US Army Corps of Engineers
Buffalo District

Summary of March 31, 2005, Air Conference

Niagara Falls Storage Site

Lewiston Township, Niagara County, New York

Prepared by:
U.S. Army Corps of Engineers
Buffalo District

December 2007

200-1e
NFSS_08.10_0044_a

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I. Background:

1.1. Proposal Receipt

In early September of 2005, the Niagara Falls Storage Site (NFSS) Committee of the community Restoration Advisory Board (RAB) (now the Radiation Committee of the community RAB) sent a proposal to the Buffalo District U.S. Army Corps of Engineers (USACE) requesting a 60-minute conference call with representatives From the Corps, the public RAB, the New York State Department of Environmental Conservation (NYSDEC), the U.S. Environmental Protection Agency (EPA), the Agency for Toxic Substances and Disease Registry (ATSDR), and academia. The proposed purpose of the conference call was to assess the design adequacy of the NFSS air surveillance program and to determine whether the program design was in need of further scrutiny. Included in the proposal was a request to provide the following overview package to conference call participants by September 6, 2005:

- Map of LOOW site with current property usages
- Inventory of NFSS waste containment cell (footnote of potential materials not on inventory such as a Knowles Atomic Power Laborabory (KAPL) material, etc./identification of hazards to air)
- Map of air monitoring equipment locations
- Wind roses from Chemical Waste Management (CWM) (1995, 1997, 1999, 2001, 2003)
- Outline of surveillance methods and list of measured parameters
- Environmental monitoring test results from 2003.

The proposal was delivered to Dr. Judith Leithner, Project Manager of NFSS, and was circulated among the following individuals for consideration and possible approval: Jim Karsten, Formerly Utilized Sites Remedial Action Program (FUSRAP) Program Manager and FUSRAP Program Advocate; Jack Rintoul, Deputy of Programs and Project Management; Stephen Yaksich, Environmental Branch Chief and FUSRAP Program Advocate.

1.2. USACE Consideration and Approval of Proposal

Because the proposal arrived at the end of the USACE fiscal year and before a budget was approved for the next fiscal year, the proposal was approved in concept with the following conditions:

- The conference would be held once the USACE budget was signed by the President of the United States and funds were available to the Buffalo District
- The forum would be a live conference with phone conferencing available to those who could not attend in person. The reason for live attendance was to better facilitate reference to specific areas in drawings and figures that would be used in the discussions.
- Since the conference was proposed to assess the design adequacy of the NFSS air surveillance program, USACE concluded that material detailing the NFSS air monitoring program must be an essential component of the overview package that would be mailed to the conference participants before the meeting. The following items were mailed:
    - A Fact Sheet: Summary of Environmental Surveillance Ambient Radiation monitoring; the fact sheet covered surveillance procedures, testing equipment used, a summary of changes in monitoring

locations from 1992 to 2003, and conclusions concerning dosage to local public, as presented in Attachment 1.

- A figure showing NFSS radiological air monitoring locations, as presented in Attachment 2.
- A history of the NFSS surveillance monitoring program with a listing of waste containment structure contents, as presented in Attachment 3.
- A copy of the 114-page 2003-2004 Technical Memorandum, a document covering all test procedures and equipment in detail and including all test results (air, groundwater, surface water and sediment). Obtainable at https://web.ead.anl.gov/NFSSteam/secure/login.cfm; Username: nfssrab, Password: Nfrab!07

Based on receipt of funding by the Corps and on availability of attendees invited by the citizens' RAB members and USACE, the conference was held on March 31, 2005. A list of conference participants is provided in Attachment 4.

II. Summary of March 31, 2005, Ambient Air Monitoring Conference

The two-hour conference proceeded according to the agenda, attached to the present document as Attachment 5.

Call to Order and Summary of Purpose: The meeting was opened by Jim Karsten, FUSRAP Program Manager, who welcomed everyone and summarized the purpose of the meeting. Mr. Karsten explained that the conference grew out of a proposal from the NFSS Committee (now the Radiation Committee) of the citizens' RAB. The proposal had expressed a concern with the protectiveness of the NFSS air monitoring program and requested that agencies and subject matter experts convene to evaluate the program's protectiveness of human health and the environment.

Introduction of Participants and Order of Business: Joan Morrissey, Buffalo District Outreach Specialist, facilitated introduction of attending participants and those participants participating by teleconferencing. After a brief summary of the pre-mailed informational materials, Joan explained that there would be several presentations by USACE's NFSS project team, and asked that attendees hold their questions until the conclusion of each presentation. One question per participant would be taken at first, and then additional questions would be entertained until the two-hour conference concluded. All participants with remaining questions were invited to submit them by Email or in writing to Ms. Morrissey for future responses.

Historical Summary: Dr. Judith Leithner summarized the history of the ambient radiation air monitoring program. In 1997, the USACE acquired the NFSS remediation project and its associated site surveillance program from the U.S. Department of Energy (DOE). The surveillance program includes ambient radiation air monitoring as well as radiological and water quality monitoring of groundwater, surface water, and sediment.

The first step that the USACE performed after acquiring responsibility for the surveillance program was to have the program, as described by the yearly technical memoranda, reviewed by the USACE Hazardous, Toxic and Radioactive Waste Center of Expertise (HTRW-CX), the NYSDEC and Region 2 of the EPA. The purpose of the review was to determine whether the program was protective of human health and the environment and whether it met applicable Federal and State regulations. All reviewers agreed that the program was protective of human health and the environment and met regulations, although Region 2 EPA required that we restore the radon flux associated Niational Emission Standards for Hazardous Air Pollutants (NESHAPs) calculations that they had exempted DOE from performing. The NESHAPs calculations were restored per the EPA's request.

From the time the DOE began the surveillance program and through to present day, there have been no regulatory exceedances. The ten-hour per day, five-days per week on-site presence of our maintenance contractor supports this program by performing daily inspection of the interim waste containment structure cap and by performing all of its required maintenance. The History Fact Sheet that was pre-mailed to participants is provided in Attachment 3.

Description of Present Air Monitoring Program and Associated Technical Information: Tom Papura, Project Health Physicist, began the technical discussion by summarizing the properties of the contents of the interim waste containment structure (IWCS). Because the surveillance program's reason for existing is to continually assess the integrity of the IWCS and its highly active radioactive residues, the IWCS contents, a listing of the IWCS contents was provided with the Site History Fact Sheet, shown in Attachment 3.

Mat Masset, District Chemist, reviewed program sampling techniques, types of measurement instruments employed, and summarized: tissue equivalent dose results, radon peripheral results and radon flux results, all versus action levels. The techniques and instrumentation are described in Attachment 1 of this document. The results, for all three parameters, have always been and still remain well below action levels, as is provided in historical and current Technical Memoranda. All copies are available on the project web site:

https://web.ead.anl.gov/NFSSteam/secure/login.cfm; (Enter username: nfssrab and password: Nfrab!07).

Michelle Rhodes, NFSS Project Engineer, described the structural design of the IWCS, highlighting the fact that the structure is completely surrounded by an impervious clay cutoff wall and is capped with over four feet of clay and soil to retard radon emissions and facilitate precipitation-derived runoff. She provided gamma walkover maps, demonstrating that the cap and surrounding surface soil are free of surficial radiological contamination. Ms. Rhodes was supported in her presentation by Tony Cappella, District Industrial Hygienist, who stated that results of personnel air monitoring were well below action limits, and have remained below action limits for intrusive work conducted by real-time personnel air monitoring devices.

Questions and Participant Discussion: After each of the above presentations the floor was opened for questions. For ease in formatting, questions and the provided answers are consolidated in this section. Unless otherwise noted, all responses to questions were provided by the USACE NFSS project team.

Q1. (Ann Roberts) How confident are you of knowing the contents of the cell, especially the uranium ore residues and other high level radioactive waste?
A1. The IWCS contents were documented by the DOE as they were placed in the containment cell. We have a high level of confidence in that information and in the confirmation that was done by the National Academy of Science in 1995. However, these materials are not high-level wastes. All of these residues were generated by processing uranium ore, and as such are formally classified as low-level radioactive wastes. They are classified as high-activity wastes, however, due to their levels of radioactivity expressed as pCi/g.

Q2. (Dr. Andrew Karam) Do you have an inventory of the various isotopes in the landfill and can I get a copy?
A2. Yes, an inventory was prepared by the National Academy of Science. A copy of the inventory was promised to Dr. Karam.

Q3. (Dr. Andrew Karam) Does the 3 pCi/L figure have a timeframe attached to it?
A3. Yes, it is an annual average, where it accumulates over one year's time. Fluctuations are minimal, normally ranging from less than 0.2 to 0.3 pCi/L (< 0.2 to 0.3 pCi/L).

Q4. (Amy Witryol): To what extent do the air monitors rely on the containment structures (basement)? Is it hearsay or have fissures developed in the cap?
A4. To our knowledge, no fissures have developed in the cap since the Corps acquired the project. The cap is well grassed, and is well maintained year-round. Fissures would likely develop in case of extreme drying; therefore the cap is watered during times when regular atmospheric precipitation is not forthcoming.

Q5. (Mark Fisher) Is the Corps holding to the DOE standard of 3 pCi/L of radon on site on the perimeter?
A5. Yes. Results are at least an order of magnitude lower than 3 pCi/L, normally ranging from less than 0.2 to 0.3 pCi/L.

Q6. (Dr. William Boeck) Referencing DOE's guidance of 100 pCi/L at any time, what if gas suddenly disperses? Is there capability for a short-term event as in days or hours? My concern is that the design does not address separating warm and cold seasons, and the quality of the data for radon on site.
A6. The monitoring program was designed for long-term measurements, as you suggest. If conditions begin to develop that would favor a sudden release, we rely on visual inspections of the IWCS cap, repair protocols before a release actually happens, and notification of local responders if the release appears imminent. For the record, there has never

been data showing upward trends in radon concentrations. Dr. Boeck indicated that he had more comments on this subject. Dr. Boeck was requested to submit his comments to the District.

Comment: (Dr. Karam) The numbers are reassuring and below detection limits. Any sudden influx, such as a change in geological events, would have little bearing on human health. It would be interesting to see the effects of a long-term event as short-term events fluctuate.

Q7. (Amy Witryol): Why do you test for radon flux only one day per year?
A7. Testing is difficult for two reasons: first, in order to measure worst case condition, it is necessary to test under dry conditions. Wet conditions will cause the concentration measurements to read lower than they actually are. Because a 48-hour window is required in order to test under dry conditions, and because it is desired to test in the hottest and driest part of the year (summer), the difficulty in working with the weather has resulted in our testing only once when the measurements are highest.

Q8. (Dr. Boeck): What was the date of the last radon flux test?
A8. The test was conducted in August of 2004. The next radon flux test is scheduled for August of this year.

Q9. (Amy Witryol): Are there potential contaminants from the animal carcasses, the Rochester burial wastes brought from LOOW in the cell and elsewhere? If the air monitors do not detect any, do you assume nothing is there? What influence does the bottom of the cell or lack thereof have on the air monitoring?
A9. Monitoring addresses contaminants in the University of Rochester waste in case they are present. However, those contaminants are not volatile, so are measured for other media (groundwater, surface water and sediment). The bottom of the IWCS is concrete underlain by dense clay; this has no effect on air monitoring. The cap is the release control structure for releases of contaminants to the air.

Q10. (Amy Witryol): What type of equipment is used in air monitoring?
A10. Lithium Fluoride Thermoluminescent Dosimeters (TLDs) and Aluminum Oxide TLDs are used to detect external gamma radiation and alpha-track detectors are used to measure radon gas. Details of these instruments are described more thoroughly in the pre-mailed Ambient Radiation Monitoring fact sheet. For any monitoring done during remediation, high-volume real-time monitors will be used as will personal air monitors for on-site workers.

Q11. (Dr. Boeck): Why isn't the modeling data taken from the sites on the lake plain rather than the Air Force Base? I am not arguing with the data, just the methodology.
A11. We use these data from the Air Force Base because EPA NESHAPs methodology requires use of National Oceanic and Atmospheric Administration (NOAA) weather data, which this is.

Comment: (Dr. Karam): I concur with the data shown, that it shows no risk and the approach is regulatorily sound, but from a scientific standpoint, I'd like to see a comparison of wind data from CWM and the Niagara Falls International Airport.

Q12. (Becky Zayatz): What data is used for the particulate measurement?
A12. USACE uses the data from the theoretical analysis resident in the NESHAPs protocol.

Q13. (Dr. Boeck): Would it be helpful to run the high volume samples 1-2 months per year to see if there is any other radioactivity around the site?
A13. Under the Buffalo District FUSRAP operating procedures, the high volume samplers are set up for one year prior to any intrusive remediation and these run 24 hours per day, seven days per week. This measurement provides baseline data prior to the remediation.

Q14. (Mark Fisher): Requested clarification on the integrity of the cap. Is sampling once a year adequate? Does it measure the radon flux at the most likely time of the year?
A14. We are confident concerning the integrity of the cap under the current maintenance protocol. The radon flux has been measured over a 20-year period under conditions that yield the maximum flux through the cap, i.e. under hot, dry conditions. In the entire 20-year period, we have never approached the action levels for radon emissions. In addition, our regular gamma scan to the cap surface (including over the place where the K-65s are known to be buried) is and remains at less than background. We have also monitored cap elevations to watch for the potential of cap cracking due

to settling. There has been only a 0.2 ft change in cap elevation over an eight-year period, demonstrating that cracking due to settling is highly unlikely.

Q15. (Ann Roberts): Have you looked at the geophysical results for vulnerability areas in the dike?
A15. Yes. Of interest was integrity of the dike in the area of an existing sand lens. The geophysical results indicate that the DOE, when constructing the dike, jogged the dike to avoid the sand lens. Therefore, vulnerability at this location is not an issue.

Q16. (Dr. Boeck): Are there sensors in the clay area of the cap? How long would it take to add one inch of water to the cap?
A16. There are no sensors in the clay cap itself. The DOE originally put sensors (electric piezometers) into the storage portion of the cell itself to monitor presence of water there, but they were destroyed by lightning. The cap is watered by irrigation equipment similar to a farmer's irrigation system and is watered all summer unless rainfall is sufficient to maintain the grass cover. It is difficult to apply water such that an inch of water can be measured, as the cap was designed to facilitate precipitation runoff.

At this point the conference concluded and participants were invited to send additional questions to Joan Morrissey, USACE Outreach Specialist. The questions that were submitted are presented on the following pages with the NFSS Project Team's responses.

Register of Comments Received From Participants of 3/31/2005 NFSS Air Monitoring Conference

Comment Number	Comment By	Submission Receipt	Comment	Response to Comment
1	Dr. W. Boeck	Pre-conference, but after review of monitoring documents	Requested info on: methods to detect moisture conditions on IWCS cap, watering methods for IWCS cap; monitoring and prevention of intrusion of IWCS cap by deep-rooted plants and burrowing animals.	The IWCS has a designed slope that quickly directs excess water off of the top, down the clay cut off walls, into the drainage ditches surrounding it and finally into the west or central ditches. The clay layer under the topsoil and grass cover is designed to prevent water penetration. Being that the cap is elevated, exposed to direct sun and wind, it is a challenge to get enough water on it to keep the grass green. We water the cap with two Ag-Rain Water-Reels. The cap is mowed and inspected regularly, tested, aerated, fertilized and treated for weeds and pests as required. No deep rooted plants or animals have ever been allowed to cause an intrusion. If you would like more information, we can provide it in a future Radiation Committee meeting.
2	Dr. W. Boeck	Pre-conference, but after review of monitoring documents	Recommended that radon flux test date be moved to late summer to avoid monitoring during cap-watering season.	We need a minimum of two dry successive days in order to perform the test. We provide it in the July-August time frame because the hot weather provides us with the driest conditions. We normally conduct the test on a Monday or Tuesday after a weekend during which we have not applied water. If neither Monday nor Tuesday is suitable and rain free, we wait for the following week.
3	Dr. W. Boeck	Pre-conference but after review of monitoring documents	Stated that weather data from NF Airport did not represent weather conditions below the escarpment. Recommended alternate stations, e.g. CWM or Fort Niagara Coast Guard weather stations.	We are required to use NOAA weather data for the NESHAPs calculations, hence the use of the NF Airport weather data. The wind frequency distribution used in the current NESHAPs Clean Air Act Assessment Package-1988 (CAP88) calculation was compared to the wind rose for the CWM site, and they are quite similar. It is clear to us that the meteorological information from a nearby station would not alter the conclusions in the NESHAPs report that the offsite doses from the air pathway under the current conditions are very low and represent an extremely small fraction of the NESHAPs standard of 10 mrem/year. In addition, use of local data would require that Stability Array (STAR) files be created to use in the CAP88 calculations. (Star-file data are used to compile location-specific precipitation and wind input to

				CAP88). This can be a non-trivial process depending on the quality of the data, and [illegible] not clear that there would be any value added to the monitoring program given the extremely low doses predicted by CAP 88. However, we are looking into the feasibility of making this change.
4	Dr. W. Boeck	Pre-conference but after review of monitoring documents	Recommended real-time monitor of radon daughter products in the unlikely but serious breach of the IWCS.	We will be looking at issues like this when we review and revise our surveillance plan. A working level (WL) monitor is capable of measuring radon daughters as well as radon and will be considered.
5	Dr. W. Boeck	Post-conference comments	Recommended repair or replacement of the moisture monitoring system in the clay layer of the cap. This could be tied in to an on-site weather station.	There was never a moisture monitoring system in the clay cap. It was within the repository itself, to determine whether groundwater was impacting the waste, The system was destroyed by lightning and has not been replaced due to the associated hazards. We do have a manual rain gauge near the cap to determine how much rain the cap has received. However, like a lawn, one can visually tell when it needs to be watered.
6	Dr. W. Boeck	Post-conference comments	Recommended record keeping of the dates and volumes of water delivered to the cap to provide quality assurance regarding cap maintenance.	We provide water enough to maintain the grass cover, but not enough to allow the water to pool. However, we will be looking at issues like this when we review and revise our surveillance plan.
7	Dr. W. Boeck	Post-conference comments	Recommended that the two 6-month radon measurement cycles be changed from January-June and July-December to May to October and October to April to get more valid data for dryer summer conditions when radon emissions can be expected to be maximized.	Given precipitation patterns at the site, it [illegible] be wetter during the suggested months. We are not remotely close to the 3.00 pCi/L limit. Most results fall between <0.2 and 0.3 pCi/L as it is. Since we are taking the results over the course of the full year, we are not sure how this change would be beneficial. In addition, the USACE more routinely inspects and irrigates the IWCS cap throughout May through October to offset potential soil moisture deficits, thereby reducing the likelihood of desiccation and potentially increased radon emissions.
8	Dr. W. Boeck	Post-conference comments	Recommended that some radon monitoring locations use a second sensor to get an annual measurement.	The current monitors can be left for one year. Use of these monitors, as suggested, is under consideration. We will keep you advised of our progress.
9	Dr. W. Boeck	Post-conference comments	Stated that there are no radon sensors on the southwest corner of the IWCS.	There is no detector on the southeast corner of the IWCS. There is a monitor on the southeast perimeter of the site, however. It is planned to review the NFSS environmental monitoring plan and to revise as appropriate by the time the feasibility study has concluded. The need for additional monitors will be addressed then. Public input will be considered when this effort is underway.
10	Dr. W.	Post-conference	Recommend that all air	We are required to use validated NOAA

	Boeck	comments	dispersion models for radon utilize data from the CWM Met station and the USACE station (when established).	weather data for the NESHAPs calculations (i.e. STAR files), hence the use of the NF Airport weather data.
11	Dr. W. Boeck	Post-conference comments	Recommended that all exposure models calculated from the Niagara Falls Airport weather station data be recalculated using data from the LOOW site.	We are required to use validated NOAA weather data for the NESHAPs calculations, hence the use of the NF Airport weather data. The wind frequency distribution used in the current NESHAPs CAP88 calculation was compared to the wind rose for the CWM site, and they are quite similar. It is clear to us that the meteorological information from a nearby station would not alter the conclusions in the NESHAPs report that the off-site doses from the air pathway under the current conditions are very low and represent an extremely small fraction of the NESHAPs standard of 10 mrem/year. In addition, use of local data would require that STAR files be created to use in the CAP88 calculations. This can be a non-trivial process depending on the quality of the data, and it is not clear that there would be any value added to the monitoring program given the extremely low doses predicted by CAP 88. However, we are looking into the feasibility of making this change.
12	Dr. W. Boeck	Post-conference comments	Recommended that USACE establish a single real-time radon air monitoring station in the southeast quadrant of the fence line and provide a "tripwire" notification of any major radon releases from the IWCS.	It is planned to review the NFSS environmental monitoring plan and to revise as appropriate by the time the feasibility study has concluded. The need for a real-time monitor and an appropriate notification system will be addressed then. Public input will be considered when this effort is underway.
13	Ann Roberts	Post-conference comments	Requested a list of documents that have been reviewed for both the Knolls Atomic Energy Laboratory and the animal waste from the University of Rochester.	These requested documents were provided at the August 23, 2005, RAB meeting.
14	Ann Roberts	Post-conference comments	Stated that airborne particulate dose should be recalculated because only low-level wastes and residues were used, but not Knolls Atomic Laboratory waste which was once stored on site.	The doses from airborne particulates included in the NESHAPs compliance report are measured data collected for the Remedial Investigation (RI) Report. Any contamination from the KAPL waste is so small in comparison to that from previous management of the radioactive residues and wastes at the site as to not impact the results presented in the NESHAPs report in any meaningful manner. However, we are considering including Cs-137 in the source term when we revise the surveillance program, as it was detected on site above background and risk-based screening levels.
15	Ann Roberts	Post-conference comments	Asked if NRC 1987 Regulatory Guide 3-59 *Methods' for*	Equation (3) in Regulatory Guide 3.59 had been used for a number of years by DOE to

			Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Operations still apply if high-level radioactive site were on site.	estimate airborne particulate emissions in the annual NESHAPs compliance report (currently included as Appendix C of the annual surveillance technical memorandum). When USACE assumed responsibility for NFSS, this approach was continued through the 2003 technical memorandum. This was largely done to ensure consistency with the previous reports issued by DOE, so that any trends would be much more evident. However starting with the 2004 technical memorandum, a revised approach based on EPA Air Pollutant Emission Factors (AP)-42 methodology was employed. So the approach described in Regulatory Guide 3.59 is no longer being used
16	Ann Roberts	Post-conference comments	Stated that local weather data be used (e.g. on CWM property) instead of the Niagara Falls Air Base data.	We are required to use NOAA weather data for the NESHAPs calculations, hence the use of the NF Airport weather data.
17	Ann Roberts	Post-conference comments	Stated that data from both Phase I and Phase II investigations should be used for dose calculations (not just the Phase I data that was used).	The 2004 Technical Memorandum and all subsequent Technical Memoranda use data from all three phases.
18	Ann Roberts	Post-conference comments	Stated that she was disturbed that visual inspection was the only technique used for monitoring the IWCS cap moisture status.	We do have a manual rain gauge near the cap to determine how much rain the cap has received. However, like a lawn, one can visually tell when it needs to be watered. Addition of moisture supports healthy thatch, but knowing the exact moisture content of the cap would not add protectiveness considering the level of on-site inspection during moisture-stressed periods.
19	Ann Roberts	Post-conference comments	Stated that-real time air monitoring should be necessary because contamination was found at the property boundaries.	It is planned to review the NFSS environmental monitoring plan and to revise as appropriate by the time the feasibility study has concluded. The need for a real-time monitor and an appropriate notification system will be addressed then.
20	Amy Witryol	Post-conference comments	Recommended that real-time particulate monitoring be carried out, both real time and cumulative.	The cumulative data can be back-calculated. Results of real-time monitoring are essentially background; the data do not become useful until actual intrusive work is done and the measured levels have potential of exceeding background. Most of the site is covered with grasses, brush and trees, all of which prevent particulate transport. However there are a few small areas on site that are not covered with grass or vegetation. As part of our look at revising the program, we will look at covering these areas with vegetation or stone to prevent air transport of particulates.
21	Amy Witryol	Post-conference comments	Recommended that a follow-up conference be convened to	It is planned to review the NFSS environmental monitoring plan and to revise

			discuss a number of items in more detail: particulate sampling equipment, air monitoring for chemical contaminants, weather station data, cap monitoring options, background locations.	as appropriate by the time the feasibility study has concluded. The need for a real-time monitor and an appropriate notification system will be addressed then. Public input will be considered when this effort is underway.
22	Amy Witryol	Post-conference comments	Convene a "RAB"/NFSS call to discuss the other items (other than air monitoring) that are part of the NFSS surveillance program,	These items can be dealt with systematically in follow-up meetings. There is much too much information to be included in a single phone conference
23	Amy Witryol	Request for additional Information	Selection, changes, and 5-yrs results for each "background" location in recent years. Note date and change to equipment type.	There have been no changes in the past five years. However, we will be using a different TLD starting in 2008 since Landauer is discontinuing the X9. As for five-year results, The information to perform these calculations is publicly available in the NFSS Technical Memorandums.
24	Amy Witryol	Request for additional Information	List of all waste types and amounts (if known) brought to the LOOW site for which there are no records of final disposition, i.e., potential for storage in IWCS if not documented to have been shipped off site. Include list of all documents reviewed for Knolls nuclear reactor program (KAPL) and Rochester Burial and any other unaccounted for LOOW material.	To our knowledge, our records are complete. We are unaware of any other sources requiring investigation.
25	Amy Witryol	Request for additional Information	List of any additional applicable regulation for air, groundwater, surface water, sediment and soil testing required of LOOW wastes not yet located (ex. KAPL and Rochester Burial)	The USACE is following all applicable regulations for management of the radioactive materials at the site. We are unaware of any additional applicable regulations beyond those we currently follow.
26	Amy Witryol	Request for additional Information	List of seismic-related documents used to determine risk to IWCS from earthquake, etc.	The citizen's RAB Radiation Committee has its own copy of the large geophysical survey report including this information. It is suggested that they consult that document. Additional information can be obtained from the DOE's Failure Analysis Report for NFSS (1994), which is available in the NFSS Administrative Record.
27	Amy Witryol	Request for additional Information	Comparison of CWM weather station data, to the Niagara Falls Airport weather station data used	We are required to use validated NOAA weather data for the NESHAPs calculations, hence the use of the NF Airport weather data.

28	Amy Witryol	Request for additional Information	Copy of documents from all participants on the NYSDEC and U.S. EPA "panel of technical experts" whom reviewed the NFSS air monitoring design in 1997.	It is recommended that the RAB contact these agencies and request the information. The NFSS monitoring program materials (not just air info) were sent to the agencies' points of contact. We do not know who specifically constituted the review panels for each agency.
29	Amy Witryol	Request for additional Information	Description of NFSS Worker Safety rad detection equipment and results for last 5 years	USACE self issues TLD badges to trained and qualified rad workers who intermittently perform duties and/or spend time on site. There have been no recordable exposures. This is sensitive information (i.e. contains personal information) and is not intended to be published or shared beyond appropriate governmental agencies and the individuals themselves. Sudhakar (our maintenance contractor) does not fall under our program, but their Site-Specific Radiation Protection Plan (RPP) must comply.
30	Amy Witryol	Request for additional Information	Copy of last 5-years supporting data for, "NYSDEC routinely conducts external gamma radiation sampling on and off the NFSS property."	This is the NYSDEC's data and should be publicly available from them.
31	Amy Witryol	Request for additional Information	Copy of 1988 DOE well testing survey referenced	The 1988 DOE well survey was superseded by a more recent private wells survey. In March 2006, the Niagara County Department of Health conducted a private well study near LOOW and identified 117 wells; 11 were reported as potable, 8 were reported as non-potable, 20 were inaccessible, and 78 were not used. Of the 11 potable private wells indentified, 6 were identified as secondary water sources. Thirteen wells were sampled for various water quality, chemical, biological, and radiological parameters, all of which met safe drinking water standards and reflected natural background conditions with respect to radiological analytes.
32	Dr. M. Resnikoff & A. Schneider	Post-conference comments	States that surveys of Vicinity Property H indicate a relatively high concentrations of some radionuclides as reported in June 1983.	A comprehensive radiological survey of NFSS Off-site Property H was conducted by the DOE in June-August 1983. The walkover identified numerous, small, isolated surface areas with elevated gamma radiation. Subsequent sampling indicated less than 3% of the samples collected had Radium-226 concentrations greater than the 5 pCi/g above background. Although several other pieces of rock-like material were considered attributable to Manhattan Engineer District/Atomic Energy Commission (MED/AEC) operations, the radium/uranium equilibrium conditions of most elevated samples suggest that the material is pseudowallastonite (or rankinite, a slag byproduct of chemical processing operations

				possibly associated with Pinellas Plant operations) and not MED/AEC-like material. DOE had and USACE has only the authority to address MED/AEC material (which resulted from past government operations).
33	Dr. M. Resnikoff & A. Schneider	Post-conference comments	States that high volume air particulate monitoring should be instituted for the land adjacent to NFSS because it is not as well studied as NFSS and may be more contaminated.	This comment refers to CWM property. USACE's NFSS monitoring program is authorized solely for NFSS under FUSRAP. We will not be conducting rad particulate monitoring at CWM.
34	Dr. M. Resnikoff & A. Schneider	Post-conference comments	States (using a 1984 document) that it is possible that KAPL waste might be buried on the LOOW site and that air monitoring would indicate the presence or absence of these materials in soil.	1. This statement refers to the open Vicinity Property (VP) G, which was only partially cleaned up under DOE. USACE is authorized to investigate radiological contamination at VP-G under FUSRAP. The USACE priority at this time is the NFSS. When FUSRAP priorities and funding allow, USACE can initiate an investigation. However, the presence of the CWM operating lagoon is a physical constraint on field investigations which must be dealt with. 2. If KAPL waste is buried, its presence will not be detectable in air.

Attachment 1

US Army Corps of Engineers® Buffalo District

Summary of Environmental Surveillance
Ambient Radiation Monitoring

NIAGARA FALLS STORAGE SITE (NFSS)

Introduction

USACE Buffalo prepared this Summary in response to a request from the Lake Ontario Ordnance Works (LOOW) Restoration Advisory Board's (RAB) NFSS Committee. Specifically, the Committee requested a summary of the Corps' Ambient Radiation Monitoring Program at the Niagara Falls Storage Site in Lewiston, NY.

How the Corps' Conducts its Ambient Radiation Monitoring Program at NFSS

The Corps conducts its routine ambient radiation monitoring at NFSS in collaboration with technical experts at USACE Buffalo. In addition, New York State Department of Environmental Conservation (NYSDEC) routinely conducts independent external gamma radiation sampling on and off NFSS property.

The Corps' routine ambient radiation monitoring is part of an overall NFSS Environmental Surveillance Program. The Corps monitors:

- *external gamma radiation*
- *radon*
- *radon 222 flux*

Additionally, on an annual basis, the Corps uses scientific modeling to estimate the potential *airborne particulate dose* to hypothetically exposed off-site individuals from the environmental transport of airborne radioactive particulates.

Documenting Results

Each year, the Corps produces a Technical Memorandum (enclosed), which describes the year's data results and conclusions, as well as historical information, information about monitoring types, equipment, location, frequency of testing, and airborne particulate dose.

If results are trending toward an exceedance, corrective measures will be undertaken. In the event of a trend toward an exceedance of regulatory standards, the Corps would identify the source of release and monitor for potential acute (or short-lived) exposures. However, there is no historical evidence that any exceedance or trend toward an exceedance has occurred at the NFSS.

For an electronic copy of all the Corps' FUSRAP Environmental Surveillance Technical Memoranda associated with Niagara Falls Storage Site, go to https://web.ead.anl.gov/NFSSteam/secure/login.cfm [type in user name nfssrab; password Nfrab;05]. Note: This password exprires every 6 months.

Electronic copies of the Technical Memoranda for Calendar Years 1982 through 2003 can be found on the secure website under Documents – Reports – Environmental Surveillance Program – Environmental Surveillance Reports.

Why Different Types of Testing?

The primary radioactive materials of concern at NFSS are radium, thorium and uranium. These radioactive materials emit different types of radiation. Various devices are used to measure these radiations. At NFSS, the Corps instituted a monitoring program to measure ambient radiation levels. To implement this program, the Corps uses several technologies and protocols. Thermoluminescent dosimeters (TLDs) are used to measure direct gamma exposure, charcoal canisters are used to measure short- term concentrations of radon, and alpha track detectors are used for long-term measurements of radon.

Interim Waste Containment Structure (IWCS)

A vast majority of the radioactivity is contained in a 10-acre interim waste containment structure (IWCS). The IWCS has a 3-foot compacted clay cap covered with 18 inches of topsoil. It is well documented that alpha and beta radiation cannot penetrate a soil cover as thick as the one placed on top of the IWCS. The compact IWCS cap traps and retains radon gas generated by the radioactive material, shields all forms of ionizing radiation produced by the radioactive material in the IWCS, and prevents the radioactive material from being exposed to the weather and generating radioactive isotope-contaminated dust. Additionally, grass is grown and maintained on the IWCS cover to prevent wind erosion.

Monitoring Results Comply with Federal Guidance Levels

Radiation levels on and near the NFSS have not exceeded the federally established guidelines. Each year, final copies of the Corps' Technical Memoranda are sent to representatives within the United States Senate, United States Congress, U.S. Department of Energy, Niagara County Health Department, NYSDEC and Region II Environmental Protection Agency.

***External Gamma Exposure:* Confirms that the IWCS cover is thick/dense enough to absorb gamma radiation generated by the radioactive material in the IWCS.** External gamma radiation levels have not exceeded the Nuclear Regulatory Commission (NRC) (10 CFR 20.1301) and Department of Energy (DOE Order 5400.5) 100 mrem/yr public exposure limit.

***Radon Gas Monitoring:* Confirms that the IWCS cover is retaining the radon gas as designed.**
Radon levels have not exceeded the 3.0 pCi/L DOE (Order 5400.5) standard for radon concentration above background.

***Radon-222 Flux:* Confirms that the IWCS cover is retaining the radon gas as designed.**
Radon flux levels have not exceeded the 20 pCi/m2/s Department of Energy DOE (Order 5400.5) and Environmental Protection Agency (EPA) (40 CFR Part 61 Subpart Q) limit for radon emission from a surface.

***Airborne Particulate Dose:* Theoretical doses are well below the 10 mrem per year standard, individual dose,** as specified in 40 CFR, Part 61, Subpart H, and the DOE Order 5400.5.

Figure 1: 2002 Oblique of NFSS; IWCS in foreground

The IWCS cover consists of a 3-foot compacted clay cap covered with 18 inches of topsoil. The cover is monitored and maintained to ensure that

External Gamma Exposure:

Monitoring Type:

The Corps measures external gamma radiation dose at NFSS using Thermoluminescent dosimeters (TLDs).

Monitoring Equipment:

1. (April 1988-2000): Lithium Fluoride (LiF) Tissue Equivalent Thermoluminescent Dosimeters (TLDs) Sensitivity of this TLD is approximately 10 mrem (annual).
2. (2001-present): Aluminum Oxide (Al_2O_3) TLD (shown in Figure 2). The Corps started using these TLDs at NFSS in 2001, as this new system is more sensitive (0.1 mrem) than the previous method (bi-annual).

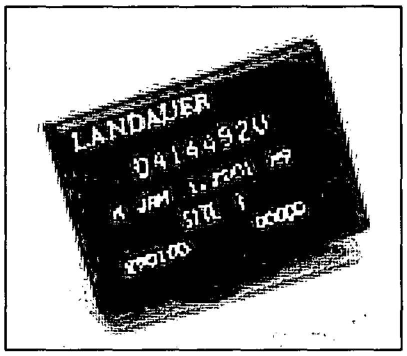


Figure 2: The Landauer X9 Aluminum Oxide TLD *www. landauerinc. com/x9.htm*

Why TLDs?

The Aluminum Oxide TLD detects a minimal external gamma dose of 0.1 mrem and a maximum dose of 100 rem. It is designed for indoor and outdoor usage, and to withstand extremes of temperature, humidity, precipitation and other environmental conditions.

The TLDs used at the NFSS are currently placed at various locations on the site throughout the year. Each TLD measures a cumulative dose over a period of exposure of approximately 6 months. Background[1] radiation levels that occur naturally must be subtracted from the on-site result to represent the site contribution of gamma radiation at that location. When normalized to a year's exposure and corrected for background, these detectors provide a measurement of the net annual external gamma radiation dose at that location due to site activities.

The corrected data are used to calculate the external gamma radiation dose rate at both the nearest residence and the nearest commercial/industrial facility to estimate the hypothetical maximally exposed individual (MEI). Dose rate is a function of distance to the fence line, the distance of the individual from the site, and the amount of time the individual spends at that location.

Monitoring Locations:

Current onsite external gamma radiation monitoring locations are shown in Figure 3.

1992: Because of low exposure rates measured during the previous 5 years, the number of monitoring locations was reduced from 46 to 22. The new locations were selected based on the ability to detect maximum exposure levels from the IWCS and accessibility to the public.

1992-1996: There are 22 monitoring locations, 11 are on the NFSS perimeter, 6 are on the IWCS perimeter and 5 are background locations.

1997: Due to similar results at each of the background locations, DOE eliminated four of the five background locations.

1997-1999: There are 18 monitoring locations, 11 are on the NFSS perimeter, 6 are on the IWCS perimeter and there is one background location.

2000-2003: There are 20 monitoring locations, 11 are on the NFSS perimeter, 6 are on the IWCS perimeter and the number of background locations was expanded to 3 stations.

Frequency of Monitoring:

1992-2000: Annual monitor exchange
2001-present: Biannual monitor exchange

Sampling Results:

On-site and background external gamma radiation levels from 1997 (when USACE acquired FUSRAP) to present are graphically depicted in Figures 4 and 5.

Conclusions:

External gamma radiation levels at the site have not exceeded the Nuclear Regulatory Commission (NRC) (10 CFR 20.1301) and Department of Energy (DOE Order 5400.5) 100 mrem/yr public exposure limit.

From 1998 to present, the average external gamma radiation doses for the NFSS perimeter (35.97 mrem/yr) and IWCS perimeter (35.03 mrem/yr) were indistinguishable from background (35.25 mrem/yr). The IWCS is of sufficient thickness and density to absorb gamma radiation.

[1] Everything is naturally radioactive to some degree. In the context of NFSS, background radiation is cosmic radiation and radioactivity in the soil, water, and air from natural and man-made sources not occurring as a direct result of MED/AEC FUSRAP related activities.

Figure 3: NFSS Radiological Air Monitoring locations.

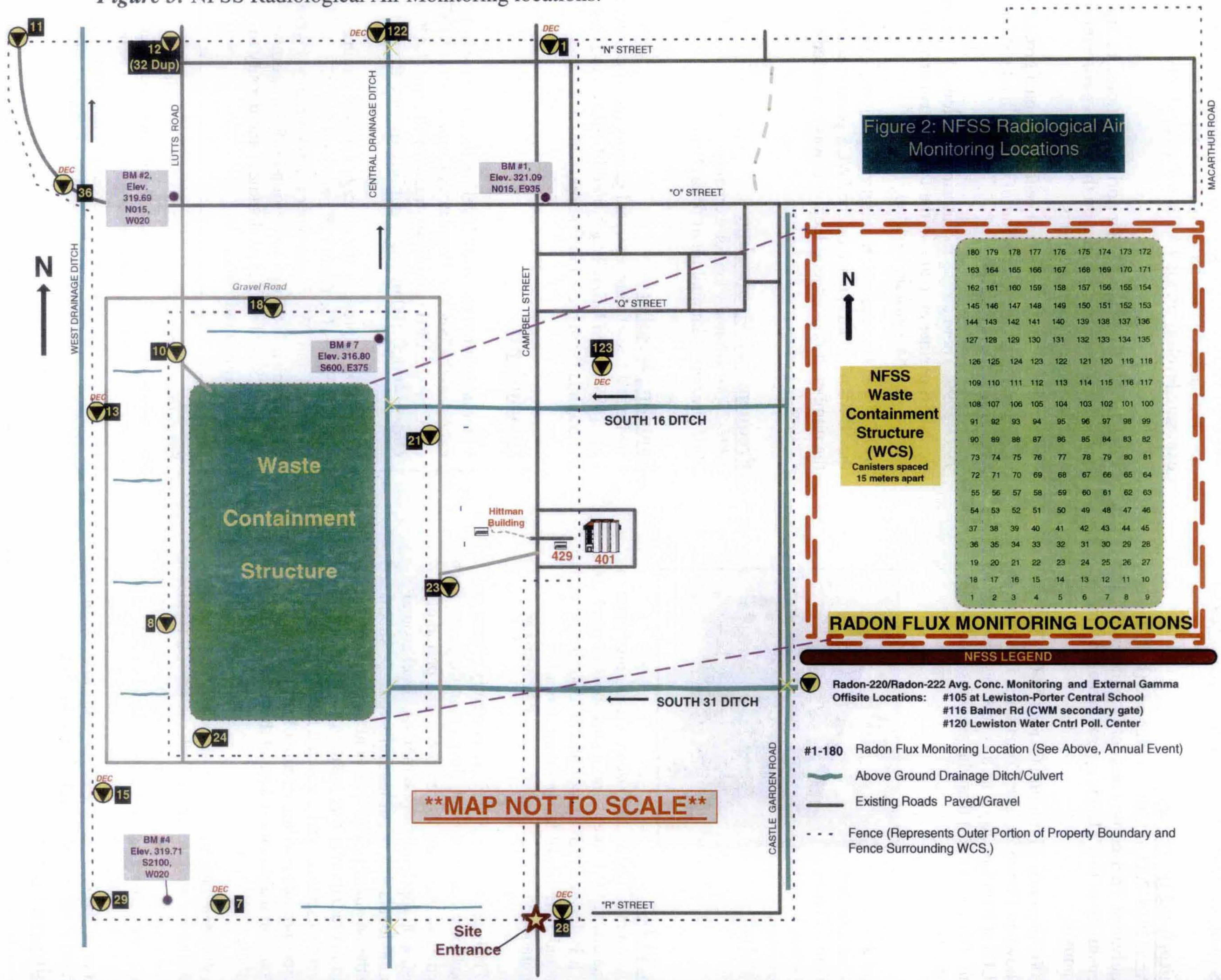
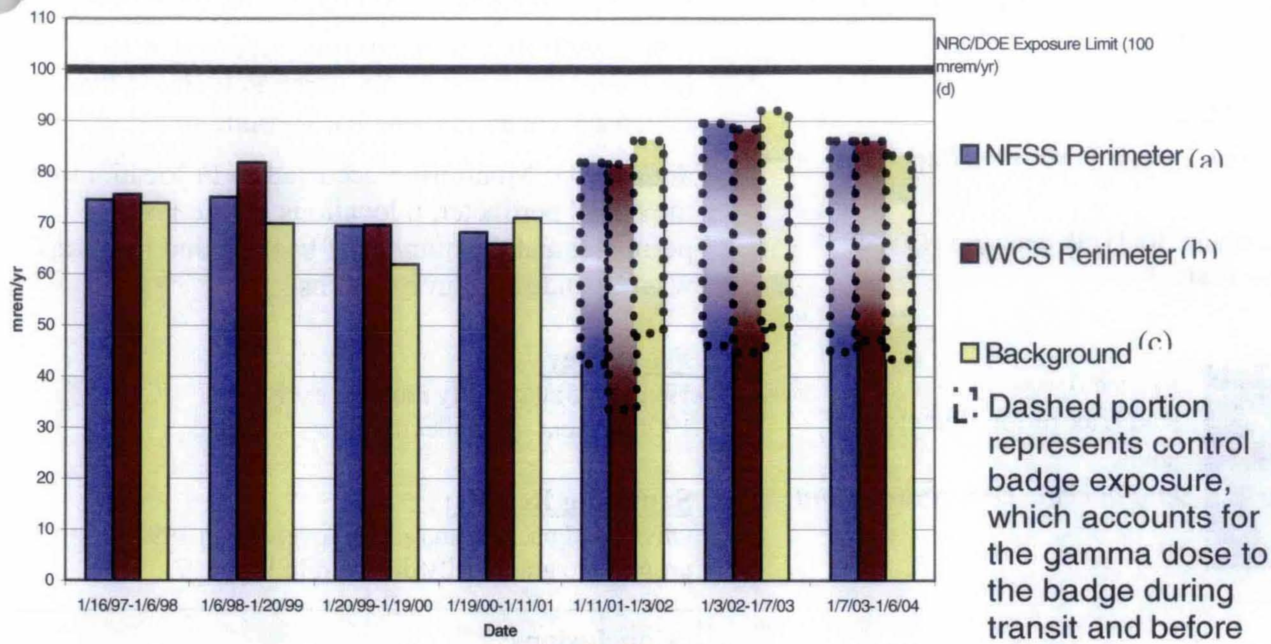
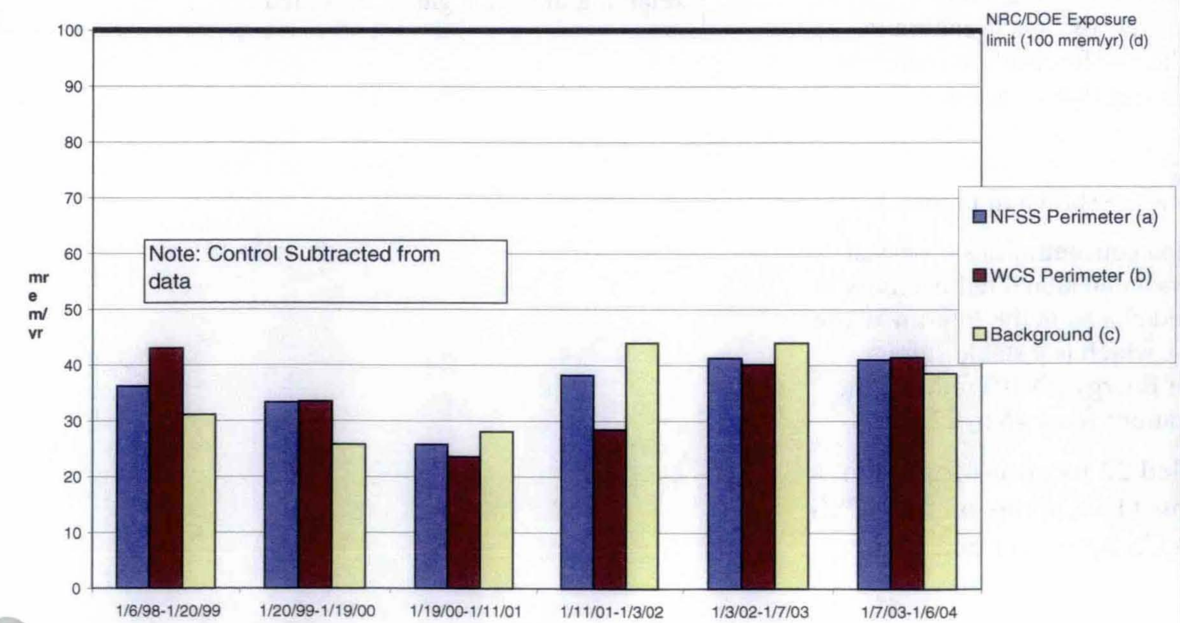


Figure 4: Gross External Gamma Radiation Results



a: NFSS Perimeter: Monitoring Stations 1, 7, 11, 12, 13, 15, 28, 29, 36, 122, & 123.
b: IWCS Perimeter: Monitoring Stations 8, 10, 18, 21, 23 & 24.
c: Background Monitoring Stations 105 (1997- present), 116 & 120 (2000- present).
d: Nuclear Regulatory Commission (NRC) public exposure limit. Regulation (10 CFR 20.1301) & Radiation Protection of the Public and the Environment. Department of Energy (DOE) Order (DOE 5400.5)
e: A lithium fluoride badge was used from 1/16/97 through 1/11/01. A more sensitive aluminum oxide badge was used after 1/11/01 to present. Also, the last three years represent a bi-annual versus an annual exchange.

Figure 5: Corrected External Gamma Radiation Results



Note: 1997 control results are not available.
a NFSS Perimeter: Monitoring Stations 1, 7, 11, 12, 13, 15, 28, 29, 36, 122 & 123.
b WCS Perimeter: Monitoring Stations 8, 10, 18, 21, 23 & 24.
c Background: Monitoring Stations 105 (1997-present), 116 & 120 (2000-present)
d Nuclear Regulatory Commission (NRC) Public exposure limit. Regulation (10 CFR 20.1301) & Radiation Protection of the Public and the Environment. Department of Energy (DOE) Order (DOE 5400.5)

What is a 'Control?'

In the context of a TLD badge, a control refers to a dosimeter that is exposed to radiation occurring during badge transit and/or deployment. The use of controls allows the calculation of net exposure due solely to the source of interest. Control values are subtracted from all gross TLD values to report exposure only related to the site.

Radon Gas:

Monitoring Type:
The Corps measures both isotopes of radon (Rn-220 and Rn-222) at NFSS using alpha-track detectors.

Monitoring Equipment:

(1982-1994): Terradex Type-F Track-Etch Radon gas detectors

(1995-present): Landauer RadTrak detectors (Type: DRNF Outdoor Air Radon)

Figure 6:
RadTrak radon detector
www. landauerinc.com/radtrak.htm

RadTrak is an alpha-track radon gas detector designed to monitor radon gas exposure from 3 months to 1 year. The minimum detectable limit is 0.2 pCi/L.

The RadTrak detectors continuously monitor the NFSS throughout each year. The detectors measure alpha particle emissions from both isotopes of radon and collect passive, integrated data throughout the period of exposure of approximately 6 months. Since radon emanation also occurs naturally from terrestrial sources, the background, or radon levels that occur naturally, must be subtracted from the on-site result to represent the site contribution of radon at that location.

Monitoring Locations:
Radon monitoring locations are shown in Figure 3.

1992: Because of low radon concentrations observed during the previous 5 years and residual radioactivity at the site was remediated and placed in the Interim Waste Containment Cell (IWCS), which is a stable storage facility, the Department of Energy (DOE) reduced the number of monitoring locations from 46 to 22.

1993-1996: DOE sampled 22 locations for radon concentrations, including 11 locations on the NFSS perimeter, six on the IWCS perimeter and five background locations.

1997: Due to similar results at each of the background locations, DOE eliminated four of the original five background monitoring locations.

1997-1999: Radon monitoring occurred at 18 locations, 11 on the NFSS perimeter, six on the IWCS perimeter and one background location.

2000-2003: Monitoring occurred at 11 locations on the NFSS perimeter, 6 locations on the IWCS perimeter and the number of background locations was expanded to three stations.

Frequency:
1992-1995: Quarterly monitor exchange
1996-present: Biannual monitor exchange

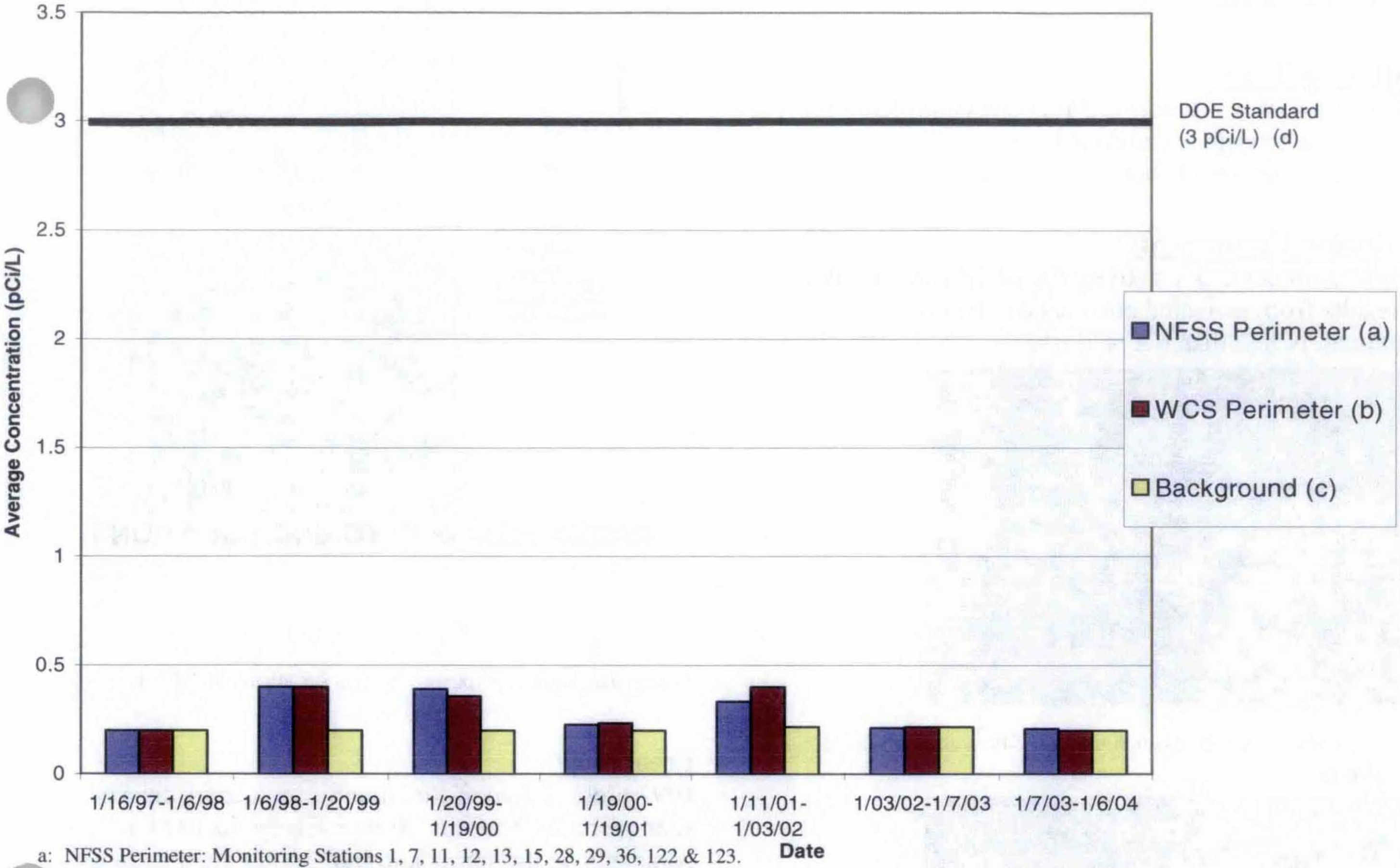
Sampling Results:
Onsite and background radon levels from 1997 to present are graphically depicted in Figure 7.

Conclusions:

On-site or background radon levels have not exceeded the 3.0 pCi/L (DOE Order 5400.5) standard for radon concentration above background.

From 1997 to present, the average radon gas levels from the NFSS perimeter (0.282 pCi/L) and IWCS perimeter (0.287 pCi/L) were indistinguishable from background (0.205 pCi/L). The IWCS cover is retaining the radon gas as designed.

Figure 7: Radon Gas Results



a: NFSS Perimeter: Monitoring Stations 1, 7, 11, 12, 13, 15, 28, 29, 36, 122 & 123.
b: WCS Perimeter: Monitoring Stations 8, 10, 18, 21, 23 & 24.
c: Background: Monitoring Stations 105 (1997-present), 116 & 120 (2000-present).
d: DOE (Order 5400.5)

Radon-222 Flux:

Monitoring Type:

The Corps measures Radon-222 flux emissions from the surface of the interim waste containment structure (IWCS) using activated charcoal canisters.

Monitoring Equipment:

The minimum detectible activity for lab instruments that read results from activated charcoal canisters is approximately less than 0.2 pCi/m^2-s.

Figure 8: Radon Flux canister opened to show the activated charcoal pouch.

Figure 9: Placement of a canister on the IWCS

Radon emissions from the IWCS are monitored to ensure the protective clay cap is effectively retarding radon from infiltrating up to the ground surface.

Monitoring Locations:

There are 180 canisters placed at 15-meter (approximately 50 feet) intervals on the surface of the Waste Containment Structure (IWCS) for a 24-hour exposure period. Radon Flux monitoring locations are shown in Figure 10.

1997-1999: The background location was collected at Lewiston-Porter School (location 181)

2000-present: The background locations were Lewiston-Porter School (location 181), Balmer Road (location 182) and Lewiston Water Pollution Control Center (location 183).

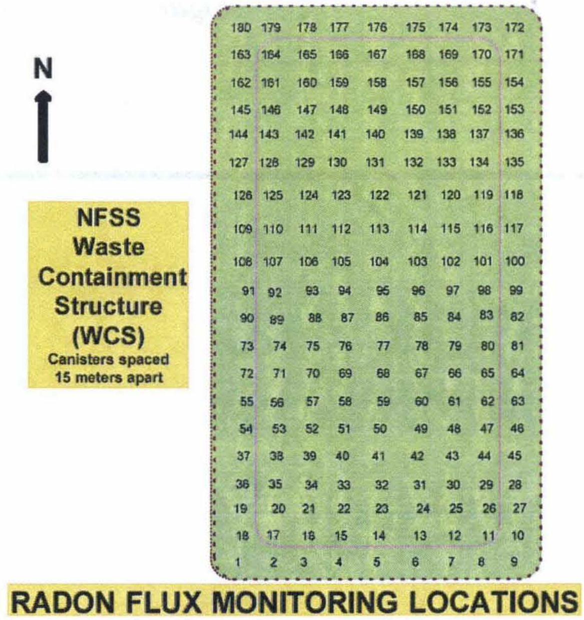


Figure 10: Radon Flux monitoring locations at NFSS.

Frequency:

1992-present: Radon-flux monitoring occurs once per year over a 24-hour time frame. Except in 1994, it was completed in the spring and fall.

Monitoring Results:

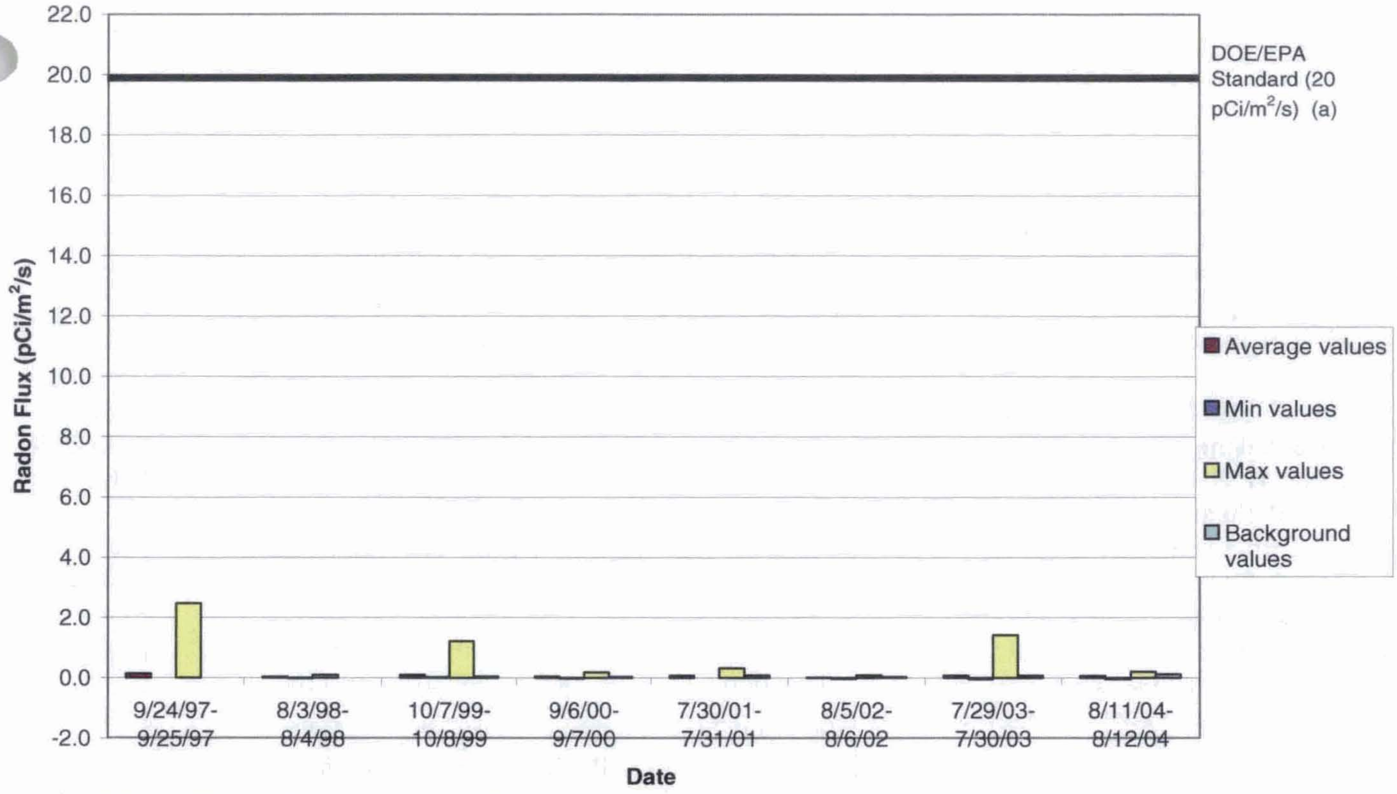
Onsite and background radon flux levels from 1997 to present are graphically depicted in Figures 11 and 12. After Corps' review, radon flux results are sent to the USEPA Region 2 independent and prior to the release of the Technical Memorandum for that year.

Conclusions:

No onsite and/or background radon flux level has exceeded the 20 $pCi/m^2/s$ Department of Energy (DOE Order 5400.5) and Environmental Protection Agency (EPA 40 CFR Part 61 Subpart Q) limit for radon emission from a surface.

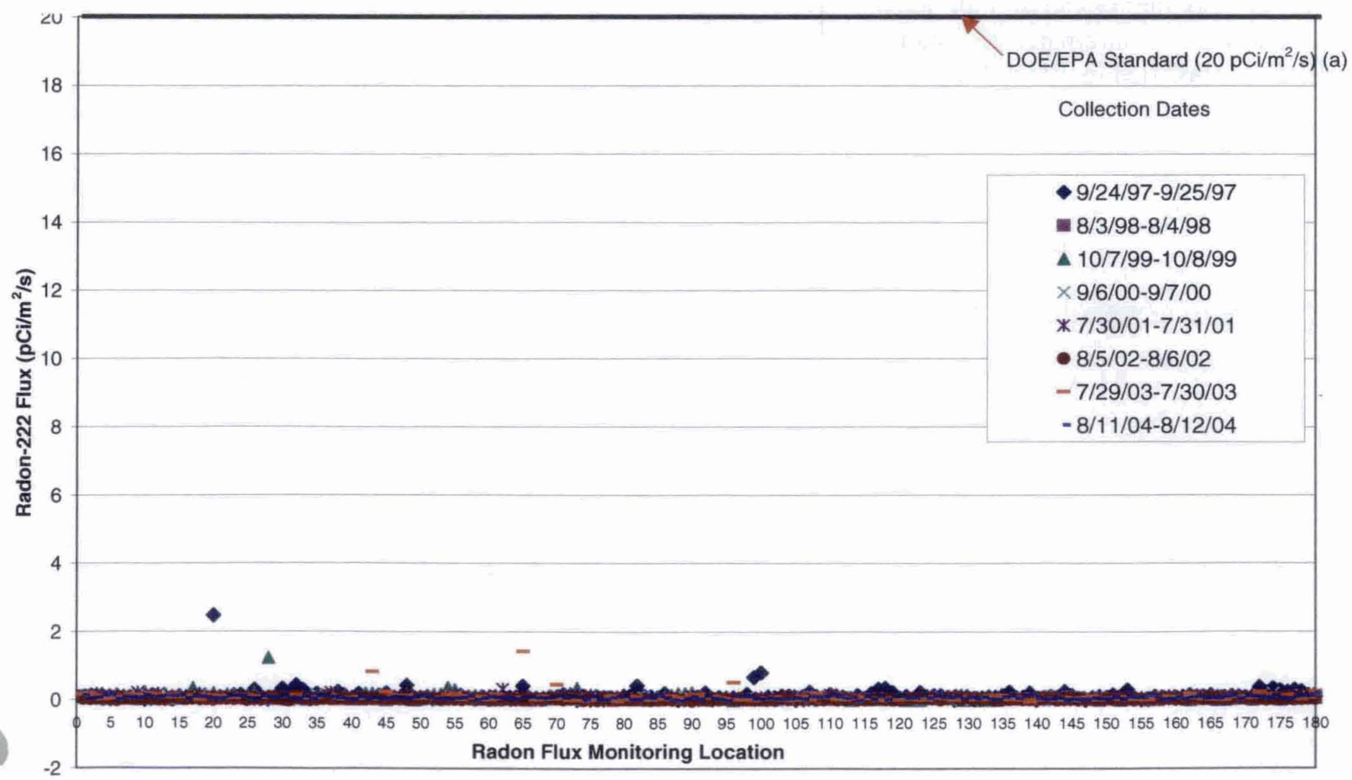
From 1997 to present, the average radon flux results from the site (0.071 $pCi/m^2/s$) were indistinguishable from background (0.069 $pCi/m^2/s$). The IWCS cover is retaining the radon gas as designed.

Figure 11: Radon Flux Results by Year



[a] DOE Order 5400.5 & EPA Standard 40 CFR Part 61 Subpart Q

Figure 12: Radon Flux Results by Location



[a] DOE Order 5400.5 & EPA Standard 40 CFR Part 61 Subpart Q

Airborne Particulate Dose:

Method:
On an annual basis, the Corps uses an air dispersion model computer code to estimate the dose(s) to the hypothetically exposed off-site individuals from the environmental transport of airborne radioactive particulates.

Discussion:
The Corps uses USEPA's CAP88-PC (Version 2.0) computer code to demonstrate compliance with 40 CFR Part 61, Subpart H, National Emission Standard for Hazardous Air Pollutants (NESHAPs). Contributions from the release of radon gas (not a particulate) present in the wastes and residues stored in the IWCS are negligible and are considered separately. The theoretical dose is not indicative of actual exposure to the public and is generated solely to demonstrate compliance under a worst-case scenario.

Why Not Conduct Real-Time Air Monitoring *NOW* for Particulates?

Real-time air monitoring for particulates is typically conducted when intrusive activities (i.e. digging, drilling, excavation, etc.) are occurring. The Corps is not conducting intrusive activities at the NFSS site at this time.

Real-time monitoring is an "active sampling process" and is intended to be a screening device at the point-of-operation that indicates whether or not designed engineering or administrative controls are effective. The Corps will use real-time monitoring as an "early detection device" if conducting intrusive activities to determine if a release of radioactive materials is occurring – this will allow rapid evaluation of potential exposures off-site.

Conclusions:

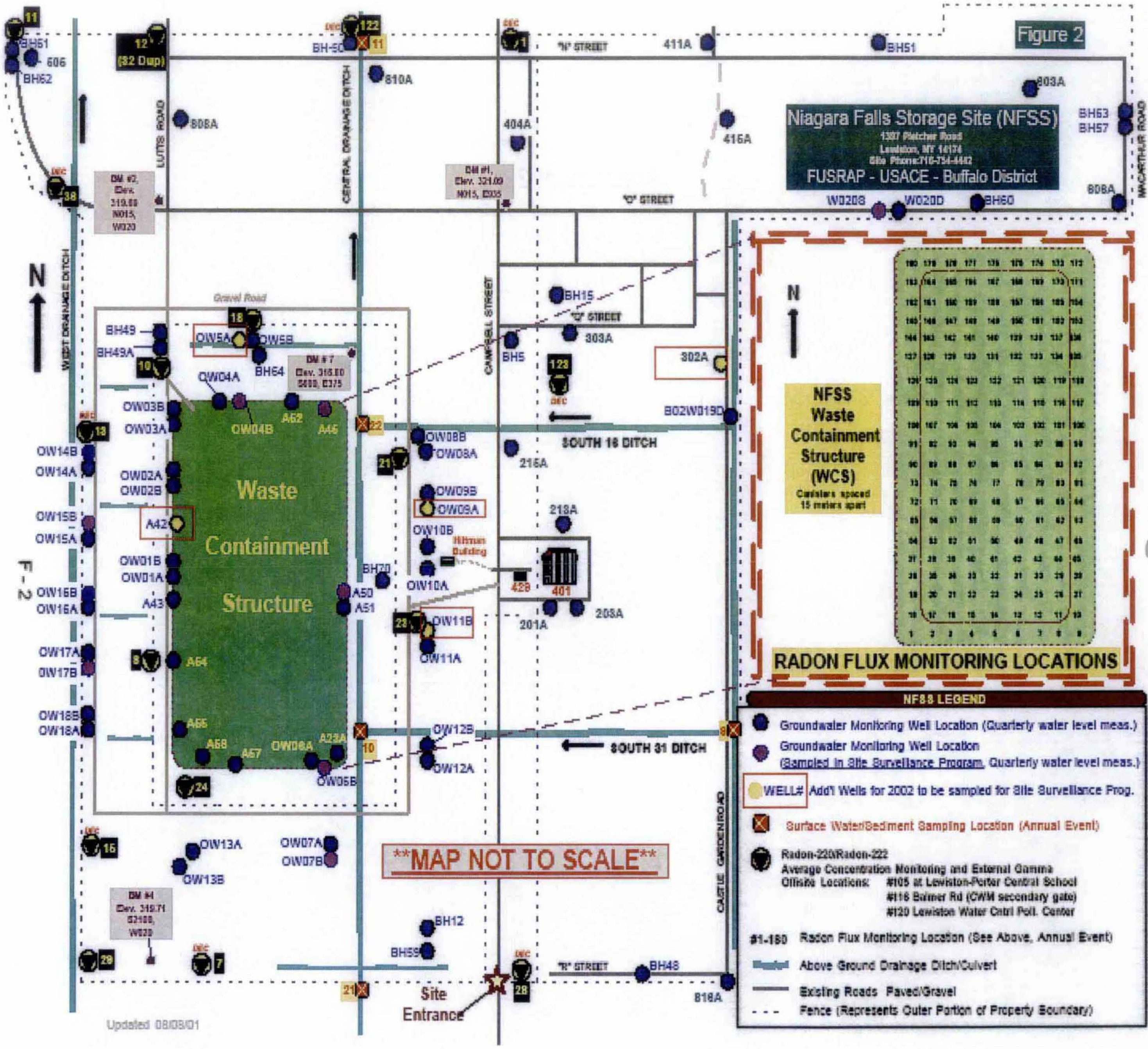
Results indicate that the airborne particulate dose to the hypothetical maximum exposed individual (MEI) is well below the 10 mrem per year standard for individual dose, specified in 40 CFR, Part 61, Subpart H.

For More Information:

Visit http://www.lrb.usace.army.mil/fusrap/nfss/index/htm

Attachment 2

NFSS Surveillance Sampling Locations



F-2

Attachment 3

US Army Corps of Engineers®
Buffalo District

History

Environmental Surveillance Monitoring Program
Niagara Falls Storage Site (NFSS)

Formerly Utilized Sites Remedial Action Program (FUSRAP)

THE HISTORY

In 1997, the responsibility for maintenance and cleanup of the Niagara Falls Storage Site (NFSS) was transferred from the Department of Energy (DOE) to the U.S. Army Corps of Engineers, Buffalo District (the Corps). This 191-acre site, which contains a 10-acre Interim Waste Containment Structure (IWCS), was used from the mid 1940s to present to store radioactive wastes and residues generated by the Manhattan Project during World War II. Contents of the IWCS are listed in page 2 of this History Summary.

ORIGINAL AGENCY PROGRAM REVIEW

When the Corps acquired this project, it also took over the responsibility for the Environmental Surveillance Program that monitored radiological concentrations in groundwater, surface water, sediment, and air. To ensure that this Program currently met Federal standards, the Corps had the Program reviewed upon receipt from the Department of Energy in 1997 for protectiveness and completeness by a panel of technical experts within the Corps, the New York State Department of Environment and Conservation (NYSDEC) and by the U.S. Environmental Protection Agency (USEPA), Region 2. The panel recommended the addition of several samples and addition of NESHAPS point source calculations to the report on results and the Buffalo District revised the monitoring and reporting controls accordingly.

COMMUNITY CONCERN

In late 2004, citizen members of the Lake Ontario Ordnance Works (LOOW) Restoration Advisory Board (RAB) expressed concern as to whether the air monitoring portion of the Program's protocol is protective of the local community's health. The LOOW RAB requested that the Corps sponsor a meeting with regulatory agency and technical subject matter experts to discuss the ambient radiation monitoring portion of the NFSS Environmental Monitoring Program.

NEXT STEPS – 2ND PROGRAM OVERVIEW

The Corps' leadership approved a Program description and question session specifically on the ambient radiation monitoring and reporting activities at the NFSS. The Corps scheduled this meeting for March 2005, where the Corps will begin the 2nd Program overview. It will be a phased effort consisting of the following steps.

- Mail out to invited participants of pertinent program information
- Meeting March 31, 2005 with concerned citizens and other subject matter experts to discuss the existing program and address questions.
- Participants will submit input in writing to present any questions or concerns.
- The Corps will consider questions and concerns, will assess them, and respond to those received.

FOR MORE INFORMATION:

Dr. Judith Leithner
Environmental Engineering Team
Environmental Branch
U.S. Army Corps of Engineers, Buffalo District
judith.s.leithner@usace.army.mil

Inventory of Interim Waste Containment Structure (IWCS) contents

Source		Reported Inventory Volume[a] (yd³)
Residue		
K-65	Afrimet	40,309
L-30	Afrimet	7,960
L-50	Afrimet	2,150
R-10	DOE	9,400
F-32	Afrimet	440
Middlesex Sands	DOE	230
Subtotal Residue		24,210
Contaminated Soils		
1972 – Remedial Action		15,000
1982 – Remedial Action		15,700
1983 – Remedial Action		
On-Site Cleanup		39,850
Off-Site Cleanup		14,150
1984 – Remedial Action		
On-Site Cleanup		4,640
Off-Site Cleanup		23,260
1985 Remedial Action		
On-Site Cleanup		8,300
Vicinity Properties		1,000
Hot Spot		3,000
1991 – Remedial Action		
Miscellaneous Soils		3,200
Subtotal Soils		128,100
Contaminated Rubble		
Building 410 & ground piping		4,210
Building 415		100
Building 434		1,400
Thaw House Foundation		220
K-65 Slurry transfer piping		170
1991 – Hittman tanks, misc. debris		300
Subtotal Rubble		6,400
Miscellaneous		
Existing Structures prior to WCS		15,000
Misc. materials added to upgrade		25,000
Contaminated below grade material		48,000
Dike material (assume only a 2 ft width is contaminated)		14,000
Total Waste Volume within WCS		260,710
Cap Material		60,000
Total Waste Volume		**320,710**

Attachment 4

Niagara Falls Storage Site Air Monitoring Conference
Participants

Dr. William Boeck Research Professor Niagara University	Fredrick Boglione, P. E. Chief, Environmental Engineering Section Buffalo District, USACE	Anthony Cappella Industrial Hygienist Environmental Health Team Buffalo District, USACE
Christine Chaika Environmental Scientist Environmental Analysis Team Buffalo District, USACE	Paul Dicky Supervising Public Health Engineer Niagara County Department of Health	Mark Fisher Industrial Hygienist HTRW Center of Expertise USACE, Omaha, NE
Mathew Forcucci Project Manager/Public Health Specialist NYS Department of Health Buffalo, NY	Jackie James Williamsville, NY	Dr. Andrew Karam Research Assistant Professor Rochester Institute of Technology Rochester, NY
James Karsten Chief, Special Projects Branch Buffalo District, USACE	Dr. Karen Keil Risk Assessor Environmental Health Team Buffalo District, USACE	Dr. Sean Kelly Associate Professor Department of Political Science Niagara University
Dr. Judith Leithner NFSS Project Manager Buffalo District, USACE	Mathew Masset District Chemist Environmental Health Team Buffalo District, USACE	John Mitchell NYSDEC, Albany NY Bureau of Radiation and Hazardous Materials
Joan Morrissey Outreach Specialist Special Projects Branch Buffalo District, USACE	Thomas Papura Project Health Physicist Environmental Health Team Buffalo District, USACE	Dr. Marvin Resnikoff Senior Associate Radioactive Waste Management Association (RWMA), NY, NY
Michelle Rhodes NFSS Project Engineer Environmental Analysis Team Buffalo District, USACE	Craig Rieman Chief, Environmental Health Section Buffalo District, USACE	Dennis Rimer NFSS Site Superintendent Chief, Environmental Engineering Section Buffalo District, USACE
Ann Roberts Chemist Member of citizens' Restoration Advisory Board (RAB)	David Romano LOOW Project Manager Special Projects Branch Buffalo District, USACE	Joseph Sciascia NYSDEC Division of Air Buffalo, NY
Robert Snyder NYS Department of Health Bureau of Environmental Radiation Protection, Troy, NY	Hank Spector Health Physicist Environmental Health Team Buffalo District, USACE	Larry Stiller NYSDEC Division of Air Buffalo, NY
William and John Tisch Tisch Environmental Cleves, OH	Martin Wargo Chief, Environmental Analysis Section Buffalo District, USACE	Amy Witryol Member of citizens' Restoration Advisory Board (RAB)
Dr. Stephen Yaksich Chief, Environmental Branch Buffalo District, USACE	Becky Zayatz Environmental Engineer CWM Chemical Services and Member of citizens' Restoration Advisory Board (RAB)	Julie Zielinski Administrative Officer Design Branch Buffalo District, USACE

Attachment 5

U.S. Army Corps of Engineers, Buffalo District

Special Projects Branch

Formerly Utilized Sites Remedial Action Program (FUSRAP)

Meeting Agenda

March 31, 2005

10:00 a.m. -12:00 p.m.

Type of Meeting: Summary of the Niagara Falls Storage Site (NFSS) Ambient Radiation Monitoring Program

Agenda "Keeper": Joan Morrissey, U.S. Army Corps of Engineers, Buffalo District

Participants: See attached list

I. **Call to order: Purpose of meeting** *(Jim Karsten, USACE Buffalo District)*

II. **Introductions and Roll call** *(Joan Morrissey, USACE Buffalo District)*

III. **Introduction: Order of Business** *(Joan Morrissey, USACE Buffalo District)*

- Quick run-through of mailed informational materials.
- Questions taken after presentations conclude
- Limited time; large attendance. Start with one question per attendee – if remaining time, more questions during Q&A at end.

V. **Description of Present Program** *(Please hold questions until presenters complete presentations)*

a. Description of potential source terms & Summary of public protection protocols: *Tom Papura, USACE Buffalo District*

b. Radon Monitoring: *Mat Masset, USACE Buffalo District*

- TETLDs & results versus action levels
- Radon peripheral monitors & results versus action levels
- Radon Flux & results versus action levels

c. Particulate monitoring: *Michelle Rhodes, Tom Papura & Tony Cappella, USACE Buffalo District*

- Structural Design of Interim Waste Containment Cell
- Gamma walkover maps: condition of surface soil
- Results of personnel air monitoring results/on-site workers vs. action levels
- Real time air monitoring results for intrusive work vs. action levels

VI. **Questions and participant discussion** *(Joan Morrissey)*

VII. **Discussion of Next Steps**