

ATTACHMENT 8

Crandlemere and Associates Roof Mounted Transmission Devices
Document Review & Evaluation

R. W. CRANDLEMERE & ASSOCIATES, INC.
PROTECTING BUSINESS AND THE ENVIRONMENT

ROOF-MOUNTED TRANSMISSION DEVICES
DOCUMENT REVIEW AND EVALUATION
ONE WORLD TRADE CENTER
NEW YORK CITY, NY 10081

Project #000095

Merritt & Harris, Inc. #20-251E

User:

Merritt & Harris, Inc.
Attn: Mr. Robert G. Weiland, V. P.
110 East 42nd Street, 12th Floor
New York City, NY 10017-5685

Date Issued: November 7, 2000

The review and evaluation of documents provided regarding the roof mounted transmission devices described herein was conducted by the undersigned, of R. W. Crandlemere & Associates, Inc. (CRANDLEMERE & ASSOCIATES). CRANDLEMERE & ASSOCIATES assessment consisted solely of the activities described in the Introduction of this report. The assessment was conducted in accordance with the Scope of Work described in our Proposal No. 00-090. It is subject to the Limitations and Service Constraints submitted in Appendix A of the ASTM Phase I Environmental Site Assessment provided as part of this Project. See Appendix F of that report for ASTM definitions of word in italics in this report.

Report Prepared by:



R. Wayne Crandlemere
President

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1.0 INTRODUCTION

1.1 Background

R. W. Crandlemere & Associates, Inc. (CRANDLEMERE & ASSOCIATES) was retained by Merritt & Harris, Inc. (the *user*) to conduct an ASTM E1527-97 Phase I *Environmental Site Assessment* (ESA) of One, Two, Four and Five World Trade Center, located in the Borough of Manhattan, New York City, New York, 10081.

It is our understanding that Merritt & Harris, Inc. is providing this information in conjunction with, and as part of, a larger assessment of the *property* and has named The Port Authority of New York and New Jersey as an *additional user* as defined by the ASTM Standard E1527-97 Section 3.3.39. As an *additional user*, The Port Authority of New York and New Jersey may rely on the information presented in this report.

This report presents CRANDLEMERE & ASSOCIATES' professional opinion, and no warranty, expressed or implied, is made. The Port Authority of New York and New Jersey has the right to reproduce in full and provide copies of this report to interested parties. All reports, both verbal and written, are for the benefit of The Port Authority of New York and New Jersey and its' agents, employees, participates, and assigns.

On September 26, 27, 28 and 29 and October 10 and 11, 2000 Mr. R. Wayne Crandlemere of CRANDLEMERE & ASSOCIATES conducted a *Site visit* to identify *recognized environmental conditions* at the Site. In addition, CRANDLEMERE & ASSOCIATES' assessment included reconnaissance of adjacent properties, background research, and review of available local, state and federal regulatory records regarding the presence of petroleum products or hazardous materials at or in the vicinity of the Site.

The results of our work regarding the ASTM Standard for a Phase I Environmental Site Assessment of the Site is provided in a separate Phase I ESA report.

Discussions related to the facility programs that deal with asbestos-containing materials (ACM) and the electro-magnetic radiation related to the antenna tower on One World Trade Center are included in the condition assessment reports related to each building (One, Two, Four & Five World Trade Center), the Retail Mall and Plaza, Central Services and Sub-grade areas.

This report is a discussion of the information specific to the One World Trade Center, the North Tower related only to the roof-mounted transmission devices located on One World Trade Center, the North Tower, and their potential impact on workers and or visitors at One World Trade Center and visitors to Two World Trade Center, the South Tower. See the other specific reports for information specific to those buildings and facility areas.

1.2 Scope of Work

Beyond the Scope of Work of the ASTM Standard for a Phase I Environmental Site Assessment, but as requested by the *user*, reports related to safety issues regarding the roof-mounted antennas on the Site was performed by R. W. Crandlemere & Associates, Inc. Reports concerning the roof-mounted transmission devices were reviewed to determine the extent and nature of any additional studies or reports necessary to satisfy the due diligence requirements of a typical institutional acquisition entity related to safety concerns regarding the use of broadcast antennas on the roof of One World Trade Center, the North Tower.

2.0 REVIEW OF DOCUMENTS

There is a 360 foot tall antenna mast (Photo #1) rising from the top of the One World Trade Center Tower extending to a height of 1,728 feet above ground level. The tower and roof have antennas reported to service 9 television stations and 4 FM radio stations, and has an additional 83 wireless communication antennas (Photos #2, 3 & 4). As part of this assessment, CRANDLEMERE & ASSOCIATES reviewed the following documents provided by the owner:

- "An Evaluation of the Radiofrequency Environment at the World Trade Center North Tower", September 29, 1997, prepared by Richard Tell Associates, Inc., Las Vegas, NV;
- "Radiation Safety Survey of World Trade Department Ion Mobility Spectrometer Instrument – One World Trade Center" Memorandum March 11, 1998, prepared by Paul W. Mitchell, Environmental and Occupational Health Division, Risk Management, The Port Authority of New York & New Jersey;
- "Antenna Structure Registration", issued 3/23/98, Registration #1002506, U.S. of America, Federal Communications Commission;
- "RF Safety Awareness for World Trade Center Workers, A Presentation at the World Trade Center", dated February 1999 (2/3/99) presented by Richard Tell Associates, Inc. of Las Vegas, NV;
- "Engineering Report Electromagnetic Field Strength Survey at the South Tower of the World Trade Center", March 17, 1999, prepared by Denny & Associates, P.C., Washington, DC;
- "Radiation Safety Survey – One World Trade Center", Memorandum July 26, 1999, prepared by Paul W. Mitchell, Environmental and Occupational Health Division, Risk Management, The Port Authority of New York & New Jersey;
- "A Reevaluation of Radiofrequency Fields on the World Trade Center North Tower", September 15, 1999, Revised March 21, 2000, prepared by Richard Tell Associates, Las Vegas, NV;
- "Radiation Safety Survey – One World Trade Center", January 27, 2000, prepared by Paul W. Mitchell, Environmental and Occupational Health Division, Risk Management, The Port Authority of New York & New Jersey;
- "An Investigation of RF Safety Considerations on the World Trade Center Antenna Mast Relevant to Work to Install a New Digital Television Antenna" May 12, 2000, prepared by Richard Tell Associates, Las Vegas, NV; and

- "Radiation Safety Survey -- One World Trade Center", July 28, 2000, prepared by Paul W. Mitchell, Environmental and Occupational Health Division, Risk Management, The Port Authority of New York & New Jersey.

All above cited documents are attached.

The May 12, 2000 Richard Tell Associates (Tell) report indicates "controls are in place to restrict access to the rooftop to personnel who have been trained in radio frequency (RF) safety matters or who are escorted by someone who has been so trained." On the date of CRANDLEMERE & ASSOCIATES roof visit, the access to the roof was so restricted (Photo #5) and Mr. Crandlemere was so escorted. The Tell report states "special procedures are in place for tower maintenance activities to prevent exposure to RF fields that would exceed the occupational/controlled maximum permissible exposure) MPE limit." Tell's work, as described in their May 12, 2000 report, as well as in their previous work, included "RF field measurements...taken in...designated work region(s) and provides insights and recommendations that will assist in complying with the FCC rules." Appendix C of the May 12, 2000 report includes a Roof Map of RF Fields which indicates only 0.72% (195 square feet) of the roof area potentially exceed FCC RF MPE limits for occupational/ controlled exposures on the roof of the One World Trade Center, the North Tower. They further report "It is important to emphasize that these calculated results are based upon an assumption that all wireless telecommunications antennas on the roof are simultaneously active; that is likely not the case most of the time."

The Radiation Safety Survey reports all indicate acceptable test results. Our review of the documents provided indicate apparently reasonable RF surveys have been performed, safety surveys are performed and personnel safety protocols are in place. Mr. Taylor provided training materials from a presentation made to World Trade Center employees on February 3, 1999. This review did not include any additional field testing nor evaluation of their raw data. The Tell reports indicate that "Under normal broadcasting conditions, complying with the site guidelines of maintaining a minimum clearance of 3 feet from all antennas will likely suffice to control personnel exposures, most of the time." They further report, however, that during the "Tower maintenance mode of operation, access to the roof should be carefully controlled with due attention paid to roof field maps for guidance on areas of suspected maximum field levels. It is during the times of "maintenance mode" operation that field strengths are expected to be the highest and some areas of the roof may exceed the FCC MPE limits for occupational/controlled exposures by up to nearly 3 times the MPE limit.

Work performed by Denny & Associates as reported March 17, 1999, indicates that the RF levels measured on the outside observation deck of Two World Trade Center, the South Tower, exceed "the maximum permissible level for general population/ uncontrolled exposure...for certain modes of auxiliary broadcast antenna use at WTC1 (North Tower)." They conclude that "The basic finding of this survey is that only the low band VHF television stations can operate using their auxiliary antennas without causing overexposure of the outdoor observation deck walkway at WTC2." That report indicates "Further investigation of the WTC2 exposure levels is warranted." "Since the

initial objective of identifying procedures by which the broadcast stations at WTC1 can employ either their main or auxiliary antennas without exceeding the FCC MPE for general population/uncontrolled environments on the observation deck walkway at WTC2 has not been achieved... additional studies will permit broadcasters at WTC2 to move closer and ultimately fulfill their objectives of assuring compliance with the FCC rules."

3.0 MAJOR FINDINGS AND CONCLUSIONS

Based upon the information reviewed and summarized above, it appears that operational guidelines are currently in place to provide protection for trained workers and trained or escorted visitors to the roof of One World Trade Center, the North Tower, meeting the requirements of FCC MPE limits for occupational/controlled exposures. However, the 1999 Denny & Associates report indicates that under certain conditions the broadcasting at One World Trade Center, North Tower, creates RF exposures on the Two World Trade Center, South Tower, roof-top outdoor observation deck walkway that exceed the FCC MPE limits for general population/uncontrolled exposure. They recommended additional investigation. Based upon these reports, CRANDLEMERE & ASSOCIATES also recommends additional investigation of the RF exposure levels on the roof-top outdoor observation deck walkway on Two World Trade Center, the South Tower, with the intent of identifying procedures under which broadcasts at One World Trade Center, the North Tower, do not create RF exposures exceeding FCC Rules on the Two World Trade Center, South Tower, observation deck.

APPENDIX A

APPENDIX A-1

Memorandum July 26, 1999
Regarding Radiation Safety Survey, One WTC

THE PORT AUTHORITY OF NY & NJ

MEMORANDUM

TO: George Tabeek, Project Manager
FROM: Paul W. Mitchell
DATE: July 26, 1999
SUBJECT: RADIATION SAFETY SURVEY - ONE WORLD TRADE CENTER
COPY TO: N. Chanfrau, D. Karpiloff, M. Plaskon, P. Taylor, G. Wojnar

On June 10, 1999, staff of Inspection and Safety Division's Occupational Health Unit conducted the semi-annual Radiation Safety Survey of the Barringer IONSCAN 400 Ion Mobility Spectrometer located in the lobby of 1 WTC. Possession and use of the instrument is in compliance with the conditions of the general license. The instrument's New York State Department of Labor registration number is X-14101.

The survey included an inspection of the storage area and of the instrument, and leak test sampling. The results of the survey are attached. Leak test sampling of the Nickel 63 sealed source unit for detection of removable radioactivity was performed. The sample was submitted to Monitoring Services for analysis and the result was found to be acceptable. A copy of the report is attached for your records.

The next radiation safety survey is scheduled for December, 1999.

If you have any questions or require further information regarding this survey, I can be reached at (201) 216-2173.



Paul W. Mitchell, CIH
Manager
Occupational Health
Inspection and Safety Division

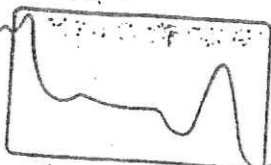
Attachments

WORLD TRADE DEPARTMENT WORLD TRADE CENTER RADIOACTIVE SOURCE SURVEY

INSTRUMENT	REMOVABLE RADIOACTIVITY TEST RESULT	INSTRUMENT IS SECURELY STORED	INSTRUMENT IS PROPERLY LABELLED	OPERATOR'S MANUAL IS AVAILABLE
Barringer Instruments IONSCAN 400 Ion Mobility Spectrometer Serial No. 10A	Acceptable	Yes	Yes	Yes

Inspection and Safety Division

June 1999



Monitoring Services

P.O. BOX 580648 • HOUSTON, TEXAS 77258-0648 • AREA CODE 713/641-0391 • FAX 713/641-6153

SEALED SOURCE LEAK TEST CERTIFICATE

PORT AUTHORITY OF NY & NJ
241 ERIE STREET ROOM 306
JERSEY CITY, NJ 07310
ATTN OF: WILLIAM PÖCKELS

C FILE 2194

S FILE 29436

N FILE 1662

INVOICE NO. _____ DATE _____

RADIONUCLIDE NI-63

ACTIVITY 15 MCI CI SERIAL NO 10A

WIPE DATE 061099 WIPE BY _____

EFF 652

GROSS CPM 29 BKG CPM 19 NET CPM 10

NET CPM _____ = MICROCURIE
EFFX2 22X10⁵ DPM/CI

THE ABOVE SOURCE WIPE TEST HAS BEEN ASSAYED IN ACCORDANCE WITH OUR RADIOACTIVE MATERIAL LICENSE AND THE APPROPRIATE REGULATORY REQUIREMENTS. THE REGULATIONS DEFINE A LEAKING SOURCE AS ONE FROM WHICH AN APPROPRIATE WIPE TEST HAS REMOVED 0.005 MICROCURIE OR MORE OF ACTIVITY.

THE REMOVABLE ACTIVITY WAS 6.91E-06 MICROCURIE

ASSAY NO. 070199 33 DATE 07-01-1999

ASSAYED BY Paul H. H. H.

APPENDIX A-2

“RF Safety Awareness for
World Trade Center Workers”,
Presentation Folder