SET Environmental, Inc.
450 Sumac Road
Wheeling, IL 60090
Phone: 847/537-9221 Fax: 847/537-9265

SOIL EXCAVATION AND MONITORING REPORT
110 E. LOWER ILLINOIS STREET
CHICAGO, ILLINOIS

December, 2010

Prepared For:

City of Chicago: Dept of Environment
30 N. LaSalle
Chicago, Illinois 60602

Prepared By:

SET Environmental, Inc.
450 Sumac Rd
Wheeling, Illinois 60090

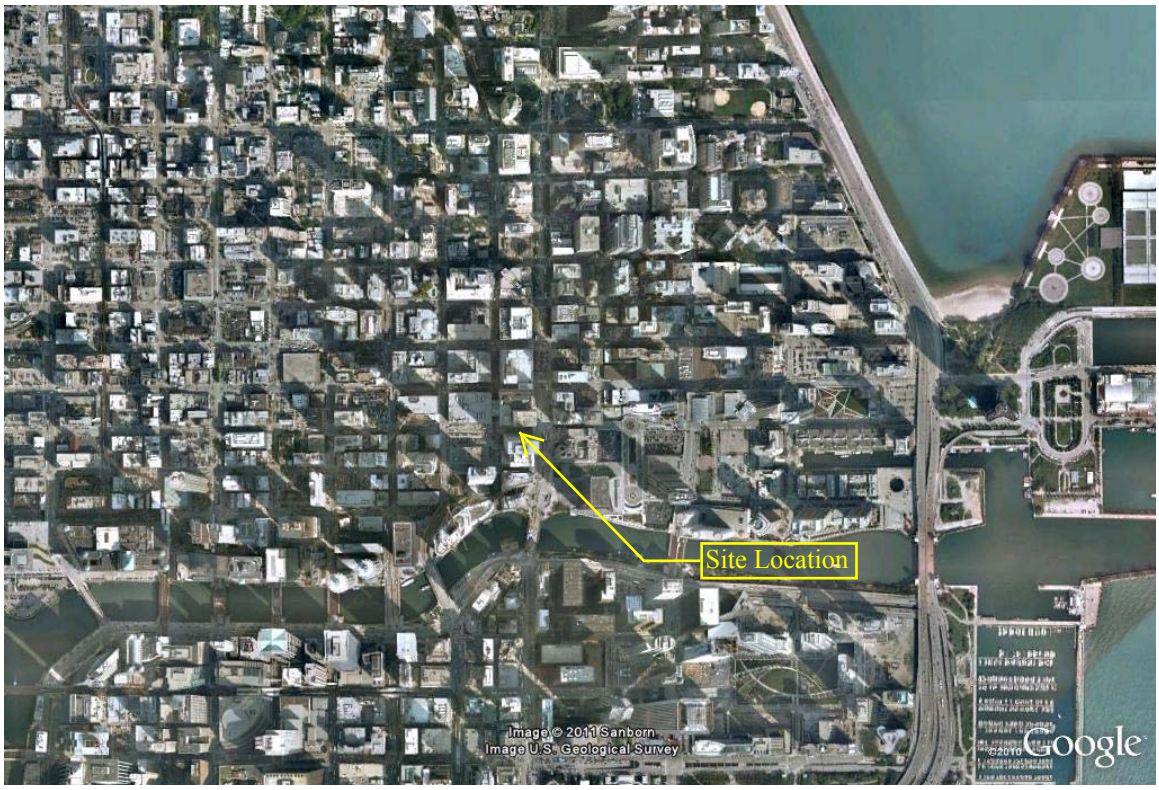
SOIL EXCAVATION AND MONITORING REPORT

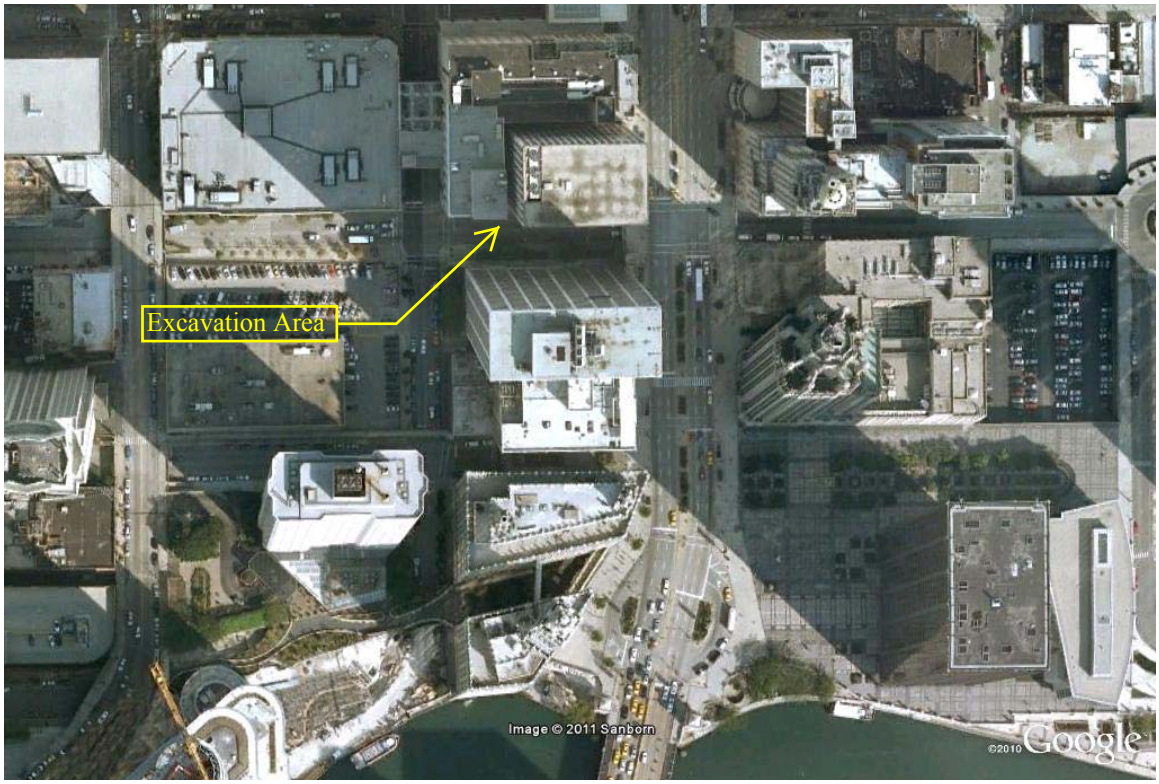
110 E. Lower Illinois Street Chicago, IL

THORIUM MONITORING DOCUMENTATON CATEGORY	THORIUM MONITORING DOCUMENTATION DETAILS
SITE INFORMATION	
Monitoring Date(s)	Monitoring of radiation levels was completed on December 23, 2010 by Stan A. Huber Consultants, Inc (SAHCI) under the direction of SET Environmental Inc. (SET).
Monitoring Location	The excavation was located at 110 E. Lower Illinois St, Chicago, IL. An aerial photograph and site location map have been provided as Appendix A. A sketch of the work area is included in SAHCI's *Thorium Monitoring Report* in Appendix C.
Excavation Details	The purpose of the excavation work performed by the City of Chicago was to repair an underground water line. The work site is in the Streeterville area, which has previously been identified by the United States Environmental Protection Agency (USEPA) and the Chicago Department of Environment (DOE) as potentially contaminated with thorium. The potential impacts resulted from historical operations at the former Lindsey Light and Chemical Company.
Monitoring Guidance	The USEPA has provided guidance for conducting radiation monitoring and implementing appropriate health and safety procedures for working in areas where higher levels of radiation may be present. All activities performed by SAHCI were conducted under the guidance of document *SET General Procedure for Thorium Monitoring* provided as Appendix B.
FIELD ACTIVITIES	
Site Health and Safety	A site walk-through and discussion of the projected activities took place between the parties onsite. SAHCI also performed a radiation safety training session.
Monitoring Activities	Before monitoring the excavation, background was determined from 5 random locations in the vicinity of the planned excavation. For excavation monitoring, entry was made after each 1.5 foot lift, and the floor and walls were scanned directly. Once the excavation was over 4.5 ft deep, each bucket was monitored and compared to the action level. The depth of excavation reached a maximum of 6.0 ft. Results are listed below and are included in Appendix C.
Soil Removal	After being screened and cleared, the removed soil was placed directly into the truck for offsite disposal. No soil was stockpiled during this project.
RADIATION SCREENING RESULTS	
Required Action Level	Based on the instrumentation used, the USEPA action level of 7.1 pCi/gram total thorium correlates to 18,728 counts per minute (cpm). Any detection at or near this level would require additional monitoring and notification of the USEPA.
Background Results	The average background level for this site was found to be 5000 counts per minute (cpm).
Excavation Screening	There were no count rates of surface soil throughout the excavation that approached the action level of 18,728 counts per minute (cpm). The maximum gamma count rate for each 1.5 foot lift is included on the *Radiation Survey Form* provided in Appendix C.
Conclusions	Since no count rates were identified about the 7.1 pCi/gram threshold limit, no additional sampling, air monitoring, or personnel monitoring was performed.

AERIAL SITE PHOTOGRAPHS

110 E. Lower Illinois St. Chicago, IL





SET Environmental, Inc.
450 Sumac Road
Wheeling, IL 60090
Phone: 847/537-9221 Fax: 847/537-9265

General Procedure for Thorium Monitoring

PRIOR TO WORK COMMENCING

- A permit and health & safety plan (HASP) will be obtained from City of Chicago Department of the Environment.
- The "General Procedure" will be forwarded to the USEPA for approval prior to commencing work.
- USEPA will be contacted 48 hours prior to work starting so that they may be present for walkover survey and start of excavation.
- Site work and initial site conditions will be documented.
  - For purposes of generating a site figure, an aerial photograph is not necessary. A map with measurements from a fixed feature (e.g., a curb) would suffice.
  - A walk-over survey will be conducted in the work location (site) and background gamma readings recorded. Background is considered to be 2.1 picoCuries per gram (pCi/g) as established for the Lindsay Light II sites.
- All contractors onsite will review USEPA HASP and General Procedure.

WORK SCOPE

- Health and safety meeting (e.g., tail-gate meeting) will be conducted before starting site work each day.
  - Potential exposure to thorium-impacted soil and what types of testing will be performed will be reviewed.
  - Contents of the USEPA HASP will be discussed and general health and safety concerns covered (i.e. PPE, traffic, heavy equipment).
  - Clean/support, decontamination, and exclusion zones will be established if needed in the event the field screening readings are above the action level of 7.1 piC/g.
  - A first-aid station will be set up.
  - The location of phone numbers and procedures for contacting ambulance services, fire dept, police and medical facilities will be identified.
  - The location of maps and routes to the closest medical facilities will be identified.
  - The location of sanitary facilities will be identified.
  - Personal and ambient air monitoring equipment will be administered for use, as needed.

- Document readings and samples:
  - Personal Monitoring: Records of all radiation exposures incurred by field personnel will be maintained.
  - Surface Soil Scan Procedure: The excavation shall be screened for radiation count rates using a Ludlum Model 2221 Scaler / Ratemeter with attached 2"x 2" NaI probe. The instrument shall be calibrated for thorium with an established

count rate threshold that correlates to the USEPA action level of 7.1 piC/g. The trench shall be excavated in lifts not to exceed 18 inches in depth.

- After each lift, the trench shall be surveyed for total radiation count rate and the maximum level recorded. Down to an excavation depth of 4 1/2 feet below ground surface (i.e., before OSHA regulations require use of trench shoring or benching), the trench can be entered to survey both the walls and floor. Beyond an excavation depth of 4 1/2 feet below ground surface, the trench floor shall be surveyed using the "Excavator Bucket Survey" procedure described below for each 18-inch lift upon removal from the trench. At this point, it will no longer be feasible to survey the trench walls, since they will be mostly covered by the shoring. A six-inch detector shield may be utilized if deemed necessary to obtain accurate survey results.

- Excavator Bucket Survey Procedure: After excavated soil is removed from the trench, the surface of the soil shall be surveyed for total radiation count rate within the excavator bucket before it is emptied. If the radiation count rates are at background levels at the soil surface in the excavator bucket, the soil spoils can be loaded directly into the clean soil roll-off box. If any count rates are noted above background levels but below the action level of 7.1 pCi/g, the bucket spoils shall be emptied on a known surface or plastic sheeting and resurveyed. If the follow-up survey shows no count rates greater than the action level of 7.1 pCi/g, the soil spoils can be then be loaded into the clean soil roll-off box.
- Thorium-Contaminated Soils Procedure: If any excavated soils are found during either surface scanning or bucket surveys with a count rate greater than the 7.1 pCi/g action level, then those soils shall be isolated, placed in supersacks, and stored in a locked roll-off box pending further sampling for laboratory analysis and disposal evaluation. The area of thorium-contaminated soils above the action level shall then be roped off and isolated as an exclusion zone. A sample of the material with the highest radiation count rate (whether excavated or in the trench) will be collected as a discrete sample and sent for laboratory analysis for confirmation purposes (if requested, this sample will also be provided to the USEPA). The trench location from which any material exceeding the action level is identified will be documented. Proper PPE, including Tyvek suits, rubber boots, and latex gloves will be worn by any personnel entering an exclusion zone. Additionally, air sampling will be implemented prior to moving or loading thorium-contaminated soil. All personnel and equipment leaving an exclusion zone shall be monitored for removable contamination. Personnel working in an exclusion zone shall be monitored for radiation exposure using self-reading pocket dosimeters or film badges (or equivalent external dosimetry).

- Minimize potential public contact:
  - Public access to excavated soil will be restricted using barricades, temporary fencing, and jersey barriers.
  - Excavated soil piles will be covered if needed to minimize fugitive dust.
  - Off-site tracking by vehicles and potentially contaminated boots or clothing by workers will be controlled.
- A final report that contains the results of the radiation monitoring and/or surveying will be completed.

Stan A. Huber Consultants, Inc.
Health Physics and Radiation Safety Services

200 North Cedar Road – New Lenox, Illinois 60451-1751 – (800) 383-0468 or (815) 485-6161 – FAX (815) 485-4433 – Email sahci@sahci.com – Home Page www.sahci.com

December 23, 2010

Mike Kasal
SET Environmental
450 Sumac Road
Wheeling, Illinois 60090

RE: 110 E. Illinois St. – City of Chicago (Department of Water Management) Thorium Monitoring

Dear Mr. Kasal:

Stan A. Huber Consultants, Inc (SAHCI) was hired by your firm to provide radiation monitoring during excavation of a City of Chicago water line repair at 110 E. Illinois St. in Chicago, Illinois. The monitoring was performed on December 22, 2010. All activities were conducted under the guidance of document *SET General Procedure for Thorium Monitoring.*

Instrumentation

Surface gamma scans were performed by Glenn Huber using a Ludlum Model 2221 Scaled / Ratemeter with attached 2"x2" NaI probe. The instrument was calibrated on November 8, 2010. The USEPA action level of 7.1 picocuries per gram (pCi/g) total thorium for this instrument is 18,728 counts per minute (cpm).

The average background count rate for this location was found to be 5000 cpm.

Soil Gamma Scans

Gamma surface scans were performed using the Ludlum Model 2221 Scaler / Ratemeter described above. Data was collected by entering the excavation after each 18 inch lift and recording the highest count rate for the floors and walls to an excavation depth of 4.5 feet. After the excavation was 4.5 feet deep, surveys were performed of the buckets of soil as they were removed from the excavation, prior to loading in the truck. No soil was stockpiled during the project and all excavated soils were loaded directly into the truck after screening.

The maximum gamma count rate for each 1.5 foot lift was recorded on the attached Radiation Survey Form. The count rates in the excavation ranged from 5000 cpm to 7900 cpm. No count rates were found at any time that exceeded the threshold limit of 18,728 cpm.

Additional Monitoring

Since no count rates were identified above the 7.1 pCi/gram threshold limit, no additional soil sampling, air monitoring, or personnel monitoring were performed.

Thank you for your assistance with this project. If you have any questions or need additional information please call me at (815) 485-6161.

Sincerely,
Stan A. Huber Consultants, Inc.

Glenn Huber, CHP
President

sahci
Stan A. Huber Counsultants, Inc.

Radiation Survey Form

Location/ Project ID:

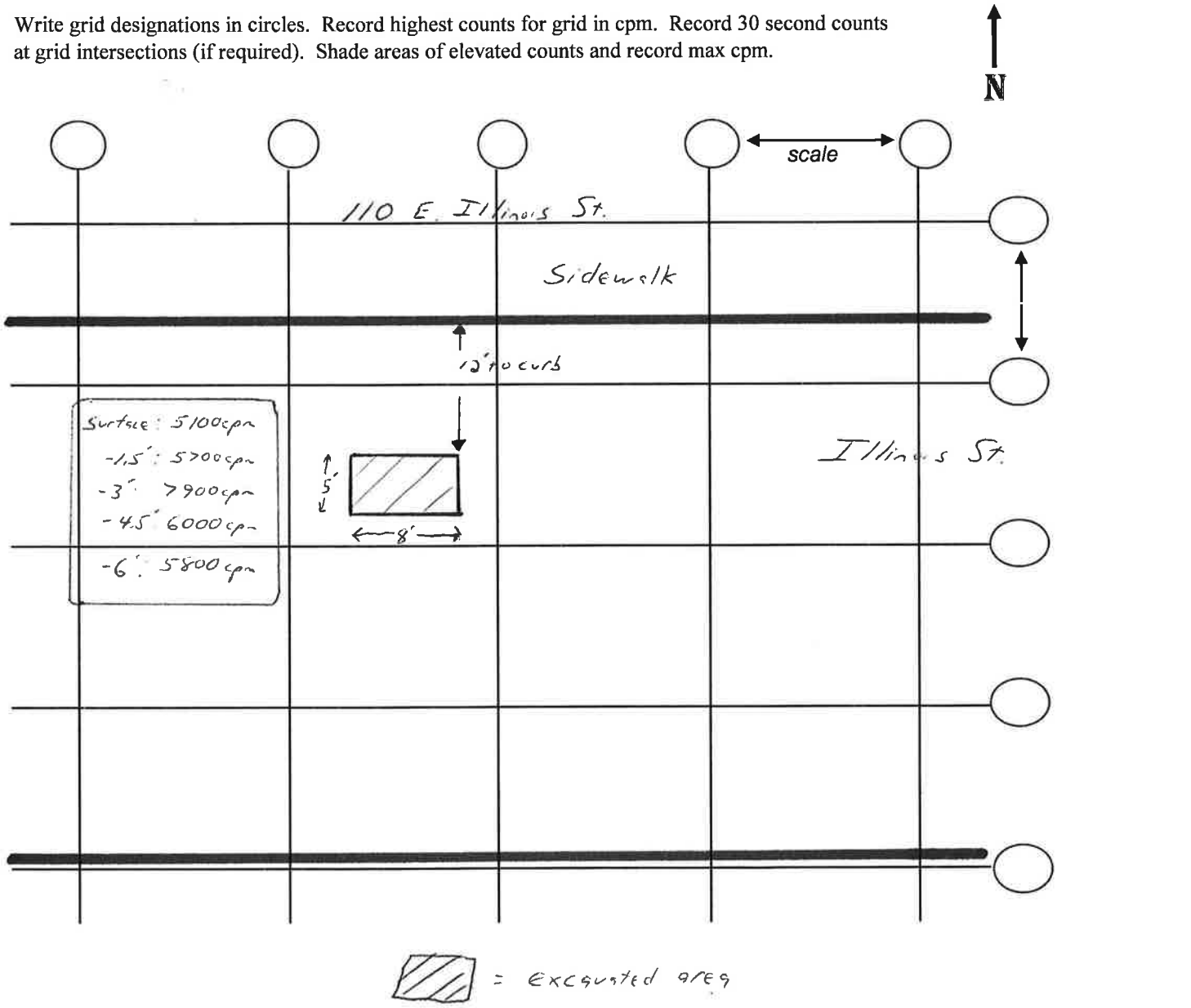
Date: 12/22/10 **Technician:** Glenn Huber

Inst Model: Ludlum 2221 **Serial No. :** 134542

Probe Type: 1"x1" NaI / (2"x2" NaI) Shielded / (Not Shielded) **Lift Elevation:** surface to -6'

Background 5000 **cpm** **Action Level:** 18,728 **cpm** = 7.1pCi/g total thorium

Write grid designations in circles. Record highest counts for grid in cpm. Record 30 second counts at grid intersections (if required). Shade areas of elevated counts and record max cpm.



= excavated area