



## Rocky Flats Citizens Advisory Board Recommendation 2002-3

### Comments, Concerns, and Recommendations on the Solar Evaporation Ponds Proposed Action Memorandum

Approved November 7, 2002

The Rocky Flats Citizens Advisory Board has the following comments, concerns and recommendations regarding the "Draft Proposed Action Memorandum for IHSS 101 and RCRA Closure of the RFETS Solar Evaporation Ponds," Revision 1, dated October 2002.

#### **Characterization:**

Attachment 1, the Data Adequacy Evaluation, concludes: "Statistical and spatial analyses both indicate that the sampling at the SEPs is adequate, especially in view of the low estimated risk observed."

1. Although some new soil samples were taken near valve vaults, sumps, potential OPWL leaks, and RCRA Units 21 and 48, the site is depending on historical data in order to characterize the liners and the soil beneath the ponds and around the pond berms. Per maps provided in the risk assessment, one of five ponds (Pond B-South) had no subsurface characterization at all, and another (Pond C) had characterization only in the depth profile below 6 feet. Historical records show that the liner of Pond B-South experienced bubbling, perhaps due to leakage. Pond C is in the vicinity of an original unlined pond, whose soils were regraded and possibly incorporated into the berms of Pond C at the time of its construction in 1970.

In terms of the historical sampling, how were sample density and location determined, and why were the areas noted above excluded?

2. RFCAB recommends that the site not rely solely on historical data for the pond liners, berms and the soil beneath the ponds. New samples should be taken in order to better characterize these areas. Similar to the 903 Pad remediation project, the samples should be independently verified. While the Data Adequacy Evaluation concluded that sampling was adequate to show with 95% confidence that residual contamination does not pose unacceptable risk to a hypothetical refuge worker, it does not speak to the question of whether more sampling is needed to analyze contaminant migration potential and impacts to surface water. RFCAB feels additional sampling would be of value for long-term stewardship purposes.

3. It does not appear that the area was surveyed for radionuclides with field instruments. Given the relatively small size of the area, RFCAB recommends that DOE look into the feasibility of doing field surveys to provide additional assurance that all surface soil hotspots have been detected and remediated.

4. Although regrading of the area is considered a best management practice, and therefore, outside the scope of the decision document, there exists the potential to expose contaminants in the process. RFCAB recommends that any potentially contaminated subsurface soil to be exposed by regrading be characterized to show that the resultant surface contamination is below action levels. An example of this is soil currently beneath the liners that will be exposed when the liners on the slopes of the berms are peeled back. Likewise, if there are areas where Old Process Waste Lines (OPWLs) or other subsurface features are brought near the surface by regrading, these should be analyzed for possible removal consistent with the proposed end state strategy.

5. How was characterization performed on OPWLs removed under the ER RSOP actions and for what constituents? These results should be made available to the public, especially in view of their relevance to the end state discussions.

### **Long Term Stewardship:**

1. Section 8.0 on Stewardship runs counter to DOE draft policy, which states, "long-term stewardship is considered in each decision that impacts DOE cleanup. This responsibility extends from the identification of remediation alternatives, remedial design, construction, and operation and through all relevant decisions made over the lifetime of the hazards." (Version 2.0 of Draft Long-Term Stewardship Strategic Plan)

RFCAB urges DOE to analyze potential impacts of residual soil contamination on the groundwater treatment system. Are there secondary source removal actions that could be taken to enhance the effectiveness of the groundwater treatment system, or to reduce the life cycle costs of maintaining it? A more robust analysis is needed in accordance with DOE's commitment to consider long-term stewardship when making remedial decisions.

2. Section 8.0 purports to address prospective long-term stewardship needs, but does so inadequately. Only the need for institutional controls is specified, and even then, there is no mention of digging restrictions. Other factors that should be considered include physical controls, physical inspections, monitoring/maintenance, information management, periodic assessment and controlling authority, much as was done in the "Present Landfill Interim Measure / Interim Remedial Action." RFCAB urges DOE to be as specific as possible regarding stewardship requirements. RFCAB would like to examine life cycle cost estimates for these requirements as

they are being developed.

3. RFCAB understands that a closeout report will be prepared for the Solar Ponds PAM. It should integrate stewardship information for the area as a whole, including not only soil but groundwater and surface water as well, into a single document. It should also include information on the asphalt liners that have been left in place, so that future stewards will be aware that these may require additional breaching should drainage problems arise.

4. The closeout report should also include maps showing residual contamination on the surface, as well as maps correlating contamination with depth. Sampling results from OPWL leaks should be noted, as well as the depths of OPWLs left in place. We recognize this list of criteria for the closeout report to be incomplete and request the opportunity to provide comment on the report prior to regulatory approval.

### **Segregation of Environmental Media:**

The Solar Evaporation Ponds area provides another example of how dividing a remedy into separate media discourages evaluating the system as a whole. For instance, a groundwater remedy for the Solar Ponds area was selected as part of a separate decision process three years ago with no analysis of whether soil removal might enhance groundwater quality over the long term. The Solar Ponds PAM examines soil removal in the context of protecting a future refuge worker, but does not analyze soil removal for the purpose of protecting groundwater and surface water.

As stated in comments made recently on other remedial decisions, namely the 903 Pad Soil Removal and the Present Landfill Cover, RFCAB continues to believe DOE would derive benefit from examining all aspects of a remedy at once.

### **Consistency with End State Proposal:**

The end state proposal involves applying a risk screen to subsurface contamination in order to evaluate the potential of erosion/landslide activity and burrowing animals to bring contaminants to the surface. Likewise, the potential impact of residual contamination on surface water quality must be analyzed.

Please describe how the Solar Ponds remedial decision considered the factors noted above. This is not to be viewed as RFCAB endorsement of the risk screen methodology, as Board deliberations on the proposal are still pending.

### **Constituents of Concern:**

The list of potential constituents of concern in this PAM is much smaller than that

considered in the 1995 IM/IRA (a document that was never approved). RFCAB understands that this discrepancy stems from the fact that the RFCA parties have developed a new process for determining constituents of concern. Where is the new process documented? Was it the result of new regulatory guidance? Was it subject to public review?

### **Hotspot Removal:**

Although RFCAB has not yet taken a position on the proposed action levels, we commend DOE for the common-sense approach used for hotspot removal at the Solar Ponds area. That is, RFCAB understands that surface soil hotspots in excess of proposed action levels were simply removed, regardless of size. RFCAB prefers simple removal to the complex, area-weighted approach spelled out in the Industrial Area Sampling and Analysis Plan, whereby small hot spots may not qualify for removal.

RFCAB appreciates the maps provided separately showing hot spots removed under the ER RSOP. These should be added to the Solar Ponds PAM because of their relevance to a no further action decision. In addition, RFCAB recommends that DOE provide maps showing residual contaminant levels for each contaminant of concern, and include them in the closeout report.

### **Budget:**

The Closure Project Baseline estimates over six million dollars will be spent on the Solar Ponds source removal activities. With the proposed "No Further Action," DOE may stand to save a great deal of money on this project. If this proves to be the case, RFCAB recommends that these funds be put toward remediation at other areas of the site.

### **Detailed Comments on the Decision Document (Not RFCAB Policy Statements)**

#### **PAM, Page 19, Paragraph 8:**

"During 1992, a brief investigation was performed to determine if the 207 B-Series Ponds were leaking into the uppermost aquifer. This was accomplished by sampling wells in the vicinity of the SEPs for a dye that was placed in the SEPs. Based on the study, it was determined that no leakage was occurring from the 207 B-Series Ponds."

It should be pointed out that this study represents a snapshot in time and does not prove that the B-Series Ponds have never leaked. In fact, according to the 1995 Proposed IM/IRA, "the subsurface PCOCs generally appear to be higher in the subgrade samples beneath the northern side of SEP 207-B than the other two SEPs

sampled [Ponds A and B-Center]..." (Page II.3-20)

**PAM, Page 31, Second Paragraph:**

"Based on historical data, uranium and nitrate concentrations in surface soil and subsurface soil are all below RFCA Tier I and Tier II action levels. In addition, lithium, nickel and selenium are also below Tier I and Tier II action levels in both surface and subsurface soil. Therefore, no additional soil removal is required for purposes of reducing the long-term stewardship obligations of the SPP treatment systems."

RFCA soil action levels have been calculated based on acceptable exposure to a future user of the site (i.e. a refuge worker) and are not necessarily protective of groundwater or surface water. Because RFCA soil action levels were not designed to be protective of surface water via groundwater, they are not a valid basis for this determination. Indeed, uranium in the subsurface soil has contributed to a groundwater plume despite being largely below the RFCA soil action levels. Although the primary source, pond sludge, was completely removed by 1995, there is still the issue of what constitutes a potential secondary source of groundwater contamination. That is, are there elevated concentrations of uranium in subsurface soil whose removal would be expected to reduce the necessary operating life of the groundwater treatment system? A subsurface leachability model would likely be needed to answer this question.

**PAM, Page 44 Section 7.0, Environmental Impacts:**

"Implementing Best Management Practices means that about 35,000 cubic yards of soil will be brought into this area."

Has DOE analyzed the effect the added weight of this material might have, if any, on the stability of the hillside? The "OU 4 Proposed IM/IRA Decision Document" dated February 10, 1995 states that a 1970 study concluded the steep slope north of the Solar Ponds to be "at high risk of failure." (Page II.1-6). To what extent does the stability of the area depend on the interceptor trench system, which removes groundwater from the hillside?

**PAM, Page 44, Section 9.0, Best Management Practices:**

This section should weigh the possible impacts, both beneficial and adverse, of not further disrupting the liners.

**Attachment II, Page 12:**

Based on review of the maps provided, very few surface soil samples appear to have been taken from the south end of the Solar Ponds area. Does runoff from this

area drain through surface water monitoring station, GS10, where there have been recurring exceedances for plutonium and americium? If so, this area deserves increased scrutiny as a possible source of the surface water exceedances.

**Attachment II, Page 22:**

There is a reference to data having significantly high values and irregular units. In "OU 4 Solar Evaporation Ponds Interim Measure / Interim Remedial Action Environmental Assessment Decision Document, February 1995, Part II, Appendix O" a result of 329,000 pCi/L for tritium in surface soil (Sample #SS00004AE) was noted and would seem to fall into this category, since surface soil results are usually represented in units of pCi/g. This data point does not appear in Table A-21 of the risk assessment. It also carries a "Y" code and may have been omitted for that reason.

**Attachment II, Page 29:**

"A central tendency mass loading (ML) value was used to estimate risk via inhalation over the 18.7-year exposure period. The RSALS Task 3 calculations used an upper 95th percentile value. This is appropriate for conservative action levels or PRGs."

For the refuge worker and rural resident scenarios, the RSALS calculations used a probability distribution for the mass loading parameter. The distribution accounts for the increase in dust inhalation that would be observed in the aftermath of a prairie fire, based on empirical data from the wind tunnel studies. The above implies a high-end point value was used as the basis for the RSAL calculations.

The statement is correct for the open space user and office worker scenarios, neither of which was deemed appropriate for setting soil action levels or PRGs.

**Attachment II, Page 37, Section 4.0 Toxicity Assessment:**

Acute toxicity does not appear to have been considered in the risk assessment. Perhaps that is due to the fact that most observed contaminant concentrations are low. Even so, if there are any contaminants of concern that have acute toxicity values, these levels should be noted so that the reader can be assured that acute toxicity has been given due consideration.

**Attachment II, Page 37:**

"Oral and inhalation SFs [cancer slope factors] are used to characterize the potency of carcinogens. A SF is a dose-response factor used to relate carcinogenic response to chemical dose. SFs are used to estimate the upper bound probability of an

individual developing cancer as a result of exposure to a potential carcinogen."

Cancer slope factors published in EPA Federal Guidance Report No. 13, "Cancer Risk Coefficients for Environmental Exposure to Radionuclides," apply to an average member of the public, and are therefore central tendency estimates, not upper bound estimates as indicated above.

**Attachment II, Page 45:**

"A 50th percentile estimate developed by the RSALS Working Group was used in the risk assessment. This figure is about double the documented site average (11.8 ug/cubic meter), but 30 percent of the 95th percentile figure used by the working group for the RSALS action levels (67 ug/cubic meter). The 95th percentile value is appropriate for action levels to be used for screening, but is too conservative for a forward-looking, long-term risk assessment. The effect of using multiple high-end factors in a risk assessment quickly leads to unrealistically high estimates of risk. EPA guidance recommends using a balance of high end and central tendency estimates to avoid this problem."

Again, this implies incorrectly that the probabilistic RSAL calculations were based on a point estimate for the mass loading parameter. It also incorrectly refers to RSALs as screening level calculations, when, in fact, RSALs are used to make remedial decisions per the RFCA.

**Attachment II, Page 45 (focusing on the last part of the above paragraph):**

"The effect of using multiple high-end factors in a risk assessment quickly leads to unrealistically high estimates of risk. EPA guidance recommends using a balance of high end and central tendency estimates to avoid this problem."

In the context of the mass loading distribution developed for the RSALs, this statement implies that the RSAL working group failed to use a balance of high end and central tendency values and thereby ran afoul of EPA guidance. Without getting into merits of the RSALs mass loading distribution (which DOE had a hand in developing), discussion of a single parameter says nothing about the overall balance of parameters selected in the RSAL calculations.

Moreover, the EPA Office of Radiation and Indoor Air, Radiation Protection Division, reviewed the RSALs Task 3 Report on behalf of EPA Headquarters. A letter to EPA Region VIII dated May 6, 2002 regarding the RSAL report stated: "The document was well thought out and the approach was based on the appropriate science." Since EPA has reviewed the RSAL report and found it to be in accordance with EPA technical guidance on risk assessment, this statement should be stricken from the PAM.

## **Attachment II, Page 45, Section 5.4.2, Uncertainties in Exposure Point Concentrations and Exposure Factors:**

This discussion should acknowledge that one of the largest sources of uncertainty in any risk assessment is associated with cancer slope factors, which are central tendency estimates of the potency of a given radionuclide to cause cancer in the general population. EPA has yet to develop probability distributions that would allow risk assessors to simulate the variability of this parameter. As a result, risk assessments do not account for the fact that certain subpopulations may be more susceptible to these carcinogenic effects than is indicated by the risk factors in Federal Guidance Report 13.

Quoting from the May 6, 2002 EPA letter noted above, whose comment was directed toward the RSALs Report, but applies equally to the Solar Ponds risk assessment: "It would be clearer if the report stated in a more prominent way that central estimates of slope factors were used for this analysis."

### **Attachment II, Page 49:**

"Americium-241, plutonium, and uranium-235 in surface soils are the largest contributors to risk."

"The majority of the risk was from chromium, americium-241, and uranium-235 in surface soil."

These two statements from the Summary and Conclusions section of the risk assessment seem to contradict each other. It may be helpful to include a breakdown of risk by contaminant to clarify the apparent discrepancy.

---

The Rocky Flats Citizens Advisory Board is a community advisory group that reviews and provides recommendations on cleanup plans for Rocky Flats, a former nuclear weapons plant outside of Denver, Colorado.

---

[Home](#) | [About RFCAB](#) | [Board Members](#) | [About Rocky Flats](#) | [RFCAB Documents](#) | [Related Links](#) | [Public Involvement](#) | [Board Vacancies](#) | [Special Projects](#) | [Contact](#)