ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

LTSM007973

September 30, 2002

Mr. Tom Pauling
U.S. Department of Energy
Weldon Spring Site
Remedial Action Project Office
7295 Highway 94 South
St. Charles, MO 63304

**SUBJECT: CONTRACT NO. DE-AC05-00OR22750
SUMMARY OF VERIFICATION ACTIVITIES AND REPORTS FOR THE WELDON SPRING SITE REMEDIAL ACTION PROJECT, ST. CHARLES COUNTY, MISSOURI**

Dear Mr. Pauling;

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) has performed verification activities for the Weldon Spring Site Remedial Action Project (WSSRAP). These activities began with the initiation of remedial response actions in the 1980's and culminated with the closure of the on-site disposal facility in 2002. Provided below is a summary bibliography of specific verification projects that ESSAP conducted at WSSRAP.

1. **Oak Ridge Associated Universities. Verification Survey of Building 409, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; April 1991.** Survey activities took place from May 2 through 5, 1988 and on February 28, 1989. Building 409 was a two story steel-framed structure located on the eastern portion of the WSSRAP Chemical Plant. The building was used for administrative purposes and had no history of radioactive materials use. One area of residual activity greater than criteria was discovered on the roof of the structure. The PMC removed the contaminated area for ultimate disposal after which the facility satisfied the unrestricted release guidelines.

2. **Oak Ridge Associated Universities. Verification Survey of the Overhead Piping and Supports, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; June 4, 1991.** Verification activities were performed during January 1989. A series of pipes, supported by steel pipe poles, and structural steel and pipe bents that were once used to transfer process chemicals, steam, air, brine, and fuel gas were laid out for survey purposes. ESSAP identified one of the surveyed sections of piping as being greater than release criteria and it was, therefore, disposed of accordingly by the PMC. The remaining material satisfied the unrestricted release guidelines.

3. **Oak Ridge Associated Universities. Verification Survey of the Quarry Construction Staging Area (QCSA) and Water Treatment Plant Site, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; November 26, 1991.** Verification activities were performed during August 1990. The QCSA was located approximately three miles from the Weldon Spring chemical plant and was comprised of approximately 12 acres to the south of Highway 94. The surveyed area was an approximate 0.5 acre portion of the property for construction of a water treatment plant. One elevated area was detected during surface scans. This area was remediated by the PMC and the subsequent samples were below site criteria.

4. **Oak Ridge Institute for Science and Education. Addendum to the November 26, 1991 Verification Survey Letter Report for the Quarry Construction Staging Area and Water Treatment Plant Site, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; December 6, 1995.** Verification activities were performed on August 13 and 14, 1990. The areas included the quarry access road and the government quarry spur. Surface scans did not identify any areas of elevated activity and all samples were less than cleanup criteria.

5. **Oak Ridge Institute for Science and Education. Letter Report—Verification Survey of Vicinity Property-9, Remedial Unit 011 (Work Package - 461), Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; April 25, 1996.** Survey activities took place on February 12, 1996. VP-9 was located near the Weldon Spring Quarry between the Katy Trail and the Femme Osage Slough. Scans did not identify any elevated locations and all soil samples were below soil cleanup criteria levels.

6. **Oak Ridge Institute for Science and Education. Letter Report—Verification Survey of Vicinity Property-6 (Work Package - 468) Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; January 1997.** Survey activities were conducted on July 29, 1996. VP-6 was located adjacent to the fence along the northeast rim of the Weldon Spring Quarry. No elevated areas were detected during scans and all soil samples were below the site criteria.

7. **Oak Ridge Institute for Science and Education. Type A Verification of Building 432 (Proof Sampler), Structure 427 (IMHOFF Tank) and Process Sewer Line, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; June 5, 1997.** Type A verification consisted of reviews of the PMC's documents and data and analysis of PMC-collected soil samples. These results confirmed those provided by the PMC.

8. **Oak Ridge Institute for Science and Education. Verification Survey of the Composite and Annex Building Construction Sites and the Subcontractor Parking Lot, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; December 1997.** Verification activities were conducted during two trips during the month of September 1992. The areas for these activities included the soil area below the concrete pad of the former Building 409 and future Annex Building and the asphalt surface of the

subcontractor parking lot. No elevated areas were detected during scans of these areas and direct measurement and soil results were all below cleanup criteria.

9. **Oak Ridge Institute for Science and Education. Verification Survey of the Construction Material Staging Area (WP - 253), Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; January 1999.** Verification activities were performed on three trips between September 1995 and February 1996. The CMSA was located in the northern portion of the site and served as a storage area for the clean soil to be used for the construction of the on-site disposal cell. Surface scans identified elevated activity in 3 CUs where the PMC performed additional remedial activities. All final soil samples were below the cleanup criteria.

10. **Oak Ridge Institute for Science and Education. Verification Survey of the Chemical Plant Area Foundations and Contaminated Soil Removal (Work Package - 420), Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; February 1999.** Verification activities were conducted during 16 trips to the site between June 1996 to March 1997. Located on the eastern portion of the site, WP-420 formerly consisted of the majority of the chemical plant's 13 major buildings and 30 support structures. Scans identified numerous areas of elevated activity, including visible pieces of slag or yellow cake (uranium oxide). Several soil samples had thorium and/or uranium levels in excess of cleanup criteria. In all cases, the PMC performed additional remedial activities in order to lower the residual activity to acceptable levels.

11. **Oak Ridge Institute for Science and Education. Verification Survey of the Northern Portion of Raffinate Pit 4 (WP - 471),Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; October 1999.** Verification activities took place during four trips between September 1997 and March 1998. Raffinate Pit 4 was located on the western portion of the Weldon Spring Chemical Plant. The northern portion of Pit 4 consisted of 10 full confirmatory units and portions of two others. Surface scans detected elevated locations in three of the CUs and six soil samples exceeded the cleanup criteria. Additional remediation was performed by the PMC in order to eliminate these areas of residual contamination.

12. **Oak Ridge Institute for Science and Education. Letter Report—Type A Verification of Frog Pond Drainage Outlet, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; September 26, 2000.** A Type A Verification was performed that consisted of reviews of the PMC's documents and data and analysis of PMC-collected soil samples. These results confirmed those reported by the PMC.

13. **Oak Ridge Institute for Science and Education. Letter Report—Verification Survey of Vicinity Property DA-6, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; September 27, 2000.** Verification activities were performed in January 2000. DA-6 consisted of the Ash Pond stream drainage which extended approximately 345 meters west of the chemical plant fence line. Three elevated locations were detected during scans and one soil sample exceeded the release criteria.

However, averaging this sample along with other samples in the 100 m^2 area satisfied the criteria.

14. **Oak Ridge Institute for Science and Education. Letter Report—Verification Analysis of the Quarry Equalization Basin, Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; March 15, 2001.** Verification activities were performed on February 21, 2001. Located at the quarry entrance, the equalization basin is approximately three miles from the chemical plant. The equalization basin served as a holding area for wastewater which had been pumped in from the quarry prior to its transfer to the on-site wastewater treatment plant. No elevated activity was detected during surface scans and all soil samples were below cleanup criteria.

15. **Oak Ridge Institute for Science and Education. Verification Survey of the Retention Pond Area (Work Package-399), Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; April 2001.** Verification activities were performed during three trips between June and November 1995. The retention pond area was located across the northern to northeastern portion of the site and consisted of remedial units RU001, 002, and 003 and also included some unaffected areas. Several elevated locations were detected during scans, including two locations where visible slag was responsible for the high readings. All soil samples were below the cleanup criteria after additional remediation by the PMC.

16. **Oak Ridge Institute for Science and Education. Letter Report—Verification Survey of Work Package-458 Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; May 2002.** Verification activities were performed during three visits between December 1997 and June 1998. WP-458 consisted of vicinity properties DA1, DA2, DA3, DA5, MDC3, MDC4, MDC5, and MDC 10. Elevated activity was detected during initial and follow-up scans of DA5. A total of 20 samples was collected for the entire work package. One sample exceeded the Ra-226 clean-up criteria. The PMC was contacted regarding this location and further remedial activities were conducted.

17. **Oak Ridge Institute for Science and Education. Verification Survey of the Disposal Cell Facility (Work Package - 437) Weldon Spring Site Remedial Action Project, St. Charles County, Missouri. Oak Ridge, TN; August 2002.** Verification activities were performed during 13 trips between July 1998 to July 2000. WP-437 consisted of the footprint of the planned disposal cell, which included the administrative, frog pond, asbestos storage area, material staging area, CMSA, ash pond, raffinate pits, temporary storage area, chemical stabilization/solidification area, and site water treatment plant work zones. Surface scans detected numerous areas of elevated radiological activity in 17 of the surveyed CUs. A total of ten soil samples had radium or thorium activities in excess of cleanup criteria. Where additional soil samples were not available for averaging purposes, the PMC performed additional remediation. All final soil samples satisfied cleanup criteria.

All verification surveys were performed in accordance with ESSAP's **Final Verification Plan—Weldon Spring Structures** (April 1988) and the **Final Verification Survey Plan for the Chemical Plant Area** (December 1995).

ESSAP concludes that all final results satisfied the cleanup standards for each of the verified phases of WSSRAP remedial action activities. Please contact me at (865) 576-5073 with any questions or if you require additional information.

Sincerely,

Timothy J. Vitkus
Survey Projects Manager
Environmental Survey and
Site Assessment Program

TJV:klp

Enclosure

cc: B. Boettner, DOE/HQ
W. Beck, ORISE/ESSAP
E. Abelquist, ORISE/ESSAP
File/0333