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STATE OF NEW YORK
DEPARTMENT OF HEALTH

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Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

December 14, 2004

Jill A. Knickerbocker
Technical Manager
CWM Chemical Services, LLC
1550 Balmer Road
P.O. Box 200
Model City, New York 14107

Dear Ms. Knickerbocker:

This is in response to your letter dated November 16, 2004 concerning the comparison of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and the U.S. Department of Energy (DOE) reports on the characterization and remediation of the Lake Ontario Ordnance Works (LOOW) Vicinity Properties (VPs).

We have completed an initial review of the characterization work performed from April through October 1983 by Oak Ridge Associated Universities (ORAU) with respect to the LOOW VPs as well as the remediation work performed by DOE including the verification documentation. In particular we focused our review on VPs A, B, C, C', D, and F. These properties were certified by DOE as meeting their release criteria and are within the M-3 zone you have requested the Department to evaluate first. In addition, we reviewed other available documents concerning the LOOW VP history and results of other radiological surveys and analysis.

Based on our review of the DOE reports we do not concur with your assessment that VPs E, E' and G are the only VPs (owned by CWM) that have the potential for isolated areas of elevated contamination. It appears that there are a number of data gaps with regard to the characterization of certain areas (see below) that were developed or in the process of development by the property owner at the time the surveys were conducted. The development of these properties had the potential to obscure the detection of contamination in the soil and to relocate contaminated soil to other parts of the property. A summary of these gaps is presented below.

Summary of DOH review of DOE LOOW Reports

The site characterization work performed by ORAU from April to October 1983 formed the basis for the remediation work conducted by DOE and its contractor. Areas that ORAU found exceeded the DOE guidelines were identified by ORAU for remediation. From 1983 to 1986, DOE remediated the identified areas and resurveyed those areas to confirm the effectiveness of the remediation. However, only the areas remediated were resurveyed. If ORAU missed any areas of contamination during the characterization survey, these areas would not have been identified for remediation or included in DOE's verification surveys. The ORAU characterization surveys served as the final status survey for areas not remediated. Therefore, it was important that ORAU conduct a complete characterization survey that would demonstrate that any contamination had been identified for remediation. A complete characterization survey should have included conducting subsurface investigations in impacted areas that had been covered or disturbed by earthmoving activities and areas where soils from the impacted areas had been relocated.

Based on our review, it appears that the work done by ORAU in 1983 to identify and characterize areas of contamination was impacted by previous and on-going earthmoving activities on CWM property such as the construction of landfills, ponds and berms. These activities and structures prevented ORAU from conducting complete characterization surveys in many areas. For example, for VPs C, D and F, the ORAU characterization reports indicate that it is likely that any surface contamination which may have been present has been relocated or is covered and inaccessible due to the waste treatment and construction operations of the current property occupants. Enclosed (Attachment A) are maps developed by ORAU showing the VPs A, B, C, C', D and F and the structures that prevented ORAU from conducting a complete characterization of the properties.

In 1982, prior to the ORAU characterization work, DOE conducted a comprehensive historical site assessment of the LOOW VPs. The results of that study are published in a 1982 report[1]. The report also includes a list of recommendations. One of the recommendations states: "*If coring operations in hazardous waste landfills presents a greater hazard that is known to be present from residual radioactive material, it is recommended that the affected areas not be cored. The certification process can subsequently approve the area for alternate beneficial use with restrictions.*"[2] Although DOE did not conduct subsurface investigations (cores) in the landfill areas, it did not impose restrictions on such areas, despite the 1982 report's recommendation that these areas be approved with restrictions if coring did not occur. Another recommendation states: "*Plots C, C', F, N, L, M, and R were found to have substantial areas with gamma activity above 20 microroentgens/hour. However it was not possible to determine whether these levels were due to contamination, natural radioactivity from roadbed materials, or shine from materials on the site. Samples and measurements should be taken to determine the source of these gamma levels.*"[3] Properties C and F in particular had undergone significant development since the 1970's (see Attachment B) and this development interfered with the characterization of the properties. As mentioned above, ORAU was unable to fully characterize

[1] "Background and Resurvey Recommendations for the Atomic Energy Commission Portion of the Lake Ontario Ordnance Works", The Aerospace Corporation, November 1982.
[2] Ibid. p53.
[3] Ibid., p.52

these areas yet DOE certified VP F as meeting their release criteria. For VP C, DOE stated that "*The survey results for properties C, J and K indicate that there is no contaminated material on these properties. Therefore, no remedial action is needed*[4]." It is unclear why DOE provided these assurances on a property (VP C) that had been previously identified for further investigation but could not have been adequately surveyed due to the presence of 2 ponds, 4 landfill areas, a swamp and the remaining areas impacted by earthmoving activities (see attachment A).

Other issues identified include:

- On VP B, DOE found Radium- 226 contamination that exceeded the criteria for unrestricted release on the inside surfaces of a warehouse. Contamination was found at levels up to 18,700 dpm/100cm^2 on the floor, 520 dpm/100cm^2 on lower walls and 7,040 dpm/100cm^2 on upper wall and ceiling surfaces. The guidelines for release of facilities (surfaces) contaminated with Ra-226 are 100 dpm/100cm^2 (average) and 300 dpm/100cm^2 (maximum). DOE stated that the preferred alternative would be to demolish the building and bury the rubble[5]. However, DOE released this building without performing any remediation. CWM continues to use this building today.

- There was no analysis for Thorium-230 in the characterization or remediation/verification surveys. Since most of the contamination at LOOW originated from process wastes from Manhattan Engineering District (MED) operations, this analysis should have been performed.

- The ORAU characterization report for VP D states: "*There are continual construction and maintenance activities on this property and these activities have the potential for relocating, distributing, and concealing contaminated residues that were identified by this survey. During a visit to the property in November 1982 (after the survey had been completed), it was observed that additional earthmoving has occurred in the west-central portion of the property, the area where numerous isolated pieces of the contaminated rock-type material had been identified.*" Despite these activities we found no documentation of any additional characterization work for this area or any analysis of where these soils may have been relocated.

- It is not clear if the grid system used by ORAU to determine the number and location of samples is adequate to demonstrate compliance with New York State Department of Environmental Conservation (DEC) guidelines. As stated in your November 16, 2004 letter, the DEC acceptance limits are based on the average concentration in any six-inch interval averaged over 100m^2. In order to get an average value for 100m^2, there should be at least one sample for every 100m^2 (for Class 1 areas). Except for VP C', the average sampling density used by ORAU was less than 1 sample for every 1000m^2. Considering that each VP (except C) had areas requiring remediation (Class 1), and the variability of the concentrations of contamination found, it would appear that additional sampling is needed for most areas or that additional justification for not conducting such sampling must be provided.

[4] Letter dated June 4, 1984 from John E. Baublitz, Director, Division of Remedial Action Projects to George Spira, SCA.

[5] Certification Docket for the Remedial Action Performed at the Niagara Falls Storage Site Vicinity Properties in Lewiston, New York, from 1982 through 1986, DOE, July 1992

- As stated in your November 16, 2004 letter, MARSSIM does not include procedures for subsurface sampling. However we do not agree that the limited subsurface investigations performed by ORAU indicates a satisfactory survey. The MARSSIM manual states: "*It* [MARSSIM] *only deals with surface contamination, it doesn't provide guidance for evaluating subsurface contamination in soils or volumetrically contaminated materials. NRC guidance on this issue can be found in Section 1 and 11.1 of Appendix E in NUREG-1727 NMSS Decommissioning Standard Review Plan.*"[6] NUREG-1727 states: "*The number of cores to be taken is the number N required for the WRS or Sign test, as appropriate. However the mixing volume assumed in the scenario may require a larger number of core samples. There is no adjustment to the grid spacing for the elevated measurements comparison because scanning is not applicable.*" ORAU only performed a limited number of cores for each VP apparently based, in part, on accessibility. There was no grid system established for cores and, given the size of each VP, it would appear that the number of cores taken is much less than the number advised by NRC in NUREG-1727.

- The post-remedial action reports[7,8] state that a near surface scan of the remediated areas was performed "*to ensure that radiological conditions at each excavated area complied with remedial action guidelines before the area was backfilled. This process was repeated until the average concentrations were below the applicable guideline values.*" However, there is no information in the report on the results of such surveys, the survey procedures used, instrumentation including minimum detectable concentration of the scan, or any other related data. Such information would have been helpful and is required in a MARSSIM final status survey report.

Based on this initial evaluation, we cannot concur that E, E' and G are the only VPs that have the potential for isolated areas of elevated contamination. The extensive amount of land development that occurred prior to and during the characterization surveys made it difficult or impossible to fully evaluate these areas and may have relocated contamination. The 1982 historical site review indicated that VP E was a low priority area. However, contamination was found and DOE did not certify this property because a lagoon prevented access to sampling. DOE states "*It is therefore not possible to state categorically that contamination does not exist in those areas*[9]." It is unclear why DOE did not make the same statement for other inaccessible areas.

We should point out that ORAU, DOE and its contractor conducted a significant amount of work to identify and remediate radiological contamination. Also, the Atomic Energy Commission conducted radiological surveys of the LOOW VPs in 1971 and remediated certain areas in 1972. The 1971 and 1972 activities were conducted prior to many of the construction activities by Chem-Trol and would have detected any significant quantities of contamination present on the ground surface in the areas surveyed. Therefore, it does not seem likely that large areas or quantities of

[6] "Implementing the MARSSIM Approach for Design and Conduct of Radiological Surveys" Oak Ridge Associated Universities, May 23, 2002

[7] "Post-Remedial Action Report for the Niagara Falls Storage Site Vicinity Properties – 1983 and 1984, Bechtel National, Inc. December 1986.

[8] Post-Remedial Action Report for the Niagara Falls Storage Site Vicinity Properties – 1985 and 1986, Bechtel National, Inc. January 1989.

[9] Letter dated May 7, 1992, from Lester K. Price, Director Former Site Restoration Division, DOE to George H. Spira, VP and General Manager, CWM

contamination continue to be present on the VPs we evaluated, but small isolated areas of contamination exceeding the guidelines could be present in areas released by DOE.

The Department will continue to evaluate available information and attempt to identify areas that have been adequately surveyed/remediated and areas where additional information is needed. However, given the current and previous land use activities, such an analysis cannot be completed without detailed information from CWM on historical soil movements on the affected properties.

If you have any questions, please contact me at (518) 402-7550.

Sincerely,

Stephen M. Gavitt, CHP
Assistant Director
Bureau of Environmental Radiation Protection

SG/crs

Enclosures: Attachment A - ORAU Maps
Attachment B - 1971 and 1983 aerial photos

cc: S. Page
S. Hammond
G. Mikol
P. Kline

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