John Hickman

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Sent: Tuesday, July 29, 2008 11:35 AM
To: John Hickman
Subject: RanchoSeco Questions.doc
Attachments: RanchoSeco R#3Questions.doc

Comments & Questions
Rancho Seco Round #3 FSSR Reviews

1. **Non-Industrial area surveys**

Where does the LTP cover or describe these surveys?

RSNGS Response
Non-industrial area surveys are described in Section 2.3 of the LTP.

Regarding Appendix A – Test SAB Reports – and the tests. NRC comment is that it adds confidence to the survey process to demonstrate that surveys will detect radioactive contamination under field conditions. The test situations include the use of small check sources and contamination resulting from plant operations. It is not clear that the tests demonstrated what was expected – to show the detection of contamination by these systems in unambiguous terms.

RSNGS Response
Pages 1 and 2 of the Rancho Seco Non-Industrial Area Survey Area Survey Project, Final Report, Revision 2, Volume 2, describes the basis of the test conditions and is paraphrased and summarized below:

"...SAB location B1-3 –T2 repeated location B1-3 (that was measured at the start of the survey) at the end of the survey to permit demonstration of the reproducibility of the measurement system and methods. The B1-3 SAB is also reported as B1-3-T1 in the table which refers to a performance test in which small button radioactive check sources were placed at random on the same area. Finally, the area of known contamination that is not part of the site release is reported as B1-5-1. This was also measured as a performance test of the system and methods. The rows of data for the two performance SABs (B1-3-T1 and B5-1-1) are highlighted to differentiate them from other SABs. Below the data each variable is summarized in two ways: all SABs including the two performance test (known contamination) SABs, and all SABs without the two performance test areas. The summaries provide statistical data and the return. The return is the inverse of the probability for the largest observation, given the mean and standard deviation. It provides an estimate of how many samples would be required to observe that extreme a value. When the return is within a factor of two or three of 1200 (the actual number of measurements) the observed extreme values of the variable are not unreasonable. When the return is very large, the maximum value observed in an SAB is not reasonable. For example,, the return maximum value of Cs-137 (9.8 pCi/g in SAB5-1-1 and 7.72 in B1-3-T1 with the average maximum value of 0.33 ±0.47 pCi/g) would require nearly 10^6 measurements to be statistically reasonable, given the average and standard deviation of the maximum value observed in all SABs. When the two performance test SABs are not considered the return is 743, a reasonable value as compared to the 1200 measurements. The return rapidly directs the reader to the variables that indicate extraordinary change.

The summary statistics that had large changes when the test SABs are included are highlighted in a darker color to guide users of the data to significant changes. As expected the performance test SABs provided significant change for the gross,

Compton, Cs-137 and Co-60 data. The potassium normalized distribution for maximum over mean also shows a significant change due to large measured maximum values of potassium in the test SABs and small average values. Also the uranium was flagged due to a slightly larger percent standard deviation in SAB B5-1-1 as compared to typical grids."

Table 1 does not indicate a concentration for the small check sources, and the narrative indicates that CFD in Table 3 show the presence of the check sources. Were the CFD available during operations to validate the detection capability?

RSNGS Response
The Co-60 button check sources that were used totaled about 1.6 microcuries. Appendix F of the Rancho Seco Non-Industrial Area Survey Project, Final Report, Revision 2, Volume 1 discusses the uses of these sources relative to the scan speed of the Subsurface Multi-spectral Contamination Monitor.

The CFDs were used to illustrate the detection of the check sources for the SABs in Appendix A, Volume 2 of the report. The data results and data evaluation demonstrated that the analysis system MDCs for soil contamination were approximately 15 times lower than the generic NRC Screening Levels. The MDCs are listed for every SAB.

2. *Round 3 of final status surveys covers the banks on both sides of No Name Creek. What is the status of a final status survey of No Name Creek?*

RSNGS Response
The Part 50 licensing basis for the release of radioactivity in liquid effluents defines the "site boundary for liquid effluents" as the headwaters of No Name Creek as it passes under the security fence now known as the Industrial Area Boundary. Radioactive materials that are in No Name Creek are the result of licensed releases of radioactivity in liquid effluents and as such, any dose to a member of the public has been conservatively accounted for. It is and has been the District's position that No Name Creek itself is "off site" and not subject to FSS.

Section 2.1.5.7.2 Table 2-3 of the LTP provides the results of sediment samples collected in 2005from the discharge basin. In addition, this section list the studies conducted by Lawrence Livermore National Laboratory and Oak Ridge National Laboratory. The latter facility evaluated the environmental impact of the radioactive liquid releases for the NRC. This evaluation was applied to both the onsite and offsite locations. The results are documented in NUREG/CR-4286.

3. Round #3 FSSR Comments or Questions

3.1 F8000141 – North 1A Soil

Table 1 in the Round 3 transmittal letter listed F8000141 as 6410 m^2. This survey unit consolidated 899913, 8000014, 803002 & 806003 and has an area of 55761 m^2.

Rancho Seco Response

When Table 1 was prepared for Submittal 3, the author transcribed the original area for 800014 and did not account for the consolidation. The area is listed correctly in the Summary Report for the survey unit.

3.2 Questions/Comments on the Listed FSSRS Where the Planned & Implemented Final Status Surveys Differ

In several instances, the samples actually taken exceeded the number of samples required in the planning basis for the survey unit final status survey. This prompts these questions: (1) were the survey/sampling scheme implemented equivalent to the required/planned sampling? (2) Does the final status survey report provide an adequate explanation of the rationale for the actually sampling or the differences in the survey/sampling schemes?

Rancho Seco Response

Determining the number of samples from the MARSSIM table is only one step in the process of survey design. When actual survey design occurs, the resulting survey plan may require more samples than the "minimum" for a variety of reasons. The "minimum" is provided in Table 1 as a reference to show that in no case have too few samples been taken. In all cases, the final pre-planned survey design is implemented in the field, and the number of (planned) measurements is reported as having been taken. Since it is conservative to take more samples than the "minimum", and since the survey maps in each Summary Report clearly show the results of the design process including the grid patterns used and locations of samples (or direct measurements) taken, no explanation was considered to be required. If fewer samples were taken, or some other circumstance is present that affects the survey design, it should be included in the "Survey Unit Design Information" section. For example, SU 8990291 discusses the difficulty in accessing the permit-required confined space within the Main Circ Water Piping as a consideration in the design process.

1) The survey scheme does address the necessary survey requirements. The listed FSSRS are for pipe surveys that were performed. Based on the Teleconference conducted between Rancho Seco Decommissioning Group and the NRC on February 2, 2006 it was concluded that Rancho Seco would conduct direct measurement surveys of piping at six inch increments and not perform scan surveys. DTBD 05-016 "Rancho Seco Nuclear Generating Station Pipe Detector Selection, Calibration and Use" showed that each pipe detectors field of view was equal to or greater than six inches. Any elevated locations are readily identified and Class 1 survey units are 100% "scanned" Direct measurements conducted at six inch intervals can result in a large number of direct survey measurements for each piping survey unit. Because the DQA used for evaluation of the piping surveys is also the Structure DQA, entries for the piping area are entered in m^2 The DQA then evaluates the area entered as it would a structure survey and reports the appropriate N-Value from the Tables found in Table 5-5 of NUREG-1575. While, the N-Value concept of Table 5-5 is valid and the number of survey locations are correct Rancho Seco has committed to evaluate the piping based on the six

incremental direct measurements which are appropriately addressed by the Sign Test.

2) The Final Status Reports states that measurements are acquired at six inch intervals.

3.3 FSSR F899072 – CDS Turbine Building Drains

Planned 100% scan coverage & 15 samples. Implemented 819 survey measurements at 15 cm intervals for 100% coverage.

No comments were provided for measurements that exceeded 3 standard deviations in Att 4 – Data Assessment. What actions do the QA procedures specify for this situation?

Rancho Seco Response
Measurements were acquired at six inch intervals. The DCGL of 100,000 dpm/100 cm^2 is principally based on the gamma exposure pathway: if the outliers (>3 sigma) are below the DCGL the annual dose contribution for the Auxiliary Building (most restrictive based on DTBD 05-009 Embedded Piping Scenario and DCGL Determination Basis) is less than 0.2 mrem/year. There are no QA procedures required for this situation.

3.4 FSSR F8990291 – Main Condenser Circ Water pipe.

This survey unit was scanned by ISOCS due to worker health & safety concerns for entry into the survey unit since the pipes were confined spaces.

The FSS design indicates that Rancho Seco planned to do 4% scans and 14 samples (randomly selected) in this class 3 survey unit. The sampling & surveys conducted were 4 ISOCS scans of 4 segments of 90" piping or 4% of the area of circ pipes.

Please describe the survey of the Circ pipes with ISOCS.

Does the LTP cover these sorts of changes in the FSS design? The LTP identifies a process for the reclassification of survey units, but may not address other changes or the licenses discretion is making changes without NRC concurrence.

Rancho Seco Response
The Canberra Geometry Composer software was used to create the geometry conditions of the piping. The geometry used for the ISOCS survey of the piping resulted in each measurement comprising ~43.9 m^2. The HPGe unit was centered in the face of the piping. This activity was performed at four of the accessible openings. The results of the measurements (dpm/m^2) were converted to dpm/100 cm^2 values and imported into the DQA software for evaluation. Copies of the survey design instructions can be provided.

The use of ISOCS for structure, soil surveys and other geometric objects has been utilized at several facilities for FSS processes. The use of the geometry composer software allows the user to provide an almost unlimited scope to the evaluation of objects and surfaces for final status surveys. Rancho Seco has used this tool to develop geometries for FSS to evaluate penetrations and piping. The current DTBD (DTBD 06-003, Use of In-Situ Gamma Spectroscopy for Final Status Surveys) for performing ISOCS measurements addresses land areas and structures surfaces.

DTBD 05-016 (Rancho Nuclear Generating Station Pipe Detector Selection, Calibration and Use) Section 6.5 states, "Portable MCA units may be used to analyze piping segments, determine the principle nuclide distribution or activity of selected piping. These analysis systems may be used to conduct final surveys and investigations of piping systems or segments. The MCA count times, geometries, MDAs, investigation levels, and survey results will be documented in the survey package(s)."

Buried piping is treated differently than normal structural surfaces. Because of the difficulty in accessing buried piping in particular, it was realized that access would be difficult in many cases. Therefore, we included in the LTP provisions for buried piping to allow surveys to be performed on only the accessible surfaces. In fact, buried piping is so difficult to survey that we have gone to the expense of removing all Class 1 buried piping from the facility, including over 1200-feet of piping last summer that ran from near the Turbine Building to the Retention Basins. The applicable LTP reference, Section 5.4.2.3, states that:

Residual radioactivity on internal surfaces, such as floor drains, embedded piping, and buried piping may be inaccessible or difficult to measure directly using field survey detectors and established techniques. Where no remediation has occurred, inaccessible or difficult to measure internal surfaces are assumed to have the same level of residual radioactivity as that found on accessible internal surfaces. No special measurement methods are applied.

3.5 FSSR F8990321 – Nitrogen Gas System Piping.

Planned survey/sampling was 11% scans and 14 samples. Surveys/sampling scheme implemented was 109 surveys. The static scan MDA (pipemon 1" and 44-159 2" detectors) for the detectors used in the final status survey report should be better than scan MDA – so 11% static scans should met the specified scan requirement.

Since the detector coverage is not always provided in the LTP or in the Final Site Survey Handbook - did the 109 surveys cover 11% of the survey unit? What are the detector coverage for pipemon 1" and 44-159 2" detectors for this situation?

Rancho Seco Response
The 109 survey measurements do represent 11% coverage of the survey unit.

Detector coverage for the 44-159 detector was determined by actual testing as documented in DTBD 05-016 that the field of view for two inch piping was greater than six inches. The 44-159 is an 18 by 18 mm CsI detector. CsI detectors have nearly the same response characteristics as NaI detectors. The Pipemon is a Bicron 0.5 diameter by 3.0 inch NaI detector. The detector field of vision for 1.5 inch diameter pipe was determined by actual testing however, the data was not included in the DTBD because the testing was preformed after the DTBD had been completed. The test data demonstrates that the Pipemon detector has at a minimum a field of vision of six inches. The field of vision of the Pipemon detector was not developed for one inch piping because there was not sufficient room for the detector and the flexible source inside 1 inch piping. Because the efficiency for the Pipemon detector in 1.0 and 2.0 inch piping does not differ significantly (0.035 and 0.032) it is reasonable to presume that the field of view does not change significantly.

Note that the scan coverage for this survey unit was as provide in the DQA was ~2.6 m^2 and the total area was 24.7 m^2 which results in the 11% coverage noted. The 44-159 and Pipemon detector surveys result in 2.457 m^2 and 0.093 m^2 respectively.

3.6 FSSR F8990521 – Acid Waste Pipe

Planned 100% scan coverage & 14 samples. Implemented 918 survey measurements at 15 cm intervals for 100% coverage.

No comments were provided for measurements that exceeded 3 standard deviations in Att 4 – Data Assessment. What actions do the QA procedures specify for this situation?

Rancho Seco Response
Measurements were acquired at six inch intervals. The DCGL of 100,000 dpm/100 cm^2 is principally based on the gamma exposure pathway: if the outliers (>3 sigma) are below the DCGL the annual dose contribution for the Auxiliary Building (most restrictive based on DTBD 05-009 Embedded Piping Scenario and DCGL Determination Basis) is less than 0.2 mrem/year. There are no QA procedures required for this situation.

3.7 *There are inconsistencies between the various FSSR preparers on information in Table 1 - Survey Unit Design Parameters sheets. Some of these sheets have entries in the survey design parameter column for "Design Min Samples N" and other sheets do not.*

Rancho Seco Response
The Survey Unit Design Parameter Sheets are replicas of the DQA evaluation summary. The DQA used for piping is also the DQA used for Structures. Rancho Seco increased the size of Class 1 survey units for structures to 319 m^2 (Topic of Teleconference on February 2, 2006). In order to preserve the same sample density of 1/7 m^2 (the sample density for an N of 14 used with a

survey surface area of 100 m^2) the "Design Min Samples N" is used. If the survey unit is a Class 2 or 3 the "Design Min samples N" is the same as the "Design N-Value +20%". This parameter is not included for land surveys.

THY
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