered limestone) or sodium chloride. DO NOT USE WATER, CARBON DIOXIDE, OR HALOGENATED EXTINGUISHERS!

Special Firefighting Procedures: Wear full face, self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes. Flammable solid.

Unusual Fire and Explosion Hazards: Material readily reacts with water generating flammable and/or explosive hydrogen gas. Emits toxic fumes under fire conditions. **Caution!** Fire may reignite after having been extinguished. Blend with large excess of dolomite.



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V. HEALTH HAZARD INFORMATION

Effects of Exposure:

To the best of our knowledge the chemical, physical, and toxicological properties of barium have not been thoroughly investigated and recorded.

Barium compounds may cause severe gastroenteritis, including abdominal pain, vomiting and diarrhea, tremors, faintness, paralysis of the arms and legs, and slow or irregular heartbeat. Severe cases may produce collapse and death due to respiratory failure. Soluble barium compounds are more likely to cause these effects than insoluble compounds. Inhalation of fumes may cause sore throat, coughing, labored breathing, and irritation of the respiratory tract as well as the above symptoms.

Acute Effects:

Inhalation: May cause severe irritation to the nose, throat, and upper respiratory tract.

Ingestion: May cause severe irritation of the mouth, throat, and esophagus.

Skin: Contact with skin can cause mild to moderate irritation. May cause chemical burns as it reacts with moisture on living tissue. Can lead to the development of a hypersensitivity in susceptible individuals.

Eye: May cause chemical burns as it reacts with moisture on living tissue.

Chronic Effects:

Inhalation: May cause sensitization.

Ingestion: May cause chronic barium poisoning.

Skin: May cause dermatitis.

Eye: May cause corneal opacity and blindness.

Target Organs: Respiratory System, Eye, Skin, Immune System (Allergic Reactions), Central Nervous System, and Heart.

Medical Conditions Generally Aggravated by Exposure: Pre-existing respiratory disorders.

Carcinogenicity: NTP: No IARC: No OSHA: No

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air, keep warm and quiet, give oxygen if breathing is difficult, seek immediate medical attention.

INGESTION: Seek immediate medical attention.

SKIN: Remove metal particles. Remove contaminated clothing. Carefully brush material off skin and wash area with soap and water. Seek medical attention if irritation develops.

EYE: Remove metal particles. Contamination of the eyes should be treated by immediate and prolonged irrigation with copious amounts of water. Lift upper and lower eye lids frequently. Get prompt medical attention.

NOTE TO PHYSICIAN: Treatment should be directed at preventing absorption, administering to the symptoms as they occur, and providing supportive therapy. Attention: Up to two days latent period.

VI. REACTIVITY DATA

Stability: Stable if used and stored according to specifications.

Conditions to Avoid: Water or moisture and air. Avoid friction, heat, sparks, and flame.

Incompatibility (Materials to Avoid): Water or moisture, oxidizing agents, oxygen, acids, alcohols, halocarbons, carbon dioxide, ammonia.

Hazardous Decomposition Products: Toxic fumes of hydrogen and barium oxide.

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area and provide ventilation. Protect from ignition sources. Keep unprotected persons away. Sweep or scoop spilled product and place in a closed container for further handling and disposal. Do not flush to sewer, stream, or other bodies of water. Cover very small quantities in the open with powdered limestone and let decompose.

Waste Disposal Method: Material in the elemental state should be recovered for reuse or recycling. Observe all federal, state & local regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH approved cartridge respirator.

Ventilation: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below exposure limits. Handle in a controlled environment in an inert gas.

Protective Gloves: Leather-palmed, heat resistant gloves.

Eye Protection: Chemical splash goggles and a full face shield. An eye wash facility should be readily available.

Other Protective Clothing or Equipment: The use of fire resistant outer clothing is advisable.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Barium metal should be stored in tightly-closed containers under argon or mineral oil. When handling, wear non-sparking shoes and flame resistant clothing. Avoid friction, heat, sparks, and flame. Use only non-sparking tools and utensils. Ground all equipment, vessels, tables, and other metallic objects that may come into contact with the product. Do not store together with acids, halogens and oxidizing agents. Store away from water/moisture.

Other Precautions: Can autoignite in air. Extremely sensitive to shock, heat, friction and static electricity. Rubber

gloves, rubber protective clothing and apron, goggles and gas filter mask should be worn when working in a barium storage area.

Empty Container Precautions: This container is hazardous when empty. Do not use heat, sparks, open flame, torches, or cigarettes on or near empty container. Empty containers can retain product residues. Do not reuse empty container for food, clothing, or other products for human or animal consumption or where skin contact may occur.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Do not use tobacco or food in work area. Wash thoroughly after handling, especially before eating, drinking, smoking, or using restroom facilities. Contaminated clothing and shoes should be thoroughly cleaned before reuse. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

TSCA Listed: Yes

DOT Regulations:

Hazard Class: 4.3

Identification Number: UN1400

Packing Group: II

Proper Shipping Name: Barium

Label: Dangerous when wet

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damage resulting from handling or from contact with the above product.

Issued by: S. Dierks

Revised/Verified: July 2011

beryllium dust on its internal surface poses a potentially serious fire hazard. Extinguishing using Class D fire extinguisher media and shut down or isolate the affected portion of the ventilation system. Because of this potential risk, sources of ignition such as flame, spark, etc. must not be allowed to enter the ventilation duct work. Also, duct work must be made of non-combustible material.

V HEALTH HAZARD INFORMATION

Primary Routes of Exposure: Inhalation: An exposure to airborne beryllium in excess of the occupational standard can occur during routine handling, material transfer, chemical processing or further processing of powdered material and when machining, melting, casting, gross handling, picking, welding, grinding, sanding, polishing, milling, crushing, or otherwise abrading the surface of solid beryllium in a manner which generates finely divided particles. Machining operations conducted under a flood of liquid coolant usually require local exhaust ventilation. The cycling through a machine of liquid lubricant/coolant containing finely divided beryllium in suspension can result in the concentration building to a point where the particulate may become airborne during use. A filter, centrifuge, or settling chamber can be installed in-line if necessary. The potential for exposures also may occur during repair or maintenance activities on contaminated equipment such as: furnace rebuilding, maintenance or repair of air cleaning equipment, structural renovation, welding, etc.

Acute Effects:

Inhalation: This product is insoluble and does not cause acute health effects.

Ingestion: This product is insoluble and does not cause acute health effects.

Skin: Skin abrasion may cause irritation.

Eye: Injury to the eyes can result from particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate.

Chronic Effects:

Inhalation: Overexposure to airborne beryllium particulate may cause a serious lung disease, in certain sensitive individuals, called chronic beryllium disease (chronic berylliosis). Chronic beryllium disease is a condition in which the tissues of the lungs become inflamed, restricting the exchange of oxygen between the lungs and the bloodstream. Symptoms may include cough, chest pain, shortness of breath, weight loss, weakness, and fatigue. Long term effects may include loss of lung function, fibrosis, or subsequent secondary effects on the heart with eventual permanent impairment.

Ingestion: There are no known cases of illness resulting from ingestion of beryllium.

Skin: Skin abrasion may cause irritation.

Eye: Injury to the eyes can result from particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate.

Carcinogenic references: Hazard communication regulations of the U.S. Occupational Safety & Health Administration require that caution labels for materials listed as potential carcinogens in either the International Agency for Cancer Research Monograph Series or the National Toxicology Program Annual Report on carcinogens must contain a cancer warning. Beryllium has also been so listed based principally on animal tests and therefore this material bears a label identifying it as a potential cancer hazard.

Medical Conditions Aggravated by Exposure: Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if excessive concentrations of dust or fume are inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) system has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk where handling and use of this material may cause excessive exposure.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. Although no cases in which a person stopped breathing as a result of exposure are known, if breathing has stopped, perform artificial respiration and obtain medical help.

INGESTION: Swallowing metal powder or dust can be treated by having the affected person drink large quantities of water and attempting to induce vomiting if conscious. Obtain medical help.

SKIN: Remove contaminated clothing, brush material off skin, wash affected area with soap and water. If irritation persists, seek medical attention.

EYE: Flush eyes with copious amounts of clean water. If irritation persists obtain medical help. Contact lenses should not be worn when working with metal dusts and powders because the contact lens must be removed to provide adequate treatment.

VI REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Oxidation will form on solid shapes when moist.

Incompatibility (Material to Avoid): Avoid contact with mineral acids and oxidizing agents which may generate hydrogen gas. Hydrogen gas can be an explosion hazard.

Hazardous Decomposition Products: Melting and dross handling or powdering operations can emit airborne dusts or fumes.

Hazardous Polymerization: Will not Occur

VII SPILL AND LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: In solid form this material poses no health or environmental risk. If this material is in powder or dust form, establish a restricted entry zone based on the severity of the spill. Persons entering the restricted zone must wear adequate respiratory protection and protective clothing appropriate for the severity of the spill. Cleanup should be conducted with a vacuum system utilizing a high efficiency particulate air filtration system followed by wet cleaning methods. Special care must be taken when changing filters on HEPA vacuum cleaners when used to clean up potentially toxic materials. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Depending upon the quantity of material released, fine powder or dust spills to the environment may require reporting the National Response Center at (800) 424-8802 as well as the State Emergency Response Commission and Local Emergency Planning Committee.

Waste Disposal Method: Dispose of in accordance with State, Federal and Local regulations.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: When potential exposures are above the occupational limits, approved respirators must be used. Exposure to unknown concentrations of fumes or dusts requires the wearing of a pressure-dem and self-contained breathing apparatus. Pressure-demand airline respirators are recommended for jobs with high potential exposures such as changing bags in a baghouse air cleaning device.

Ventilation: Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Powders should be stored and transported in tightly sealed containers and must only be handled under controlled ventilated conditions.

Protective Gloves: Wear gloves to prevent metal cuts and skin abrasions particularly during handling.

Eye Protection: Wear safety glasses, goggles, face shield, or welders helmet.

Other Protective Equipment: No protective equipment or clothing is required when handling solid forms. Protective overgarment or work clothing should be worn by persons who may become contaminated with dusts, fumes, or powders.

Work Practices: Vacuum or wet cleaning methods are recommended for dust removal. Be certain to de-energize electrical systems as necessary before beginning wet cleaning. Vacuum cleaners with high efficiency particulate air (HEPA) filters are the recommended type. The use of compressed air to remove dusts should be avoided as such an activity can result in unnecessary short-term elevated exposures to dusts. Contaminated work clothing and overgarment should be managed in such a manner so as to prevent secondary exposure to persons such as laundry operators and to prevent contamination to personal clothing. Never use compressed air to clean work clothing.

IX SPECIAL PRECAUTIONS

Packaging and Labeling Requirements: The following requirements of the U.S. Dept. of Transportation apply only to beryllium metal powder or dust, not to solid shapes:

Shipping Name: RQ Flammable Solid, Poisonous, N.O.S. (Beryllium Metal Powder).

NOTE: Must be marked on shipping papers and on the outside of the shipping container.

Hazard Class: Beryllium metal powder and dust are classified as Flammable Solid and Class B Poison.
NOTE: Hazard class must be included on shipping papers.

Identification Number: UN2926
NOTE: Must be marked on shipping papers and on the outside of the shipping container.

Label(s) Required: Flammable Solid and Poison (For Beryllium Metal Powder or Dust Only).
NOTE: Place on the outside of the shipping container.

Reportable Quantity: 10 lbs. (4.54).
NOTE: The RQ is limited to particles having a diameter less than 100 micrometers.

DOT Specification Container: Suitable for Flammable Solids. Recommended double overpack when shipping powder.

Other: Emergency response information is provided within this MSDS.
NOTE: This information must be included, in some form, with the shipping papers.

SARA Title III: Beryllium is reportable under Section 313

Issued by: S. Dierks
Date: November 1992



Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.

MUTAGENIC EFFECTS: Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 890 mg/kg [Mouse]. Acute toxicity of the dust (LC50): 229.9 mg/m³ 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium Pennsylvania RTK: Cadmium Massachusetts RTK: Cadmium TSCA 8(b) inventory: Cadmium SARA 313 toxic chemical notification and release reporting: Cadmium CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R26- Very toxic by inhalation. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:

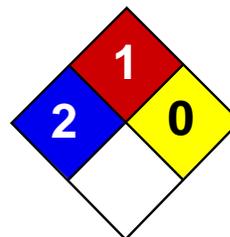
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:

Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 (mg/m³) from ACGIH (TLV) [United States] TWA: 1 (mg/m³) from OSHA (PEL) [United States] TWA: 0.5 (mg/m³) from NIOSH [United States] TWA: 0.5 (mg/m³) [United Kingdom (UK)] TWA: 0.5 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- !0 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:

Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation, sneezing, redness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconiosis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information**Federal and State Regulations:**

Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

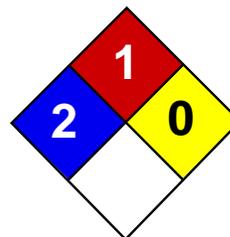
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Copper MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper

Catalog Codes: SLC4939, SLC2152, SLC3943, SLC1150, SLC2941, SLC4729, SLC1936, SLC3727, SLC5515

CAS#: 7440-50-8

RTECS: GL5325000

TSCA: TSCA 8(b) inventory: Copper

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Cu

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Copper	7440-50-8	100

Toxicological Data on Ingredients: Copper LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m³) from ACGIH [1990] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 63.54 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2595°C (4703°F)

Melting Point: 1083°C (1981.4°F)

Critical Temperature: Not available.

Specific Gravity: 8.94 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Copper Massachusetts RTK: Copper TSCA 8(b) inventory: Copper CERCLA: Hazardous substances.: Copper

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Health	1
Fire	2
Reactivity	1
Personal Protection	E

Material Safety Data Sheet

Iron Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Iron Metal

Catalog Codes: SLI2047, SLI1996

CAS#: 7439-89-6

RTECS: NO4565500

TSCA: TSCA 8(b) inventory: Iron Metal

CI#: Not applicable.

Synonym:

Chemical Name: Iron

Chemical Formula: Fe

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Iron Metal, powder	7439-89-6	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to liver, cardiovascular system, upper respiratory tract, pancreas. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Chlorine Trifluoride reacts with iron with incandescence. Powdered iron reacts with fluorine below redness with incandescence. Reduced iron decomposes with nitrogen dioxide @ ordinary temperature with incandescence. Reacting mass formed by mixture of phosphorus and iron can become incandescent when heated. This material is flammable in powder form only.

Special Remarks on Explosion Hazards: Material in powdered form can explode when exposed to heat or flame

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Moisture sensitive.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Tasteless.

Molecular Weight: 55.85 g/mole

Color: Black to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 3000°C (5432°F)

Melting Point: 1535°C (2795°F)

Critical Temperature: Not available.

Specific Gravity: Density: 7.86 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, incompatible materials, water/moisture, air, dust generation.

Incompatibility with various substances:

Reactive with oxidizing agents, acids. Slightly reactive to reactive with moisture.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:

Hot iron(wire) burns in Chlorine gas. Violent decomposition of hydrogen peroxide (53% by weight or greater) may be caused by contact with iron. Readily oxidizes in moist air forming rust. Reactive with halogens. Incompatible with acetaldehyde, ammonium peroxodisulfate, chloroformamidine, chloric acid, ammonium nitrate, dinitrogen tetroxide, nitryl fluoride, polystyrene, sodium acetylide, potassium dichromate, peroxyformic acid, sulfuric acid, sodium carbide. Readily attacked by dilute mineral acids and or attacked or dissolved by organic acids. Not appreciably attacked by cold sulfuric acid, or nitric acid, but is attacked by hot acids.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 30000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: liver, cardiovascular system, upper respiratory tract, pancreas.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Iron metal filings or dust: May cause skin irritation by mechanical action. Iron metal wire: Not likely to cause skin irritation Eyes: Iron metal filings or dust: Can irritate eyes by mechanical action. Iron metal wire: No hazard. Will not cause eye irritation. Inhalation: Iron dust: Can irritate the respiratory tract by mechanical action. Iron metal wire or filings: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Iron metal wire: Not an ingestion hazard: Iron metal filings or dust: The amount of ingested iron which constitutes a toxic dose is not well defined. Proposed toxic doses of elemental iron are 20 mg/kg for gastrointestinal irritation to greater than 60 mg/kg for systemic toxicity. Gastrointestinal effects are the first signs to appear, with hemorrhagic vomiting and diarrhea, hematochezia, abdominal pain, lethargy, metabolic acidosis, coagulopathy, shock, coma and convulsions developing from 0 to 6 hours after ingestion. Leukocytosis may also occur. An asymptomatic phase may ensue at 6 to 12 hours postingestion, followed by hypoglycemia or hyperglycemia, hepatic and renal failure, severe acidosis, cyanosis, fever, CNS depression (lethargy, restlessness and/or confusion seizures), hypotension, and cardiovascular collapse/cardiac failure in 12 to 48 hours. Hepatic cirrhosis, gastrointestinal scarring and/or strictures may arise in 2 to 6 weeks. It may also cause an anaphylactoid reaction. Non-cardiogenic pulmonary edema also develop in severe cases of iron intoxication. Chronic Potential Health Effects: Inhalation: Chronic inhalation of iron dust can lead to accumulation in the lungs and a characteristic stippled appearance on X-rays. This condition, called SIDEROSIS, is considered benign in that it does not interfere with lung function and does not predispose to other disease. Chronic inhalation of iron dust may also cause fibrosis in the lungs. Ingestion: Clinical signs of iron overload appear when the total body iron is 5 to 10 times higher than normal. Neurobehavioral defects including depression, decreased activity, habituation, reflex startle, and conditioned avoidance response performance may occur. However, similar effects were also seen in iron deficiency. It is therefore likely that these behavioral effects are secondary to general toxicity. High serum iron levels may be associated with an increased risk of fatal acute myocardial infarction (MI). Skin: Prolonged or repeated contact may cause hypersensitivity.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Metal powder, flammable, n.o.s. (Iron metal powder) UNNA: 3089 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California Director's List of Hazardous Substances: Iron Metal TSCA 8(b) inventory: Iron Metal

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS B-4: Flammable solid.

DSCL (EEC):

R11- Highly flammable. S16- Keep away from sources of ignition - No smoking. S22- Do not breathe dust.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 2

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 2

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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MSDS Number: **L2347** * * * * * *Effective Date: 07/05/07* * * * * * *Supersedes: 05/07/07*

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

LEAD METAL

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575

CAS No.: 7439-92-1

Molecular Weight: 207.19

Chemical Formula: Pb

Product Codes:

J.T. Baker: 2256, 2266

Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Hazardous		
-----	-----	-----
Lead	7439-92-1	95 - 100%
Yes		

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN.

AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

Ingestion:

POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:

Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:

Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:

Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:

Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when

empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

For lead, metal and inorganic dusts and fumes, as Pb:

-OSHA Permissible Exposure Limit (PEL): 0.05 mg/m³ (TWA)

For lead, elemental and inorganic compounds, as Pb:

-ACGIH Threshold Limit Value (TLV): 0.05 mg/m³ (TWA), A3 animal carcinogen

ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information).

For lead, inorganic:

-NIOSH Recommended Exposure Limit (REL): 0.1 mg/m³ (TWA)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:

Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

9. Physical and Chemical Properties

Appearance:

Small, white to blue-gray metallic shot or granules.

Odor:

Odorless.

Solubility:

Insoluble in water.

Density:

11.34

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

1740C (3164F)

Melting Point:

327.5C (622F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

1.77 @ 1000C (1832F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:

Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

Lead and other smelter emissions are human reproductive hazards. (Chemical Council on Environmental Quality; Chemical Hazards to Human Reproduction, 1981).

Carcinogenicity:

EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

-----\Cancer Lists\-----

Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to leach into groundwater. This material may bioaccumulate to some extent.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient Australia	TSCA	EC	Japan	
Lead (7439-92-1)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	--Canada--		Phil.
		DSL	NDSL	
Lead (7439-92-1)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
	-SARA 302-		-----SARA 313-----	
Ingredient Catg.	RQ	TPQ	List	Chemical
Lead (7439-92-1)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Lead (7439-92-1)	10	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

WARNING:

THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **0**

Label Hazard Warning:

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

Label Precautions:

- Do not get in eyes, on skin, or on clothing.
- Do not breathe dust.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately

flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

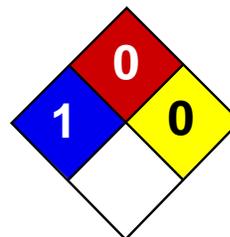
Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Manganese MSDS

Section 1: Chemical Product and Company Identification

Product Name: Manganese

Catalog Codes: SLM2245

CAS#: 7439-96-5

RTECS: OO9275000

TSCA: TSCA 8(b) inventory: Manganese

CI#: Not available.

Synonym:

Chemical Name: Manganese

Chemical Formula: Mn

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Manganese	7439-96-5	100

Toxicological Data on Ingredients: Manganese: ORAL (LD50): Acute: 9000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, lungs, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Moderate fire potential, in the form of dust or powder, when exposed to flame. When manganese is heated in the vapor of phosphorus at a very dull red heat, union occurs with incandescence. Concentrated nitric acid reacts with powdered manganese with incandescence and explosion. Powdered manganese ignites in chlorine.

Special Remarks on Explosion Hazards: Moderate explosion potential, in the form of dust or powder, when exposed to flame.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, reducing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.1 (mg/m³) from ACGIH (TLV) [United States] TWA: 5 (mg/m³) [Canada] TWA: 1 STEL: 3 (mg/m³) from NIOSH [United States] TWA: 5 (mg/m³) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 54.94 g/mole

Color: Grayish white.

pH (1% soln/water): Not applicable.

Boiling Point: 2095°C (3803°F)

Melting Point: 1244°C (2271.2°F)

Critical Temperature: Not available.

Specific Gravity: 7.44 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Superficially oxidized on exposure to air. Reacts with aqueous solutions of sodium or potassium bicarbonate. Reacts with dilute mineral acids with evolution of hydrogen and formation of divalent manganous salts. Reacts with fluorine and chlorine to produce di or tri fluoride, and di and tri chloride, respectively. In the form of powder, it reduces most metallic oxides on heating. On heating, it reacts directly with carbon, phosphorus, antimony, or arsenic. Also incompatible with hydroxides, cyanides, carbonates.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 9000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: blood, lungs, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

Manganese can cross the placenta. May cause cancer (tumorigenic) based on animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation Eyes: Dust may cause mechanical irritation. Inhalation: Dust may cause respiratory tract irritation. May cause "Metal Fume Fever" which may include flu-like symptoms (fever, chills, upset stomach, vomiting, weakness, headache, body aches, muscle pains, dry mouth and throat, coughing, tightness of the chest). May affect behavior/Central Nervous system (change in motor activity, torpor, nervousness, tremor, yawning, mood swings, irritability, restlessness, fatigue, headache, apathy, languor, insomnia than somnolence, hallucinations, delusions, uncontrollable laughter followed by crying, compulsions, aggressiveness, weakness in legs, memory loss, decreased libido, impotence, salivation, hearing loss, slow gait,) and respiration (dyspnea, shallow respiration, cyanosis, alveolar inflammation). Ingestion: Repeated or prolonged exposure from ingestion may affect brain (degenerative changes), blood and metabolism. Ingestion: May cause digestive tract irritation. There is a low gastrointestinal absorption of manganese. Chronic Potential Health Effects: Inhalation: Repeated or prolonged exposure from inhalation may affect brain (degenerative changes), behavior/Central Nervous system with symptoms to acute exposure. May also affect liver (chronic liver disease, jaundice) Ingestion: Repeated or prolonged exposure from ingestion may affect brain, blood and metabolism

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Illinois toxic substances disclosure to employee act: Manganese Rhode Island RTK hazardous substances: Manganese Pennsylvania RTK: Manganese Minnesota: Manganese Massachusetts RTK: Manganese New Jersey: Manganese New Jersey spill list: Manganese Louisiana spill reporting: Manganese California Director's List of Hazardous Substances: Manganese TSCA 8(b) inventory: Manganese SARA 313 toxic chemical notification and release reporting: Manganese

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

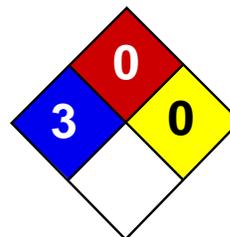
References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragryum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m³) from OSHA (PEL) [United States]
Inhalation TWA: 0.025 (mg/m³) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonylnickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsilane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalgam) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

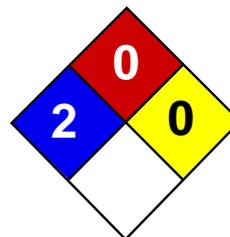
References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Nickel metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Nickel metal

Catalog Codes: SLN2296, SLN1342, SLN1954

CAS#: 7440-02-0

RTECS: QR5950000

TSCA: TSCA 8(b) inventory: Nickel metal

CI#: Not applicable.

Synonym: Nickel Metal shot; Nickel metal foil.

Chemical Name: Nickel

Chemical Formula: Ni

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Nickel metal	7440-02-0	100

Toxicological Data on Ingredients: Nickel metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer), of ingestion, of inhalation (lung sensitizer). **CARCINOGENIC EFFECTS:** Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to skin. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion. This material is flammable in powder form only.

Special Remarks on Explosion Hazards:

Material in powder form, capable of creating a dust explosion. Mixtures containing Potassium Perchlorate with Nickel & Titanium powders & infusorial earth can explode. Adding 2 or 3 drops of approximately 90% peroxyformic acid to powdered nickel will result in explosion. Powdered nickel reacts explosively upon contact with fused ammonium nitrate at temperatures below 200 deg. C.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m³) from ACGIH (TLV) [United States] Inhalation Respirable. TWA: 0.5 (mg/m³) [United Kingdom (UK)] TWA: 1 (mg/m³) from OSHA (PEL) [United States] Inhalation Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid. Lustrous solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 58.71 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 2730°C (4946°F)

Melting Point: 1455°C (2651°F)

Critical Temperature: Not available.

Specific Gravity: Density: 8.908 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Insoluble in Ammonia. Soluble in dilute Nitric Acid. Slightly soluble in Hydrochloric Acid, Sulfuric Acid.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong acids, selenium, sulfur, wood and other combustibles, nickel nitrate, aluminum, aluminum trichloride, ethylene, p-dioxan, hydrogen, methanol, non-metals, oxidants, sulfur compounds, aniline, hydrogen sulfide, flammable solvents, hydrazine, and metal powders (especially zinc, aluminum, and magnesium), ammonium nitrate, nitryl fluoride, bromine pentafluoride, potassium perchlorate + titanium powder + indusorial earth.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. Causes damage to the following organs: skin. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rat] - Route: Oral; Dose: 5000 mg/kg LDL [Guinea Pig] - Route: Oral; Dose: 5000 mg/kg

Special Remarks on Chronic Effects on Humans: May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Nickel dust and fume can irritate skin. Eyes: Nickel dust and fume can irritate eyes. Inhalation: Inhalation of dust or fume may cause respiratory tract irritation with non-productive cough, hoarseness, sore throat, headache, vertigo, weakness, chest pain, followed by delayed effects, including tachypnea, dyspnea, and ARDS. Death due to ARDS has been reported following inhalation of high concentrations of respirable metallic nickel dust. Later effects may include pulmonary edema and fibrosis. Ingestion: Metallic nickel is generally considered not to be acutely toxic if ingested. Ingestion may cause nausea, vomiting, abdominal , and diarrhea. Nickel may damage the kidneys(proteinuria), and may affect liver function. It may also affect behavior (somnolence), and cardiovascular system (increased coronary artery resistance, decreased myocardial contractility, myocardial damage, regional or general arteriolar or venus dilation). Chronic Potential Health Effects: Skin: May cause skin allergy. Nickel and nickel compounds are among the most common sensitizers inducing allergic contact dermatitis. Inhalation: Chronic inhalation nickel dust or fume can cause chronic hypertrophic rhinitis, sinusitis, nasal polyps, perforation of the nasal septum, chronic pulmonary irritation, fibrosis, pulmonary edema, pulmonary eosinophilia, Pneumoconiosis, allergies (asthma-like allergy), and cancer of the nasal sinus cavities, lungs, and possibly other organs. Future exposures can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness. Chronic inhalation of nickel dust or fume may also affect the liver (impaired liver function tests), and blood (changes in red blood cell count). Ingestion: Prolonged or repeated ingestion of nickel can be a source chronic urticaria and other signs of allergy.

Chronic ingestion of Nickel may also affect respiration and cause pneumoconiosis or fibrosis. Note: In the general population, sensitization occurs from exposure to nickel-containing coins, jewelry, watches,

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Nickel metal California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Nickel metal Connecticut hazardous material survey.: Nickel metal Illinois toxic substances disclosure to employee act: Nickel metal Illinois chemical safety act: Nickel metal New York release reporting list: Nickel metal Rhode Island RTK hazardous substances: Nickel metal Pennsylvania RTK: Nickel metal Michigan critical material: Nickel metal Massachusetts RTK: Nickel metal Massachusetts spill list: Nickel metal New Jersey: Nickel metal New Jersey spill list: Nickel metal Louisiana spill reporting: Nickel metal California Director's List of Hazardous Substances: Nickel metal TSCA 8(b) inventory: Nickel metal

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects. R43- May cause sensitization by skin contact. S22- Do not breathe dust. S36- Wear suitable protective clothing.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

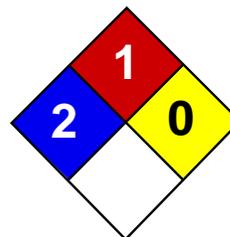
References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Selenium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Selenium

Catalog Codes: SLS2629

CAS#: 7782-49-2

RTECS: VS7700000

TSCA: TSCA 8(b) inventory: Selenium

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Se

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Selenium	7782-49-2	100

Toxicological Data on Ingredients: Selenium: ORAL (LD50): Acute: 6700 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.2 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 78.96 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 684.9°C (1264.8°F)

Melting Point: 217°C (422.6°F)

Critical Temperature: Not available.

Specific Gravity: 4.81 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6700 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Selenium powder : UN2658 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Selenium Massachusetts RTK: Selenium TSCA 8(b) inventory: Selenium SARA 313 toxic chemical notification and release reporting: Selenium CERCLA: Hazardous substances.: Selenium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

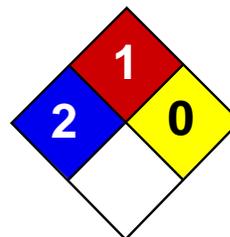
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Silver MSDS

Section 1: Chemical Product and Company Identification

Product Name: Silver

Catalog Codes: SLS4222, SLS2005, SLS3427, SLS1210, SLS2632, SLS4054, SLS1837

CAS#: 7440-22-4

RTECS: VW3500000

TSCA: TSCA 8(b) inventory: Silver

CI#: Not applicable.

Synonym:

Chemical Formula: Ag

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Silver	7440-22-4	100

Toxicological Data on Ingredients: Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (mg/m³) from OSHA (PEL) TWA: 0.01 (mg/m³) from OSHA NIOSH Australia: TWA: 0.1 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 107.87 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2212°C (4013.6°F)

Melting Point: 961°C (1761.8°F)

Critical Temperature: Not available.

Specific Gravity: 10.4 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Is not dispersed in cold water, hot water.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 100 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Silver Pennsylvania RTK: Silver Minnesota: Silver Massachusetts RTK: Silver New Jersey: Silver TSCA 8(b) inventory: Silver TSCA 8(a) PAIR: Silver TSCA 8(d) H and S data reporting: Silver SARA 313 toxic chemical notification and release reporting: Silver: 1% CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

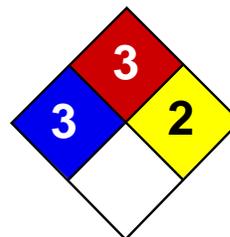
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:26 PM

Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	3
Reactivity	2
Personal Protection	E

Material Safety Data Sheet Sodium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium

Catalog Codes: SLS3505

CAS#: 7440-23-5

RTECS: VY0686000

TSCA: TSCA 8(b) inventory: Sodium

CI#: Not applicable.

Synonym: Natrium

Chemical Name: Sodium

Chemical Formula: Na

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium	7440-23-5	100

Toxicological Data on Ingredients: Sodium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 115°C (239°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Extremely flammable in presence of moisture. Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. Moisture reactive material. SMALL FIRE: Obtain advice on use of water. Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid that, in contact with water, emits flammable gases. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:

Keep under inert atmosphere. Keep container dry. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 22.99 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 881.4°C (1618.5°F)

Melting Point: 97.8°C (208°F)

Critical Temperature: Not available.

Specific Gravity: 0.97 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:

Highly reactive with oxidizing agents, acids, moisture. The product reacts violently with water to emit flammable but non toxic gases.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant). Hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Material is destructive to tissue of the mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.3: Material that emits flammable gases on contact with water.

Identification: : Sodium : UN1428 PG: I

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Sodium Massachusetts RTK: Sodium TSCA 8(b) inventory: Sodium CERCLA: Hazardous substances.: Sodium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R17- Spontaneously flammable in air. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 3

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 3

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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International Chemical Safety Cards

THALLIUM

ICSC: 0077

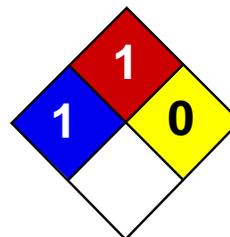
THALLIUM
 Ramor
 Thallium (metal)
 Tl
 Atomic mass: 204.4

CAS # 7440-28-0
 RTECS # XG3425000
 ICSC # 0077

EC # 081-001-00-3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION	Abdominal pain. Diarrhoea. Nausea. Vomiting. Loss of hair, pain in legs and chest, and dry skin. Symptoms may be delayed (see Notes).	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	(Further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
• EYES		Safety goggles, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Loss of vision, polyneuritis, psychic disturbances, delirium, convulsions, respiratory paralysis, coma, cardiac	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Induce vomiting (ONLY IN CONSCIOUS PERSONS!).

PHYSICAL PROPERTIES	Boiling point: 1457°C Melting point: 304°C	Relative density (water = 1): 11.9 Solubility in water: none
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to plants. It is strongly advised not to let the chemical enter into the environment because it persists in the environment.	
NOTES		
Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of acute thallium poisoning (except for gastrointestinal symptoms) do not become manifest until 12 hours to 4 days after exposure. Do NOT take working clothes home. Refer to cards for specific thallium compounds (e.g., thallosulfate - see ICSC # 0336).		
ADDITIONAL INFORMATION		
ICSC: 0077		THALLIUM
<small>© IPCS, CEC, 1993</small>		
IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Vanadium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Vanadium

Catalog Codes: SLV1306

CAS#: 7440-62-2

RTECS: YW1355000

TSCA: TSCA 8(b) inventory: Vanadium

CI#: Not applicable.

Synonym:

Chemical Name: Vanadium

Chemical Formula: V

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Vanadium	7440-62-2	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Powdered Vanadium explodes with chlorine, even at 0 deg. C.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: TWA: 1 STEL: 3 (mg/m³) from NIOSH [United States] Inhalation (Fume or Dust) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 50.94 g/mole

Color: Grey. Grayish white. (Light.)

pH (1% soln/water): Not applicable.

Boiling Point: 3380°C (6116°F)

Melting Point: 1917°C (3482.6°F)

Critical Temperature: Not available.

Specific Gravity: 6.11 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Violent reaction with bromine trifluoride, chlorine, lithium, oxidants

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Not available.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: It can cause skin irritation. Eyes: Dust can cause eye irritation. Inhalation: It can irritate the nose, throat, and lungs causing coughing, wheezing and/or shortness of breath. Ingestion: Low hazard. Low toxicity. It may cause nausea, vomiting abdominal pain, and greenish discoloration of the tongue. It may also affect behavior/central nervous system and cause headache, dizziness, tremors. Chronic Potential health Effects: Ingestion: Prolonged or repeated ingestion may cause weight loss, and may cause kidney damage. It may also affect the blood and cause anemia. Inhalation: Prolonged or repeated inhalation may irritate the lungs. It may also cause bronchitis to develop with cough, phlegm, and/or shortness of breath. It may also cause an asthma-like allergy. Future exposure may cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Vanadium Massachusetts RTK: Vanadium New Jersey: Vanadium New Jersey spill list: Vanadium California Director's List of Hazardous Materials: Vanadium TSCA 8(b) inventory: Vanadium SARA 313 toxic chemical notification and release reporting: Vanadium

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:**WHMIS (Canada):**

The classification of this product has not been validated yet by the Service du repertoire toxicologique.

DSCL (EEC):

This product is not classified according to the EU regulations. Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

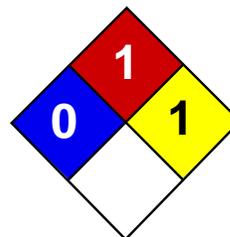
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:14 AM

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Health	1
Fire	1
Reactivity	1
Personal Protection	E

Material Safety Data Sheet Zinc Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Zinc Metal

Catalog Codes: SLZ1054, SLZ1159, SLZ1267, SLZ1099, SLZ1204

CAS#: 7440-66-6

RTECS: ZG8600000

TSCA: TSCA 8(b) inventory: Zinc Metal

CI#: Not applicable.

Synonym: Zinc Metal Sheets; Zinc Metal Shot; Zinc Metal Strips

Chemical Name: Zinc Metal

Chemical Formula: Zn

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Zinc Metal	7440-66-6	100

Toxicological Data on Ingredients: Zinc Metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials, of acids, of alkalis, of moisture. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Zinc + NaOH causes ignition. Oxidation of zinc by potassium proceeds with incandescence. Residues from zinc dust /acetic acid reduction operations may ignite after long delay if discarded into waste bins with paper. Incandescent reaction when Zinc and Arsenic or Tellurium, or Selenium are combined. When hydrazine mononitrate is heated in contact with zinc, a flaming decomposition occurs at temperatures a little above its melting point. Contact with acids and alkali hydroxides (sodium hydroxide, potassium hydroxide, calcium hydroxide, etc.) results in evolution of hydrogen with sufficient heat of reaction to ignite the hydrogen gas. Zinc foil ignites if traces of moisture are present. It is water reactive and produces flammable gases on contact with water. It may ignite on contact with water or moist air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Flammable solid that, in contact with water, emits flammable gases. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 65.39 g/mole

Color: Bluish-grey

pH (1% soln/water): Not applicable.

Boiling Point: 907°C (1664.6°F)

Melting Point: 419°C (786.2°F)

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, moisture

Incompatibility with various substances:

Reactive with oxidizing agents, acids, alkalis. Slightly reactive to reactive with moisture. The product may react violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with acids, halogenated hydrocarbons, NH_4NO_3 , barium oxide, $\text{Ba}(\text{NO}_3)_2$, Cadmium, CS_2 , chlorates, Cl_2 , CrO_3 , F_2 , Hydroxylamine, $\text{Pb}(\text{N}_3)_2$, MnCl_2 , HNO_3 , performic acid, KClO_3 , KNO_3 , N_2O_2 , Selenium, NaClO_3 , Na_2O_2 , Sulfur, Te, water, $(\text{NH}_4)_2\text{S}$, As_2O_3 , CS_2 , CaCl_2 , chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl , H_2SO_4 , $(\text{Mg} + \text{Ba}(\text{NO}_3)_2 + \text{BaO}_2)$, (ethyl acetoacetate +tribromoneopentyl alcohol. Contact with Alkali Hydroxides(Sodium Hydroxide, Potassium Hydroxide, Calcium Hydroxide, etc) results in evolution of hydrogen. Ammonium nitrate + zinc + water causes a violent reaction with evolution of steam and zinc oxide. May react with water.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Dermal exposure to zinc may produce leg pains, fatigue, anorexia and weight loss. Eyes: May cause eye irritation. Ingestion: May be harmful if swallowed. May cause digestive tract irritation with tightness in throat, nausea, vomiting, diarrhea, loss of appetite, malaise, abdominal pain. fever, and chills. May affect behavior/central nervous system and autonomic nervous system with ataxia, lethargy, staggering gait, mild derrangement in cerebellar function, lightheadness, dizziness, irritability, muscular stiffness, and pain. May also affect blood. Inhalation: Inhalation of zinc dust or fumes may cause respiratory tract and mucous membrane irritation with cough and chest pain. It can also cause "metal fume fever", a flu-like condition characterized appearance of chills, headached fever, maliase, fatigue, sweating, extreme thirst, aches in the legs and chest, and difficulty in breathing. A sweet taste may also be be present in metal fume fever, as well as a dry throat, aches, nausea, and vomiting, and pale grey cyanosis. The toxicological properties of this substance have not been fully investisgated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

New York release reporting list: Zinc Metal Rhode Island RTK hazardous substances: Zinc Metal Pennsylvania RTK: Zinc Metal Florida: Zinc Metal Michigan critical material: Zinc Metal Massachusetts RTK: Zinc Metal New Jersey: Zinc Metal California Director's List of Hazardous Substances: Zinc Metal TSCA 8(b) inventory: Zinc Metal TSCA 12(b) one time export: Zinc Metal SARA 313 toxic chemical notification and release reporting: Zinc Metal CERCLA: Hazardous substances.: Zinc Metal: 1000 lbs. (453.6 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not Available

DSCL (EEC):

R15- Contact with water liberates extremely flammable gases. R17- Spontaneously flammable in air. S7/8- Keep container tightly closed and dry.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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