Rocky Flats Environmental Technology Site:
Actinide Migration Evaluation (AME)
Meetings: June 6 to 8, 2005
Advisory Group: Greg Choppin, David Clark, David Janecky, Leonard Lane

Summary and Recommendations for Path Forward

The cleanup contract is nearing completion, therefore, it continues to be very important to make the best decisions and to track implementation to avoid re-doing work and raising questions as to the technical basis of the decisions and actions taken. Accomplishing these goals requires utilizing Site databases, modeling results, expertise, and documentation of plans and reports. The surface water monitoring projects continue to provide critical quantitative understanding of present controls and impacts. While erosion control efforts show expected response in contaminant transport, the Advisors recommend and encourage persistence, and even targeted enhancement. Surface water samples collected on the Site (in and above the ponds) may continue to have plutonium and/or americium concentrations above regulatory limits, due to soil disturbance, by remediation and demolition activities that aggravate surface water response, erosion, and contaminant transport. Reconfiguration evaluation throughout the Site requires close attention at this time. The defined area closure and use of signage observed on the Site are important means for maintaining remediation results. D&D, remediation, and other soil disturbance activities continue to be critical integrated activities for achieving closure and maintaining environmental protection. As contaminated areas are remediated to required standards and criteria, it is also important to document the rationale and analytical basis. Transition to long-term stewardship (legacy management), land configuration analyses, and independent verification/validation sampling are expected to be important topics for the next AME meeting.

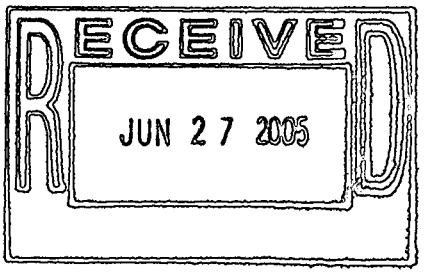
Progress and Integration

The Advisors continue to recognize that D&D, RSAL's, and water quality standards range from nCi levels, to 50 pCi/g RSAL's, to the 0.15 pCi/L water quality limits. We recommend continued efforts to remind all personnel involved in D&D activities, soil remediation, and water quality that all are responsible for protecting surface water quality through erosion control and other best management practices. B-pond soil piles, though contained within bermed area(s) with surfaces treated to minimize potential for spread of contamination, continue to be a concern.

The advisors were impressed by the results of the Site's response to the monitoring results, which revealed the presence of americium at SW093 and in Terminal Pond A-4. The combination of extensive on-site scientific understanding of actinide migration and hydrologic processes was successful in defining and optimizing a co-precipitation and filtration system to remove colloidal

americium. We were pleased with the overall integration between monitoring, modeling and treatment of the americium.

However, the advisors are concerned that similarly integrated and aggressive erosion control measures need to be consistently employed in the Woman Creek areas below the 903 Pad Lip area, around the old firing range remediation area, and on roads draining from below the 903 Lip area directly to Woman Creek.



Results and Discussions

Surface water monitoring data

George Squib (URS) presented a detailed discussion of recent surface water monitoring data. Data collected at the Point-of-Evaluation gauging station GS-10 shows a substantial increase in the 30-day average plutonium and americium concentrations between January and April of 2005. These increases coincide with recent D&D activity in the 700 area and recent construction activity associated with Functional Channel 4. These increased concentrations are consistent with increases in sediment transport due to recent soil disturbances, and not a new source term.

The Advisors were encouraged to see that the levels of plutonium and americium detected at SW093 have decreased since the construction of functional channels, removal of sources, and implementation of erosion controls across the site. In a similar fashion, the actinide contamination levels (water year 2004-2005) at SW027 are no longer reportable, which is attributed to the effectiveness of the SID. Where increased concentrations of plutonium and americium have been observed, they are attributed to increased transport of contaminated sediment due to soil disturbance, rather than the new sources.

The GS51 drainage area shows a relatively high concentration of both plutonium and americium contamination. The level of contamination has increased significantly since the reopening of the road for the Pond C-1 project. The AME Advisors recommend re-closing of this road to obtain reduction of the contamination in GS51 (and GS52) and to develop long-term stability in this area.

Walnut Creek drainage water treatment performance/status

In preparation for the Site Tour, Steve Nesta (KH) gave a presentation on the Storm Water Pollution Prevention Plan (SWPPP) that was added as part of the RFETS-NPDES permit in 2000. An important change was the requirement for individual storm water permit actions for >1 acre disturbance (rather than the previous requirement of >5 acres). This approach encourages minimum soil disturbance, which results in control and minimization of erosion and sedimentation, and minimization of runoff across the Site.

Each project is reviewed for impacts to surface water with a specifically designed control system. A significant aspect is the attention to Functional Channels (FCs). Presently there are five such FCs, using a range of methods for water flow control. These include straw bales, straw wattles, silt fences, mats, hydromulch and Flexterra™, straw crimping, and rip-rap channel lining. In addition, some new pond and wetland areas are being installed. Pictures of new controls emplaced were presented, and, later on the tour, we visited sites where they were being used. Several of these have expected useful lifetimes of a few months to a few years, and will require regular replacement until the location is stabilized and vegetation well established. Each site is inspected by Kaiser-Hill

management weekly and after storm events. On the tour, we saw teams installing several of these systems, managers in the field, and were provided useful on-site inspections.

The program for Pond A-4 water cleanup was also discussed. The general scheme for flocculation and co-precipitation of americium worked extremely well. The initial startup of the operation treated the water at a rapid rate (approximately 1000 gal/min) that reduced the concentrations to approximately 0.13 pCi/L. Slowing the process down to 300-400 gal/min brought the americium concentration to below the detection limit of approximately 0.006 pCi/L. This result gives additional confidence in the original AME assessment that the americium contamination was in a colloidal form, as the flocculation/co-precipitation approach worked well in removing the americium from the pond water. Therefore an important aspect of this project was the removal of particulate matter.

The presentation and later tour visits to several of the FC sites was most valuable in informing us of this activity and its role in preparing the site for closure. However, we note the recurring need for inspection, maintenance, and replacement of these storm water control systems for an indefinite period time in the early stage of stewardship.

Tour of Building 371 D&D site

Building 371 is the final major building to be removed at the Site. An impressive aspect of this operation is the use of lessons learned from removal of earlier buildings. The D&D of Building 771 resulted in the release of americium assisted by the large volume of dust suppression water that passed through undisrupted footing drains. For Building 776, the release of dust suppression water was prevented by building and managing a retention pond to hold the water. For Building 371 a larger (approximately one million gallon) retention pond has been built next to the building, and all the footing drains to the building have been plugged. The dust suppression water will therefore be retained in the basement area, and be pumped out and treated on site to remove sediment and contamination. This will allow release of clean water.

The evolution of clean-up methods reflected in the D&D of the Rocky Flats buildings has been extensive. Kaiser-Hill and other personnel are to be congratulated on the diligence and intelligence they have shown in the use of engineering activities to evolve more efficient and cost effective methods as they moved to D&D successive structures.

Tour of other areas – Building 771 site, 903 lip area, B-ponds, Pond C-1

Ian Paton (WWE) and George Squibb (URS) led a site tour for the AME Advisors. Erosion control in areas remediated for actinide contamination was a major focus of the tour.

Following are specific observations from the Tour of Woman Creek, the 903 Lip Area, the Firing Range remediation, and the uncontrolled roads near GS-51 and near the North Firing Range Site. The Advisors observed a number of problems in this area of the Woman Creek drainage. These include remediated areas that appear be only slowly revegetating, if at all; and formerly closed roads that have been reopened and are now supplying sediment across control structures. These issues are illustrated on the following pages in photographs with accompanying descriptive statements:

During briefings by George Squib prior to the tour it was noted that "These data further suggest that the plutonium and americium activities are at least partially the result of increased contaminated sediment transport. The loading analysis indicates that the GS51 and GS52 drainages (903 Lip area) are contributing a majority of the actinide load to SW027, due to contribution of a new source, and/or increased transport of a previously contributing source". The field observations certainly support this conclusion.

The Advisors feel that the problems outlined here are significant threats to water quality in both Woman Creek and the SID. We also feel that their remediation would be rather simple and inexpensive compared to the substantial efforts and money spent on remediation in this area, particularly at the 903 Pad and Lip area.

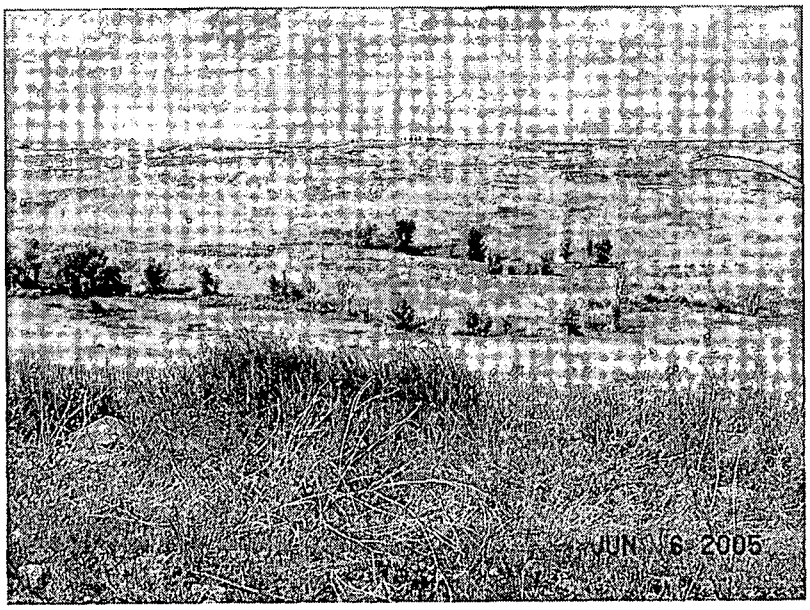


Figure 1. View to north across Woman Creek to the 903 Pad lip area. The top of the hillslope adjacent to the 903 Pad lip area does not appear to be re-vegetating as quickly as surrounding areas—green vegetation was not apparent during tour observations. This area appears to need further reseeding and revegetation efforts.

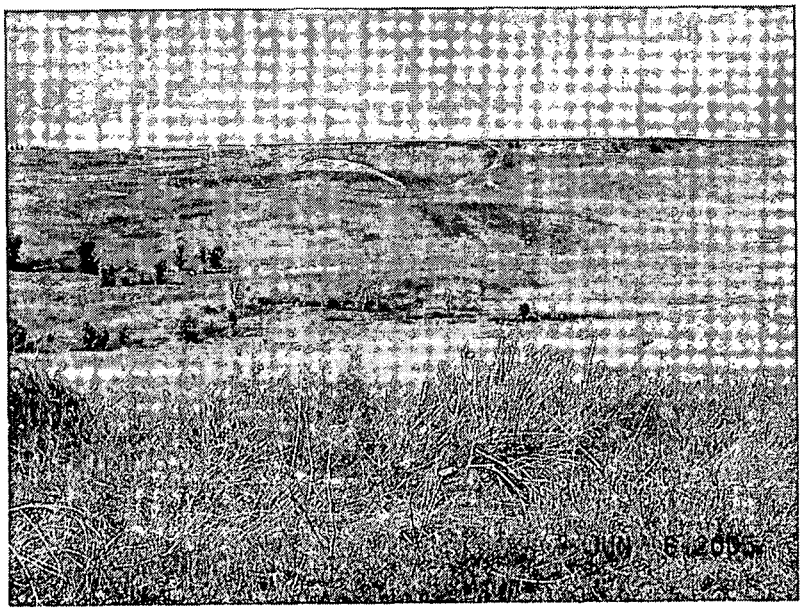
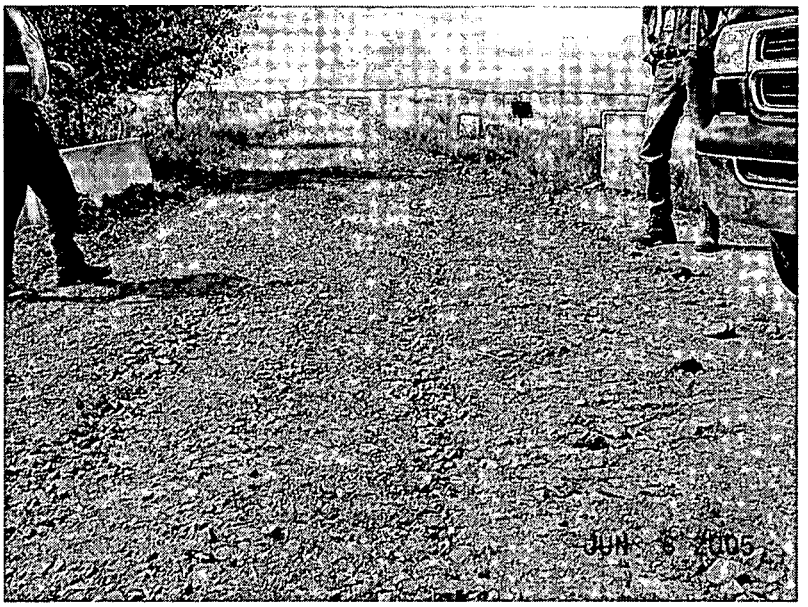


Figure 2. View north-northeast across Woman Creek. The firing range remediation area on the north side of Woman Creek is nearly surrounded by un-remediated roads (brown, unvegetated pathways to the skyline) and these are obvious erosion/sediment source areas.

a



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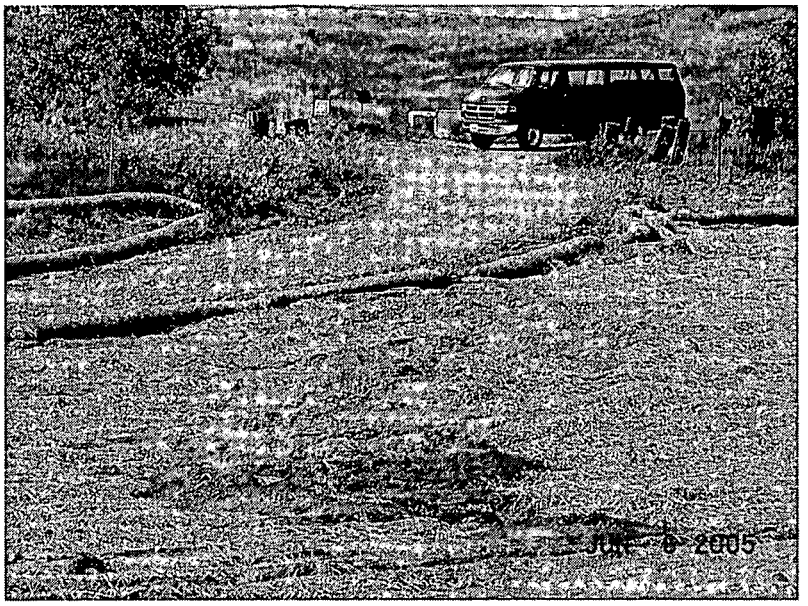

Figure 3a&b. A previously closed, up- and down-slope road near GS51 has been reopened, is eroding rapidly, and is delivering sediment to GS51 and also directly across the SID and into Woman Creek.

These pictures were taken looking to the north from the remediated area beside Woman Creek and Pond C-1. Surface water sampling station GS51 is uphill of the van, to the right of the road (see dark square of the solar power cell). The SID crosses the road under the camera in picture 3a and between the posts in picture 3b.

Post-closure pond operations

John Stover (DOE) and Ian Paton (WWE) provided an update on criteria being discussed for post-closure pond operation. Plans for notching dams were implemented at Pond C-1 on Woman Creek. No other structural changes to pond dams are anticipated before Kaiser-Hill contract completion. Re-evaluation of pond operations is occurring to determine target fill levels and release timing. Present procedures utilize a target of 50% pond capacity.

The advisors discussion focused on actinide migration retention and potential for exposure that could facilitate transport as primary criteria for operations. Targeting pond fill levels too low results in vulnerability to sediment exposure and consequent contaminated dust mobility. While airborne pond sediment mobility is not expected to create a large-scale transport load, it can result in contaminant transport out of the ponds and into the downstream water course, with potential coupled impacts on water quality measures. Issues of storm water capacity, release frequency and sampling operations are secondary criteria for pond operations.

A decision evaluation model should be built, utilizing previous approaches for multi-criteria evaluation. Key criteria include actinide retention/migration, pond storage volume, sediment exposure, storm frequency (annual and seasonal), frequency of sampling and release operations, and wildlife utilization. The model should be as inclusive of detailed data and criteria as possible, so that what if and statistical evaluation can be documented for decision applications.

Independent verification/validation sampling

Jan Walstrom (KH) discussed the Independent Verification and Validation (IVV) study that is about to start. DOE and Kaiser-Hill are undertaking an additional radionuclide survey effort, above and beyond what was agreed upon in the RFCA, in order to provide additional confidence and assurance that the data used to make cleanup decisions are sufficient and reliable. The Oak Ridge Institute for Science and Education (ORISE) developed a survey plan, and will conduct the independent verification and validation (IVV) of radionuclide contamination in soils in the buffer zone and the industrial area. The objectives of the IVV survey are to verify with reasonable certainty

- that all radionuclide contaminated surface soil beyond the known and suspected release sites has been identified and appropriately dispositioned under RFCA, and
- that remedial actions are complete and that no radiological surface contamination above RFCA soil action levels or allowable elevated measurements per the IA and Buffer Zone sampling and analysis plan.

To accomplish the IVV, the Final Survey Plan will implement a wide-area aerial scan, and targeted ground-based scan.

The wide-area scan will employ a helicopter-mounted detector system with differential-GPS and NaI detectors to identify the gamma-emitting

radionuclides 241-Am, 235-U, and 234-Th. The 239/240-plutonium concentration will be determined indirectly from the concentration of 241-americium, a decay product of 241-plutonium, and by using an accepted value for the plutonium to americium ratio. At RFETS, the acceptable values fall within the range of 4-7, and the Site has been using a value of 5.7 based on historical production data and regulatory agreements. 238-uranium concentrations are inferred from the concentration of its 234-thorium decay product. The AME advisors felt that the wide-area aerial scan represented a good management practice using standard detection technologies, that should provide valuable information and verification for Kaiser-Hill, DOE, regulators and stakeholder groups regarding success of remedial actions.

The targeted ground-based scanning will be performed around areas that have already been remediated, and where wide-area scanning was not possible. The ground-based scans will employ high-purity germanium (HPGe) detectors. These scans will be initially conducted at the boundaries of areas that have already undergone a remedial action by KH, such as the 903 Pad and Lip area.

The AME advisors suggest that care must be exercised in the interpretation of data collected at the boundaries of remediated areas to prevent misinterpretation. For example, the 36-acre 903 Pad and Lip area employed a geostatistical modeling approach known as "Kriging" to define the general area for remediation. Collecting data at the boundaries of the Kriged area will potentially identify some contaminated locations for additional remediation. Further value can be added to the assessment, however, through picking several additional transect locations within the remediated 903 Pad and Lip area for verification and validation. The advantage to this is that this area was extensively characterized with HPGe (and alpha spectroscopy) prior to remediation, as described in the March 28, 2000 final report entitled "Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone", RF/RMRS-990427.UN Rev. 1.

In that report, there is extensive characterization by both spatially located HPGe and laboratory soil analyses. Thus, there is an extensive understanding of the contamination prior to remedial action. We recommend that the IVV process should choose several of these locations and take additional HPGe data on transects across the remediation area boundary. This will give a direct comparison of how much contamination was present prior to remedial action, and an independent verification measurement at the same location using the same detection technology to verify the level of cleanup meets or exceeds the cleanup criteria. The AME advisors see great benefit in such a one-to-one comparison as a robust verification of what has been accomplished with remedial action, and what independent verification can tell us.

Functional channels and Post-closure water balance

Ian Paton (WWE) summarized the technical basis of the land configuration, specifically the functional channels. There are three main technical components of the design of functional channels:

- the hydrologic component that consists of estimating the design discharge (in this case the 1-hour, 100-year flood peak). The Rational Method was used but the selected values of the runoff coefficient, *c*, were not given. These values of *c* should be documented;
- the hydraulic modeling to incorporate design features (i.e. channel gradient) to avoid the instabilities and accelerated channel scour associated with critical velocity. The Froude number, *F*, should be less than about 0.8 or greater than 1.2 to avoid critical velocities; and
- the hydraulic analyses were used with permissible velocity calculations for the grass lined channels (low channel gradient), rock riprap (moderate channel gradient), and grouted rip-rap (high channel gradient).

In addition to these calculations a safety factor of 1-foot freeboard was used in the trapezoidal channels. The Advisors were pleased with the engineering criteria used for channel designs. The constructed functional channels were impressive and appear to be well constructed and include erosion control measures on side slopes contributing to the functional channels.

Bob Prucha (IHS) summarized the range of model scales used in computing a site wide water balance, computing water balances for specific watersheds, and computing water balance at the individual building scale. The Advisors feel that the demonstrated uses of the SWWB model illustrate the importance of a technical basis for water balance affecting "Site" performance from the building to entire RFETS scale. Only a continuous simulation model with coupled surface and subsurface calculation components, can link building D&D, remediation, functional channels, wetlands, and ponds and thereby determine their combined impact on post closure hydrology and potential contaminant transport. The Advisors commend the Site for using the SWWB model in final closing and configuration decision making.

Sampling waters from the former site of Building 771

Sampling for contaminant transport in near surface interflow from the former site of Building 771 toward North Walnut Creek has been of interest to the local Cities and the AME Advisors (see tour discussion above). The introduction of substantial amounts of dust suppression water during building D&D, subsequent release of americium contaminated water from building drains and conduits (treated from Pond A-4 as discussed above), and emplacement of a substantial earthen fill structure has led to planning and evaluation of ongoing monitoring efforts. Emplacement of three shallow wells along North Walnut Creek (with a fourth Geoprobe well to follow), within the contoured fill at this site is the first step in such a deliberate monitoring plan. In this shallow and substantially disturbed area of soils and fill, interflow waters are likely to contain

large amounts of fine sediment and colloids. The Advisors recommend that sampling operations may need to be augmented, especially in the near term, to handle this complexity. For example, in addition to bulk fluid analyses for plutonium and americium, analyses of filtered water aliquots for plutonium and americium (as well as bulk TSS) would be useful to characterize the basic colloidal load moving toward the creek. This would allow integration of these results with previous work at the site, particularly that of Santschi and others (2002) on plutonium colloidal distributions in pond waters and sediments.

Muller Engineering Consultant's report for cities on Walnut and Woman Creeks

1. *Walnut Creek Drainages Pond Reconfiguration Review, 10 pp.*

The purpose of this report is "...to provide information to the City and County of Broomfield concerning details of surface water runoff in and around the Rocky Flats Site." And, "Broomfield asked Muller Engineering Company to objectively review the DOE's actions for Walnut Creek." (See p.1, Introduction).

"The scope of Muller's assessment is limited to a brief review of available documents, a field reconnaissance of the Walnut Creek area within Rocky Flats, and a compilation of initial opinions regarding the Department of Energy's planned actions along Walnut Creek. As such, the recommendations offered in this assessment will require further evaluation and refinement." (See p. 2, Introduction).

The Advisors reviewed this report in view of the stated purpose and scope and offer the following comments and suggestions.

First, there are comprehensive, peer reviewed reports with more comprehensive evaluations and well-supported conclusions and recommendations regarding runoff, erosion, and contaminant transport. Some of the most significant ones are listed below.

- EG&G, 1992, Rocky Flats Plant Drainage and Flood Control Master Plan Woman Creek, Walnut Creek, Upper Big Dry Creek, and Rock Creek, Golden, Colorado, 1992.
- K-H, 2000, Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluation at the Rocky Flats Environmental Technology Site, Golden, Colorado, August.
- K-H, 2001,Rocky Flats Environmental Technology Site Final Source Evaluation Report for RFCA Point of Evaluation GS10 Water Years 2000-2001, August.
- K-H, 2002a, Actinide Migration Evaluation Pathway Analysis Report, Technical Appendix. Rocky Flats Environmental Technology Site, Golden, Colorado, April.

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- K-H, 2002b, Rocky Flats Environmental Technology Site Automated Surface-Water Monitoring Report Water Years 1997-2000, Golden, Colorado, September.
- K-H, 2002c, Site-Wide Water Balance Modeling Report for the Rocky Flats Environmental Technology Site, Golden, Colorado, May.
- K-H, 2003a, Rocky Flats Environmental Technology Site Automated Surface-Water Monitoring Report Water Year 2001, Golden, Colorado, May.
- K-H, 2003b, Rocky Flats Environmental Technology Site Automated Surface-Water Monitoring Report Water Year 2002, Golden, Colorado, November.
- K-H, 2004, Rocky Flats Environmental Technology Site Automated Surface-Water Monitoring Water Year 2003 Annual Report and Water Year 2004 Source Evaluations for Points of Evaluation GS10, SW027, and SW093, Golden, Colorado, December.

Second, these reports include some features and findings directly related to the Muller Walnut Creek Report.

- The long-term (100-year) Ft. Collins precipitation record was examined and found to be similar to the shorter records at Rocky Flats due to similar geographic relation to the Front Range. The shorter observed records from RFETS (9 on-site meteorological station(s) were embedded within the Ft. Collins record depending upon which station(s) was most appropriate for the particular analyses (e.g. see K-H, 2000 and K-H, 2002c). By embedding, we mean that for the time period RFETS data are available the RFETS data replaced the Ft. Collins data. This meant that we retained the long-term record from Ft. Collins while utilizing site-specific data when available.
- Analyses using the WEPP model (K-H, 2000) and the SWWB model (K-H, 2002c) were made in a continuous simulation mode so that a daily water balance (precipitation, infiltration, runoff, evapotranspiration, and changes in soil moisture) was maintained. This meant that the hydrologic analyses included wet and dry periods, accounted for antecedent moisture affecting generation of surface runoff from precipitation, and included base flow as well as storm runoff. The continuous simulation models were needed to compute annual runoff, sediment, and actinide yields. However, single storm results (such as historical events or events of a given frequency, i.e. 100-year storm) could also be computed with these models.
- The continuous simulation models (WEPP and SWWB) were calibrated using distributed precipitation, runoff, and associated monitoring data so that they represented observed data as well as possible and included uncertainty estimates for runoff volumes and peak rates.

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- The continuous simulation models (WEPP and SWWB) are physically based and thus are designed to reflect land use and management practices such as site cleanup, reconfiguration, and remediation.

Based upon the analyses described in the above reports, we feel that the continuous hydrologic simulation models produce reasonable annual water yields as well as estimates of storm runoff, e.g. the 100 yr flood on RFETS watersheds, including Walnut Creek.

Finally, future pond operations are being considered and the annual water yield and flood peak estimates needed for these considerations can be estimated with the continuous simulation models, especially the SWWB as it includes coupled or linked surface water-ground water interactions impacted by land reconfiguration and revegetation activities. Moreover, the continuous simulation hydrologic model (SWWB) and engineering hydraulic practices/models have been used to design "functional channels" which have been emplaced where needed.

2. *Woman Creek C Ponds Technical Review, 14 pp*

Note: Many of the references and comments related to the Muller Walnut Creek Report are directly applicable to the Muller Woman Creek Report.

The purpose of this report is "...to provide information to the Woman Creek Reservoir Authority concerning details of surface water runoff leaving the Rocky Flats Site." (See p.1, Introduction).

"The scope of Muller's assessment is limited to a brief review of available documents, a field reconnaissance of the Woman Creek area within Rocky Flats, and a compilation of initial opinions regarding the Department of Energy's planned actions along Woman Creek. As such, the recommendations offered in this assessment will require further evaluation and refinement." (See p. 1, Introduction).

Again, as with the Muller Walnut Creek Report, these more in depth and comprehensive analyses Muller suggest have already been accomplished and are documented in the peer reviewed documents cited in the previous sections.

Pond C-1 has been notched already and Pond C-2 will have its outlet mechanism upgraded. Detailed hydrologic analyses cited in discussion of the Muller Creek Walnut Creek Report have also been applied to Woman Creek and Pond C-2 is sufficient to retain the 100-year flood volume calculated by the WEPP and SWWB models. Therefore, we recommend the current SID, Pond C-1, and Pond C-2 configuration be maintained.

Documents Provided to Advisory Group

Agenda for meetings
Rocky Flats Envision, v11, n3 May 11, 2005 – Last TRU waste leaves Rocky Flats
Walnut Creek Drainages Pond Reconfiguration Review, March 28, 2005, Project 05007.02, Muller Engineering Company
Woman Creek C Ponds Technical Review, Muller Engineering Company
Surface Water Quality: Recap of events/activities in past year (viewgraphs)
POE/POC water data plots (George Squibb)
RFETS storm water control: closure transition meeting May 17, 2005 (viewgraphs from Steve Nesta)
Memo pm:jr:05-00310 final survey plan for rocky flats site-wide surface solid radiological contamination...
Final survey plan for rocky flats site wide surface radiological characterization
Briefing viewgraphs – final survey plan for rocky flats site wide surface radiological characterization
ORISE contract plan and cover letter to David Abelson
RFETS functional channels, summary of design criteria by Ian Paton from personnel communication from Parsons Engineering
Map of functional channels (slightly dated as does not include some wetlands)
Reference list for Surface Water
U data information

Documents and Information Requested for Advisory Group

Monitoring updates as available, particularly surface water, erosion, ponds, & building D&D
Progress on the Validation/Verification project efforts of ORISE and Kaiser-Hill
Progress on the Remedial Investigation Report (draft), particularly the section on contamination fate and transport

Requests for Future Presentations and Information

Update on surface water quality monitoring data
Land configuration & hydrologic analysis – Status, analyses and path forward
Update on transition to stewardship
Update on independent verification/validation sampling results and findings

Participants in AME technical meetings

Name	Organization
Chris Dayton	Kaiser-Hill
Greg Choppin	Florida State
David Clark	Los Alamos
David Janecky	Los Alamos National Laboratory
Leonard Lane	Tucson
Ian Paton	Wright Water Engineers
George Squibb	URS
Steve Nesta	Kaiser-Hill
David Shelton	Kaiser-Hill
Bob Nininger	Kaiser-Hill
John Rampe	DOE
John Stover	DOE
Terry Vaughn	Kaiser-Hill
Bob Prucha	IHS
Jan Walstrom	Kaiser-Hill
John Boylan	URS
Ralph Lindberg	URS

Future Meeting

October 5-7, 2005

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
REGULATORY CONTACT RECORD

Date/Time: December 13, 2004

Site Contact(s): Dyan Foss
Phone: (303) 994-0325

Regulatory Contact: Edd Kray
Phone: (303) 994-3441

Agency: CDPHE

Purpose of Contact: Disposition of Second Floor Survey Unit 27

Discussion

In accordance with the 776/777 DOP, Appendix I, the preparation of the facility for demolition is conducted in consultation with the CDPHE and is based on a series of decisions primarily related to maintaining releases to the environment and dose and risk to the workers as low as reasonably achievable (ALARA). This contact record documents the activities that were conducted to prepare the Second floor Survey unit 27 for demolition. Survey Unit 27 consists of Rooms 237, 237B, 237C, 237D, and 238.

The preparation process for Survey unit 27 was initiated June 28, 2004 when a package for in-process radiological surveys was prepared and executed. Once the surveys were complete, the following actions were taken as part of the ALARA-based decontamination effort:

- Concrete shaving was performed on floor surfaces.
- Expansion joints, cracks, and bolts in the floor were remediated, as necessary.

The area was resurveyed in accordance with the Radiological Pre-Demolition Survey Plan for Buildings 776/777. The surveys were provided to the CDPHE project representative, and a walk down of the area was conducted.

In addition to the radiological hazards, the non-radiological hazards have also been addressed in Survey unit 27. The following summarizes the non-radiological activities:

- Room 237 on the second floor of Building 776 contained a permitted RCRA container storage area, Unit 776.1. This area was washed and rinsed for RCRA closure. Closure of this area was approved by Harlen Ainscough and documented in a Contact Record dated November 15, 2004.
- Chemicals and hazardous substances have been removed.
- Beryllium regulated and controlled areas have been closed. None of the rooms in Survey Unit 27 were listed on the historical list of rooms with potential beryllium contamination. The baseline beryllium characterization of these rooms conducted

by KH in 1999 found no removable beryllium contamination. Prior to final encapsulation the room was again surveyed. Twenty (20) samples were collected in the survey unit on horizontal surfaces from floor to ceiling. All samples were below the analytical reporting limit of 0.1 ug/100 cm^2.

- Polychlorinated biphenyls (PCB) hazards and equipment have been removed.
- Asbestos has been abated.

Based on the survey results and the principles of ALARA, the risks (industrial and radiological) to the workers are greater than the benefit in source term reduction that would be gained through additional decontamination. The state project representative agrees that decontamination inside Survey unit 27 has progressed to the point of reasonably achievable removal and that the subsequent step of encapsulation is appropriate.

In summary, ALARA-based decontamination has been completed, Survey unit 27 will be encapsulated and surveyed for removable contamination, and controls will be applied during demolition. This contact record will be included as an appendix to the characterization report for Survey unit 27 and placed in the demolition file to ensure the controls and requirements are included in the demolition work packages for these survey units.

Contact Record Prepared By: Dyan Foss

Required Distribution:

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