

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
2001-001	Mary Lou Blazek	Oregon Office of Energy	4/20/01	Past Work	"(4.3.1) The [Integration Project] should institute a systematic analysis of past ecological work to determine its relevance to current critical [Integration Project] questions. By bringing together past work (from knowledge of data sets to lessons of those data sets), biological monitoring, system assessment, research, and modeling projects can be strengthened scientifically and made more relevant to [Integration Project] needs. The Integration Project needs to have the best understanding possible of the geology, hydrology, and ecology at Hanford to do its work. That understanding results from analyzing data obtained in the past and obtaining and analyzing new sampling and monitoring data. DOE has over 40 years of sampling data that can provide important information about the natural systems at Hanford. Analyzing that data will likely provide greater insights more quickly and at a lower cost than obtaining additional new data through sampling and monitoring. Therefore, DOE implementation of this recommendation should be a high priority for OOE. OOE will measure how well DOE is implementing this recommendation by asking DOE to document how many records it has reviewed, provide a description of those records, provide a description of what it has learned from the records and make the records available in electronic form or other easily reviewable means."		Pending Assignment
2001-002	Mary Lou Blazek	Oregon Office of Energy	4/20/01	Biological Endpoints	"(4.3.3) Biological endpoints should become central to the evaluation and validation of the cleanup and restoration programs. This recommendation says that the success of the cleanup is measured by ecosystem health. Ecosystem health involves a holistic approach with many pieces contributing to the whole. It puts that focus on performance, e.g., whether the particular biological receptor is protected, rather than achieving a cleanup level that has been thought based on studies to be protective. OOE will measure how well DOE is implementing this recommendation by asking DOE to provide a list of what biological endpoints it has chosen, to explain how it is gathering data about the health of those endpoints and asking DOE to give OOE complete access to the data."		Pending Assignment
2001-003	Mary Lou Blazek	Oregon Office of Energy	4/20/01	Ecological Risks	"(4.3.4) The [Integration Project] should make evaluation of ecological risks associated with contaminants (and with cleanup efforts) a centerpiece, not an afterthought, of the earliest stages of planning and decision making. This recommendation is closely tied to the previous one. It reflects a basic philosophical approach to cleanup that differs from DOE's current approach. The current approach lets technological capability, land location, and regulatory requirements drive cleanup decisions. While practicality (cost and technical feasibility) is important it has not promoted innovative cleanup approaches that safely expedite cleanup. This recommendation advises DOE to start making its cleanup decisions by determining what the acceptable level of ecological risk is and choosing cleanup approaches that are most likely to achieve those levels. OOE will ask DOE for an explanation of how it is incorporating ecological risks into its planning and decision making. OOE will measure implementation by confirming that DOE has validated the conceptual model for the Hanford Site."		Pending Assignment
2001-004	Mary Lou Blazek	Oregon Office of Energy	4/20/01	Particle Tracking of Solutes	"(5.3.2) The near-Columbia River modeling should be expanded to include particle tracking of solutes, more realistic boundary conditions, and extend the simulations to include other locations. DOE and its contractors have done valuable work in creating models that track the path of a hypothetical particle in the groundwater, including how its movement is influenced by the ebb and flow of water from the Columbia River. Dissolved materials behave similarly to particles, but also undergo diffusion and other effects that are not incorporated into the current particle tracking model. More work is needed to track how dissolved contaminants would behave. In addition, the particle-tracking model done to date has focused on a limited number of locations. More information is needed on how particles and dissolved materials behave in other locations, such as the F and H area sloughs. Particle tracking offers one of the best ways to determine travel time of contaminants to the Columbia River as well as identify locations where contaminants are entering the river and their effects. Such information would be useful for determining cleanup priorities and making cleanup decisions, such as choosing methods of remediation and construction. OOE will determine how well DOE implements this recommendation by requesting particle tracking data"		Pending Assignment

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2001-005	Mary Lou Blazek	Oregon Office of Energy	4/20/01	Groundwater Remediation	from DOE and comparing past tracking to present." " (6.2.1) Compliance and internal reporting should include both the time series data from individual monitoring wells, and an assessment of the change in total mass discharge to the river on a plume-by-plume basis. This type of reporting will provide a more transparent and defensible basis for demonstrating compliance. This recommendation appears to be based on the flawed underlying assumption that contaminant and water flow is uniform through the soil structure. To date, DOE has not shared the data underlying this assumption. The data may show a difference between the modeled and calculated mass moving into the river and the actual mass movement. OOE's priority is obtaining the data needed to reliably assess DOE's underlying assumption about how the mass is moving. With that data, OOE will assess whether to emphasize implementation of this recommendation."		Pending Assignment
Prog-3	HAB		Dec-96	Cumulative Impacts	Need for integrated approach that evaluates the cumulative impacts of the various cleanup alternatives.	The Integration Project was established for this purpose. It is establishing the SAC and related databases to this end. Refer to the Project Summary Description (DOE/RL-98-48).	Preliminary Resolution
Riv-1	Geoff Tallent		Jul-97	River Related Risks	Need for an estimate of river related human health and ecological risks.	"Initial response to issue: None. Supplement to initial response: This issue represents an early concern from within the project. Following the principles of the Columbia River Comprehensive Impact Assessment (CRCIA, DOE 1998), Candidate Sets of potential river-related human health and ecological risk pathways, receptors, and metrics were developed. From these, a suite of Study Sets was chosen using publicly agreed selection criteria (Kincaid et al. 1999). In order to evaluate these Study Sets, a System Assessment Capability (SAC) is being developed. A series of assessments are now planned, each providing information to improve the next. For the initial assessment, the endpoints selected for analysis in each of these areas, the temporal and spatial resolution, approach to estimating uncertainty, and plans for output display are all defined in a publicly accessible report (Kincaid et al. 2000). A Software Requirements Specification is included in this report (Kincaid et al. 2000), to which the SAC has been built. In this specification, the river, ecological, and human risks are addressed explicitly in Sections 4.8.7 River Flow and Transport Module Mathematical Requirements, 4.8.8 Ecological Impacts Module Mathematical Requirements, and 4.8.9 Human Health Impacts Module Mathematical Requirements. In addition, risk metrics to the regional economy and Native American cultures have been incorporated. Additionally, it is important to remember that the SAC Rev. 0 performance assessment is a ""proof of concept"" approach to verify it can be used effectively to represent the identified risks. Future assessments, such as SAC Rev. 1 will incorporate lessons learned from SAC Rev. 0 and recommended enhancements stemming from interface meetings with the regulatory community and stakeholders. Consequently, future assessments may address a broader suite of risks. References: DOE. 1998. Screening Assessment and Requirements for a Comprehensive Assessment - Columbia River Comprehensive Impact Assessment, DOE/RL-96-16, Rev. 1. U.S. Department of Energy, Richland, Washington. Kincaid, C.T. et al. 1999. Candidate Set Report. Letter Report, Bechtel Hanford Inc., Richland, Washington. Available at http://www.bhi-erc.com/projects/vadose/sac/candsets.pdf Kincaid, C.T. et al. 2000. Groundwater/Vadose Zone Integration Project System Assessment Capability (Revision 0) Assessment Description, Requirements, Software Design, and Test Plan, BHI-01365, Bechtel Hanford Inc., Richland, Washington. Available at http://www.bhi-erc.com/projects/vadose/sac/sacdocs.html Output required from issue resolution: Close out the issue based on the supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-001	Doug Hildebrand/Fred	DOE-RL/FDNW	6/17/99	Other River GW Interactio	Are there other studies of GW River interactions to guide or provide knowledge of what to consider and develop conceptual model of River/GW interactions?	A literature search for other groundwater-river interaction studies will be performed in conjunction with planned S&T work on this subject.	Pending Assignment

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SAC 99-002	Mann Doug Hildebrand	DOE-RL	6/17/99	ns Interaction of River and Hydro. Units	Request this element to review Hanford site composite analysis results for lower hydrogeologic units. Did contaminants reach lower hydrogeology? Units and transport to River Area. What is relationship of lower units with river? Use this exercise to build better case to excluded evaluating lower hydrogeologic units.	"Initial response to issue: None Supplement to initial response: This issue is being addressed as part of the ongoing development of the Hanford Sitewide Groundwater Model. Results of both the composite analysis and the SAC Rev.0 history matching simulations for the groundwater module showed that tritium concentrations in hydrogeologic units below model unit 5 (primarily Ringold C/E gravel) in the area near the Columbia River were less than 10% of the concentration in the upper part of the aquifer (Unit 1). However, it should be noted that these simulations began with an initial condition tritium plume for 1979 or 1974 that placed tritium only within the upper 20 to 25 m of the aquifer. Results of these simulations, therefore, do not show the behavior of tritium plumes beginning with a source term at a waste site. Large volume sources such as the PUREX cribs may create downward vertical gradients that drive contaminants into the deeper sediments. Future model runs are planned for the full three-dimensional sitewide model that will simulate plumes from pre-Hanford conditions using the SAC Rev. 0 source terms. These results will be more valuable for assessing the movement of tritium into the deeper hydrogeologic units of the model. Actual sampling data from various depths within the aquifer is also needed to determine whether contaminants are present in the deeper sediments. Data are needed both near source areas and near the Columbia River in plume areas. This need has been documented in the Science and Technology Road Map for the Groundwater-Vadose Zone Integration Project. Deeper hydrogeologic units (below model unit 5) are generally not in contact with the Columbia River according to current data and understanding represented in the Hanford Sitewide Groundwater Model. However, upward vertical hydraulic gradients are expected in the vicinity of the river and any contaminants present in the deeper sediments would be expected to move upward toward the river. Improving our understanding the interaction between groundwater and the river is an ongoing effort under the Hanford Site groundwater modeling task and is also included in the Science and Technology Road Map for the Groundwater-Vadose Zone Integration Project. Output required from issue resolution: Current status of issue and provision of any existing resolutions: Ongoing effort. Scope of work to resolve the issue: Timeline showing when work is needed and how long it will take to complete: Ranking of issues vs. other issues and vs. existing work:"	Resolved
SAC 99-003	Phil Staats	Ecology	6/17/99	SAC Project Links	The SAC Project Links do not include the regulatory pathway group/product. Is there an intention to open the communications between the (2) groups?		Pending Assignment
SAC 99-004	Bob Bryce	PNNL	6/18/99	Inventory for Lost Waste Sites	"At the April 29 SAC meeting someone asked if Bruce Napier was aware of a report on ""Lost Waste Sites"" published in 1989."	"Initial response to issue: Bruce Napier, the inventory task lead in July 1999, was provided a copy of the 'lost waste sites' report published in 1989 Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-005	Doug Hildebrand	DOE-RL	6/24/99	Database	Need presentation on how databases used by SAC are maintained.	A Hanford-Specific FEPs Database Rules document was developed. The database will be managed in accordance with this document. The information used to create and run the SAC will be maintained in this database. Presentation?	Pending Assignment
SAC 99-006	Doug Hildebrand	DOE-RL	6/24/99	How Model Columbia River Boundary	How explore and build alt. Boundary conditions for Columbia River. Currently assume constant head middle of River. Should it be some other conceptual models - should it be offsite W - E.g. center of River.	"Initial response to issue: None Supplement to initial response: This issue is being addressed as part of the ongoing development of the Hanford Sitewide Groundwater Model, specifically with regard to alternate conceptual models being developed to evaluated uncertainty in the model. Improving our understanding the interaction between groundwater and the river is an ongoing effort under the Hanford Site groundwater modeling task and is also included in the Science and Technology Road Map for the Groundwater-Vadose Zone Integration Project. Output required from issue resolution: Current status of issue and provision of any existing resolutions: Ongoing effort. Scope of work to	Resolved

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						resolve the issue: Timeline showing when work is needed and how long it will take to complete: Ranking of issues vs. other issues and vs. existing work:"	
SAC 99-007	Dirk Dunning	Oregon Office of Energy	6/24/99	Alternative Conceptual Model Group	"The GW Model Peer Review Group recommended forming an ""Alternative Conceptual Model Development"" group to raise and discuss alternative conceptual models. I support that recommendation and would like to see the group formed. (By phone at 6/24 work group meeting)"		Pending Assignment
SAC 99-008	F. Davis	Sandia National Labs	6/24/99	Multi-Dimensional Modeling of GW	"The current GW model (Sitewide) may be insufficient for sources near the Columbia River. The dimensional effects leading to this concern for sources near the river may also be legitimate concerns for receptors near the river. While the timeframe is currently for conceptual models, validation issues need to be identified and a plan to address them formed at this time."	"Initial response to issue: Validation of the groundwater model in the vicinity of the Columbia River for concentrations is de-emphasized for SAC Rev. 0 and the initial assessment because of a general lack of data to define the near-river groundwater plumes during the reactor operation era. In addition, sources during and since that era are poorly defined. Results of the initial assessment will be studied to determine the need for validation efforts in the vicinity of the Columbia River with regard to the predictions made and used in the risk-impact elements of SAC. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-009	F. Davis	Sandia National Labs	6/24/99	Evaporative Transport Mass Conservation	Presentation of GW conceptual model suggested that model may not conserve mass. CRCIA requires most model specifications to conserve mass.	"Initial response to issue: The SAC will require conservation of mass throughout the analysis Supplement to initial response: The groundwater model being applied in SAC Rev. 0 does conserve mass. That is, mass of any contaminant within the aquifer at a point in time is equal to the mass that has entered the aquifer (or was there initially) minus the mass that has left the aquifer through some discharge boundary condition, such as the Columbia River or a well. Activity of radioactive contaminants within the aquifer will decrease over time, however, because of radioactive decay. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-010	F. Davis	Sandia National Labs	6/28/99	Suitable Domain for GW Modeling	"As presented June 24, 1999, the GW model will go only to the midpoint of the river. CRCIA requires modeling to go to and include the east bank of the Columbia River."	"Initial response to issue: The groundwater model output will serve as input to the Columbia River model. Representation of both shorelines will be considered in design of this model Supplement to initial response: The SAC Rev. 0 Columbia River module will include the area covered by the river. All contaminants from the groundwater module will enter the river at the boundary of the model domain. The SAC Rev. 0 performance assessment is a ""proof of concept"" approach to show that such a tool can effectively represent the behavior and impacts associated with the selected contaminants of concern. Improving our understanding the interaction between groundwater and the river is an ongoing effort under the Hanford Site groundwater modeling task and is also included in the Science and Technology Road Map for the Groundwater-Vadose Zone Integration Project. Future assessments, such as SAC Rev. 1, may incorporate these improvements in understanding based on assessment needs and recommendations from interface meetings with the regulatory community and stakeholders. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues	Resolved

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SAC 99-011	Fred Mann	FDNW	7/14/99	Goal of SAC	"1. Goal of SAC, estimate, bounding, conservation's (?) and 2. Purpose of SAC, no action, site closure (?)."	and vs. existing work: N/A" "Initial response to issue: The purpose of the SAC is to provide information that will inform a broad range of decisions. It will provide a site-wide context for site-specific clean-up and disposal decisions in the near term of the next decade. It will also provide a site-wide context for site closure and stewardship decisions in the long term. While the SAC Rev. 0 is not designed to address the 'no-action' alternative, future versions of the SAC will address it by including the relevant processes, e.g., atmospheric transport. The analysis is designed to analyze from present day into the distant future. The initial assessment will address from present day until 1000 years after the closure of the Hanford Site. It is envisioned that future revisions of the capability will be designed to address up to 10,000 years beyond site closure. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-012	Doug Hildebrand	DOE-RL	7/14/99	Ingrowth and Decay Data	"1. Does current database incorporate decay daughters into the database with time or just a point of something measured and inputted? Request decay ingrowth is a part of the database. 2. Recommend that decay all inventories to the FY 2000. The year that we will be releasing the Rev. 0 study/report. 3. ERDF database do the daughter radionuclide match the parents e.g., Pu-241 and the Am-241. Should there be more? Are the in growth daughters factored into translation of ERDF data into SAC inventory database?"	"Initial response to issue: The database for the inventory scoping study did not include decay daughters. Decay ingrowth will be considered as the database for use beyond SAC Rev 0 is developed. Supplement to initial response: The database created to support SAC Rev. 0 will not be looking at daughter products. This is because SAC Rev. 0 is not considering daughter products in its ""proof of concept"" testing to determine SAC capabilities. There are ten constituents of concern identified for SAC Rev. 0 and these were selected on the basis that they are believed to have the greatest impact to human health and the environment. For the purposes of SAC Rev. 0, the radionuclides selected will be decayed on the basis of the temporal period addressed in the realization. There are numerous periods selected, including CY 2000 and 2050. As an example, if the realization is focused on the end of CY 2009, the inventory values projected for that period would be used and decayed appropriately. Future performance assessments, such as SAC Rev. 1 will incorporate lessons learned from SAC Rev. 0 and recommended performance parameters stemming from interface meetings with the regulatory community and stakeholders. Consequently, future performance assessments may address a broader suite of constituents, including differences in spacial and temporal parameters. Additionally, the request to incorporate decay daughters into the database will be factored into the call for data under the gaps and needs activity scheduled for the April timeframe under the identification number Inv-08. The intent of this data call is to document those data needs and gaps that exist. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A Outside of current project scope"	Resolved: Assigned to Data Gaps and Needs Table
SAC 99-013	Doug Hildebrand	DOE-RL	7/14/99	Inventory release of Reactor	Reactor cores - include air pathway release GENI or ARAC.	Air pathways will be excluded from SAC Rev. 0	Pending Assignment
SAC 99-014	Dave Holland	Ecology	7/14/99	Release Models	"Conceptual Model inadequate for review. Need more specific information on how release rates will be determined for key site groupings. In effort, I am already familiar with the Waste Sites but have little (or no) information on how SAC proposes to determine release rates."	"Initial response to issue: Details for the conceptual models were presented in appendices to the Preliminary Concepts document completed in September 1999 and available on the project webpage. Conceptual models will continue to be refined through the Characterization of Systems task. Supplement to initial response: A release model data package for SAC Rev. 0 implementation has been prepared and posted on the projects webpage (http://www.bhi-erc.com/vadose/sac.htm#info). The package describes in detail the release models and associated data sets to be applied in SAC Rev. 0 initial assessment and justifications for selected source terms that would not be assessed. Areas	Resolved

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						requiring attention for improving future release model capability is being identified through the Characterization of Systems task. Also provided at the same webpage is a report entitled "" Independent Testing of Release Models for SAC Rev. 0 Runs) funded by the SAC. Project. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A Outside of current project scope"	
SAC 99-015	Doug Hildebrand	DOE-RL	7/14/99	COC for Inventory	Include Am-241 as COC.	Initial response to issue: Americium-241 is not included as a contaminant to be modeled in SAC Rev. 0. It will be added to the contaminant-of-concern table for evaluation in future iterations of the SAC. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A	Resolved
SAC 99-016	Dave Holland	Ecology	7/14/99	Contaminant of Concern vs. Time Inventories	Near term of C of C's and Long-term C of C's should be different. Are both accounted for?	"Initial response to issue: Contaminants that will be important over a range of time periods will be considered in Rev 0. The contaminants of concern list will be revisited prior to each iteration of SAC development. Supplement to initial response: The contaminants included in the initial assessment performed with SAC Rev. 0 include contaminants that are anticipated to be contributors to near term risk (tritium, strontium) and contributors to longer term risk (Tc-99, carbon tetrachloride). Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-017	Dave Holland	Ecology	7/14/99	Inventory Scoping Study	Add a paragraph in the Inventory Scoping Study Report discussing the clustering of the remaining contaminants in the Inventory candidate set that did not make the final list of contaminants (study set).	"Initial response to issue: This comment was forwarded to the author for consideration. Supplement to initial response: The comment reflects discussions underway at the time that suggested that, in order to capture ""all"" of the risk attributable to Hanford, detailed risk assessments be performed for the priority contaminants, and the risk from the remaining contaminants be bounded with an ""all other"" term. While performing the screening, it was determined that the relative exposure from the contaminants recommended to be ""screened out"" of the assessment contributed only a tiny fraction of the total risk. Inclusion of an ""all other"" term would have essentially no influence on the calculated risks, adding about one-one millionth to the total (Appendix F to the scoping study). It was therefore recommended (page 7-2 of the study) that ""there is no necessity to add a surrogate contaminant to represent the all-other category."" Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-018	Dave Holland	Ecology	7/14/99	Feedback Loops	What is the feedback loops in the SAC process? For example: how do we know if the inventory scoping study eliminated a contaminant that should have been included because the contaminant is one that bio-accumulates through the food chain and results in significant impacts.	"Several methods ensure that a contaminant can be added back into the process - The contaminants of concern list will be revisited prior to each iteration of SAC development, a contaminant of interest can also be reevaluated through the issues process. The Project will complete a formal evaluation of	Pending Assignment

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SAC 99-019	Dib Goswami	Ecology	7/14/99	Database Availability	" The entire database to be used for the Rev. 0 SAC should be available for all (public, Regulators, Stakeholders and Tribal Nations) before it is used for the SAC-0."	issues in accordance with its issue management protocol"	Pending Assignment
SAC 99-020	Dave Holland	Ecology	7/14/99	Chemical Inventory	How are you going to account for chemicals that are not recorded? What kind of confidence level?	Initial response to issue: Process knowledge will be used to estimate inventory where records do not exist. The uncertainty of the estimates will need to be established at the time the estimates are made. Additional information on this approach was presented in appendices to the Preliminary Concepts document completed in September 1999 and available on the project web page. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A	Resolved
SAC 99-021	D. Goswami	Ecology	7/14/99	Tc-99 Balance	Tc-99 balance - Concern - How to deal with it?	"Initial response to issue: The RPP is developing a Tc-99 mass balance for Hanford Supplement to initial response: The staff from Characterization of Systems and the SAC inventory staff recognize the importance of maintaining mass balance, the reconciliation of competing values for inventory in question, and the need to identify uncertainties associated with contaminants of concern. This is an ongoing effort. Specific to Tc99, three integration meetings have been held with other contractors to address in part, the reconciliation of the Site Tc99 mass balance. The relevant core projects recognize there are uncertainties associated with the Tc99 inventory values. For the purposes of the SAC Rev. 0 performance assessment, these uncertainties are documented and accounted for. The Characterization of Systems and SAC will continue to facilitate, as an integration effort with other contractors and core projects, the importance of maintaining mass balance, the reconciliation of competing values for inventory in question, and the need to identify uncertainties associated with contaminants of concern. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. The recommended closing of this issue is with the understanding that maintaining mass balance is an ongoing effort. Additionally, there will always be some degree of uncertainty in total inventory for any given constituent at a particular place and time. On the basis of this understanding, keeping this issue open will serve no purpose. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-022	Doug Sherwood /Dib Goswami/ Dirk Dunning	EPA/Ecology/Oregon	7/14/99	Site Data	Sites that have 40 years of history contain only 20 year of data. Since the recording started which was much later. How to account the missing data?	"Initial response to issue: Process knowledge will be used to estimate inventory where records do not exist. The uncertainty of the estimates will need to be established at the time the estimates are made. Where waste sites have been characterized this information will be used to improve the estimates. Additional information on this approach was presented in appendices to the Preliminary Concepts document completed in September 1999 and available on the project web page. Supplement to initial response: Additionally, where estimates have been made, they are noted. This includes the methodology used to arrive at an estimated value. Heavy reliance was also placed on identifying the relevance of characterization data that could be applied, based on similar operational parameters and ratios of known contaminants. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. The	Resolved

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
						identification of estimated values where none exist to support performance assessments will continue using best professional judgement. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	
SAC 99-023	Dave Holland	Ecology	7/14/99	Missing Data	"Data known to be in WIDS is not in database, used and demonstrated during Bruce's presentation, (example: of Waste Sites 216-11, 216-10)."	Initial response to issue: The project recognizes that the database discussed on July 14 was incomplete. Additional data will be assembled prior to the use of this database in performing an assessment Supplement to initial response: Complete data has been assembled and placed within the SAC database Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Work already completed Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A	Resolved
SAC 99-024	Dave Holland	Ecology	7/14/99	Uncertainty and Significance	How is Uncertainty and Significance incorporated internally in Inventory Study? How will Uncertainty and Significance be used in interfacing with the fuller Rev. 0 Study? Comment: See me if this in not adequately clear.	"Initial response to issue: The uncertainty approach to be taken in SAC Rev. 0 is documented in appendices to the preliminary concepts document completed in September 1999 and available on the project webpage (http://erc), (i.e., September 30, 1999, Preliminary System Assessment Capability Concepts for Architecture, Platform, and Data Management). The approach to representing uncertainty in the inventory is also presented in those appendices. Additional detail on the propagation of uncertainty through the entire analysis can be found in the assessment design document, (i.e., BHI-01365, Draft A, May 2000, System Assessment Capability (Revision 0); Assessment Description, Requirements, Software Design, and Test Plan). Supplement to initial response: No other response is necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-025	Marty Bensky	Tri-Cities Caucus	8/10/99	Perceived Risk	"There are two related issues here, one probably just semantic and the other a significant issue that must be addressed as a policy issue that helps define how the project proceeds. The semantic issue concerns what we mean when we say that a risk is ""perceived"". ""Perceived"" might mean that some people believe there is a risk, but in truth there is not; call that Type I. Alternatively, ""perceived"" might mean that not only does a real risk exist, people are aware of it; call that Type II. When I speak of ""real risk"" vs. ""perceived risk,"" I am speaking only of Type I ""perceived risk"". Pubic awareness is not relevant to your task; the decision-makers must be informed about all significant risks, and you can't ignore a real risk just because no one seems to know about it. The important issue is deciding where you will stand and what you have to learn and pass on to the decision-makers about incredible hypotheses that will be formulated by hysteria-mongers and promulgated in the popular media. How much of your S&T resources will you devote to disproving wild-but-wildly-circulated theories? None, I hope. How much of your resources will you devote to hypothesizing about media attacks, pubic demonstrations and lawsuits if you don't address all the Type I ""perceived risks"" thrown you way? None, I hope. The decision-makers will include psychologists, budget experts, media gurus, and all the other soft-science types. Let engineers and scientists do what they know how to do and not try to figure out scenarios that might develop in the irrational part of the world."	"Initial response to issue: This issue is partially addressed in the Risk Assessment appendix to the Preliminary Concepts document completed in September 1999 and available on the project web page. Supplement to initial response: Under the Characterizations of Systems task, the Project has undertaken an evaluation of features, events, and processes that the System Assessment Capability (SAC) will address. The features, events, and processes (FEPs) process itself has multiple functions: Facilitating the complete evaluation of all processes that need to be considered in the future analyses; Allowing the traceability of the disposition of all comments and suggestions from project participants and stakeholders. Traceability includes developing the documentation of all analysis decisions, models, and data so that the results are reproducible by other analysts without intervention from the project analysts; Organizing and updating the requirements and capabilities of the SAC. In the evaluation of the FEPs, high-, moderate-, and low-priority features and processes were identified for the four areas of the Risk Technical Element - human health, ecological, economic, and cultural risk. A large fraction of the identified FEPs are already included in the SAC Rev. 0 capability. For some the high- and moderate-priority FEPS, scoping studies were suggested to help determine whether the features or processes identified should be included in future assessment capabilities. A total of six scoping studies were proposed for the human health area; drafts of these have been completed. A scoping study has been proposed for the economic area to quantify recreational activities along the Columbia River and their potential connection to the local economy. Another scoping study has been proposed for the cultural risk area in which regional Native American tribal inputs would be sought to identify additional features or processes that have been inadvertently omitted to date. Output required from issue resolution: This issue will be closed out with the following understanding. The perceived	Resolved

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
						<p>risk issue is addressed within SAC Rev. 0. The proposed scoping studies for the economic and cultural areas have merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification numbers R-11 and R-12, respectively. The DGN table will be updated periodically to provide a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table will document the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: The two proposed scoping studies, determining levels of Columbia River related recreational activities and their connection to the local economy and meeting with regional tribes to develop dependency webs that may highlight additional features, events, or processes to include in the analyses, will be identified in the data gap and needs call feeding the detailed work plan (DWP). Timeline showing when work is needed and how long it will take to complete: The timeline will be developed during the development of the data needs and gaps report and the FY 2002 DWP effort. Ranking of issues vs. other issues and vs. existing work: This is the only open issue in the SAC Risk Technical Element. The overall ranking of importance will be developed during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas."</p>	
SAC 99-026			8/10/99	Peak GW and Surface Water Concentrations for Unit Releases in 100/200 Areas	"1,2-Dichloroethylene has 2 (two) isomers: CIS-1, 2-Dichloroethylene and Trans - 1,2 - Dichloroethylene. The cis is more polars and therefore more water-soluble, this may effect the rate of transit through the vadose and groundwater. (See Issue, in book, for further example)"	Initial response to issue: This issue will be addressed when mobility characteristics of the contaminant are gathered should it be identified for simulation in future revisions of the assessment. Supplement to initial response: None Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A Outside of current project scope	Resolved
SAC 99-027					Issue #99-027 was originally assigned to an issue statement submitted by J. Peterson and M. MacDonell. Their statement now appears as the response to issue #99-051.	Refer to Issue #99-051	Pending Assignment
SAC 99-028	Barbara Harper	Yakama Nation	8/24/99	"Contaminants of a ""Risk Concern"" "	"See table already submitted for data input requirements. Any and all contaminates are a concern for cultural risk, so surrogates for all mobility types are needed. Co-migrating chemicals such as carbonates are also a concern for cultural risk even if they aren't from human health perspective. There may be other nitrate issues that were raised during the discussion."	"Initial response to issue: In response to this issue, SAC Rev 0 will examine 4 mobility classes of radionuclides and a representative metal and a representative chlorinated hydrocarbon. Supplement to initial response: As noted in the initial response, SAC Rev 0 is examining 4 classes of radionuclides, a metal, and an organic compound; these are listed in the table below (Kincaid et al. 2000). The tritium and technetium-99, in particular, should act as conservative surrogates for most unanalyzed contaminants. The Columbia River Comprehensive Impact Assessment conducted a screening study of all contaminants reported in Hanford soils, groundwater, sediment, and river water, and then preliminary assessment of them. Both of these studies indicated that inclusion of additional contaminants beyond those selected would add only small increments to the estimated risks (DOE 1998). An initial inventory scoping study was performed for SAC to investigate which contaminants in the Candidate Set should be included in the Study Set (Napier et al. 1999). This study, too, concluded that ""There is no necessity to add a 'surrogate contaminant' to represent the all-other category"" (Napier et al. 2000 page 7-2). Future performance assessments, such as SAC Rev. 1 will incorporate lessons learned from SAC Rev. 0 and recommended performance parameters stemming from interface meetings with the regulatory community and stakeholders. Consequently, future performance assessments may address a broader suite of constituents Table 1: Selected Radionuclides	Resolved

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
						to be Evaluated in SAC Rev. 0 and the Rationale for Selection. Radionuclides and Chemicals Included in the Initial Assessment Rationale for Selection Tritium, technetium-99 Both potentially significant dose/risk contributors: tritium for present day; technetium-99 for future. Both are highly mobile; field data exist for history matching. Iodine-129, uranium-238 Both are significant potential dose/risk contributors. Both are generally observed to be moderately mobile at the Hanford Site. Strontium-90, cesium-137 Significant quantities of these two fission products were generated and remain at the Hanford Site. They are generally observed to be less mobile than tritium, technetium-99, or iodine-129 in the Hanford Site sediments. Plutonium-239/240 Plutonium-239/240 have relatively long half-lives. Plutonium is a potential health risk if mobile. Carbon tetrachloride The largest chemical plume underlying the 200 West Area, except nitrate. Chromium Among the most significant chemical plumes in the 100 Areas. Total uranium Uranium included as a human health risk (i.e., toxin to kidney). References: DOE. 1998. Screening Assessment and Requirements for a Comprehensive Assessment - Columbia River Comprehensive Impact Assessment, DOE/RL-96-16, Rev. 1. U.S. Department of Energy, Richland, Washington. Kincaid, C.T. et al. 2000. Groundwater/Vadose Zone Integration Project System Assessment Capability (Revision 0) Assessment Description, Requirements, Software Design, and Test Plan, BHI-01365, Bechtel Hanford Inc., Richland, Washington. Available at http://www.bhi-erc.com/projects/vadose/sac/sacdocs.html Napier, B.A. et al. 2000. Groundwater/Vadose Zone Integration Project Inventory Scoping Study for the System Assessment Capability, Rev. 1, available at http://www.bhi-erc.com/projects/vadose/sac/InvScope.pdf Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	
SAC 99-029	Doug Hildebrand	DOE-RL	8/25/99	Direct Exposure	"Need to develop an approach to address assessing direct (surface) exposure at the surface, e.g., gamma, PCB. Develop working relationship of direct exposure and assessments."	These analyses will not be included in SAC Rev 0. They are currently included in many site specific assessments performed on the Hanford Site. SAC is not planning on duplicating these analyses. This topic will be explored as requirements are developed for future revisions of the SAC	Pending Assignment
SAC 99-030	Dave Holland/Damon Delistraty	Ecology	8/25/99	VZ Conceptual Model (G. Last)	"It is unclear to me why only four (4) RAD groups and two (2) chemical groups are modeled for transport. What are the limitations to modeling a suite of chemicals/RADs, (e.g., especially since CERCLA has already identified a wider suite of Chemicals/RADs)? If this is only a method demonstrating, will more chemicals be input later with the transport method and in future revisions?"	"Additional contaminants of concern will be considered. For each assessment, an appropriate set of contaminants of concern will be selected."	Pending Assignment
SAC 99-031	Dave Holland	Ecology	8/25/99	Risk from Inventory	"Direct Exposure at inventory existing in soils, sediments, and biota is not referenced in ""Predecessor"" component box."	Correct. Direct exposure is not being included in the SAC Rev 0 capability.	Pending Assignment
SAC 99-032	L. Nieves	Argonne National Lab	9/2/99	Screening Analyses in Research Phasing	"As presented at the SAC meeting on August 25, 1999, the research appears to be structured so that all modules are conducted concurrently and with little integration between them. No process was specified by which findings from the vadose zone modeling effort would influence the priorities, level of modeling detail, etc. in the groundwater model. Likewise, there was no process for findings regarding the distribution of contaminants from the river-related modules to influence the research priorities of the risk assessment. This could have important implications for the scope and cost of the risk assessment. For example, if there is only a very slight possibility that contaminants will reach the river in concentrations that exceed the present situation in hazard level, then major portions of the risk assessment scope, as currently drafted, are irrelevant. Since the research design is hierarchical, using the prior research modules to screen for priorities in the scope of successive modules will aid in developing an overall project scope that is feasible and that addresses the major issues. Evaluation is needed of the trade-off between a research plan that meets what are, perhaps, unrealistic deadlines versus one that focuses on the major issues and avoids unnecessary expenditures."	"Agree, an overall system approach needs to be taken."	Pending Assignment

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
SAC 99-033	Dirk Dunning	Oregon Office of Energy	9/2/99	Inventory Knowledge Characterization	"Little is known about the actual location of much of the waste generated at Hanford. Major characterization work is needed in all of the burial grounds, liquid and solid waste disposal sites, tank farms, shallow and deep vadose zone and other areas. The lack of precise knowledge about the location of this waste creates huge uncertainties about the risk from the waste and the risk at specific locations from the waste. Lacking identification of its actual fate, all potential locations must be considered to have the maximum potential burden for assessment of local affects and potential driving forces for movement. The larger sites will not need to over count the waste in total, but the maximum risk at all locations will need to be portrayed which will also require the presumption that the waste is in all possible locations."	"Initial response to issue: SAC 99-033-1. Much is actually known about the location and amount of waste disposed and discharged at the Hanford Site. However, our knowledge is incomplete and estimates of inventories for specific site can be highly uncertain, especially for some key radionuclides and chemicals of interest. SAC 99-033-2. Characterization conducted with the intent of developing an independent assessment of inventory is not achievable with any reasonable financial resource or within any reasonable time frame. It is not a credible objective or goal for any program where so many individual waste sites exist. SAC 99-033-3. Outline the modeling approach - its probabilistic basis - an approach that will enable locations to be assigned an inventory based on a distribution of minimum-to-maximum values during the simulation of 100 realizations. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-034	Dirk Dunning	Oregon Office of Energy	9/2/99	Inventory Element	"The inventory element of the SAC purported to use the Waste Information Database (WIDS) as its input. This database is incomplete and inadequate to the task, but is a necessary subset of the data needed to start assessing the completeness of the inventory at Hanford. However, the database assembled by the project failed to include most of the data from WIDS and grossly underestimated the amount of Plutonium, Americium and many other materials already known to reside in the environment. Despite these gross failings, the Inventory team wrongly attempted to use this inadequate and unreleased basis combined with a grossly oversimplified conceptual model to limit the nuclides and chemicals to be assessed in the Systems Assessment Capability. At best, the approach used can only determine those isotopes and chemicals, which have a certainty of needing to be assessed by the project. It has NO capability or credibility or scientific foundation for rejecting any nuclide or chemical from further study. There simply isn't enough data and the conceptual understanding of the site is too poor to do this. For credibility, it is essential that the database used by the Inventory team be constantly open to outside examination (preferably via the web) as it proceeds through draft stages."	"Issue Statement: The inventory element of the SAC purported to use the Waste Information Database (WIDS) as its input. This database is incomplete and inadequate to the task, but is a necessary subset of the data needed to start assessing the completeness of the inventory at Hanford. However, the database assembled by the project failed to include most of the data from WIDS and grossly underestimated the amount of Plutonium, Americium and many other materials already known to reside in the environment. Despite these gross failings, the Inventory team wrongly attempted to use this inadequate and unreleased basis combined with a grossly oversimplified conceptual model to limit the nuclides and chemicals to be assessed in the Systems Assessment Capability. At best, the approach used can only determine those isotopes and chemicals, which have a certainty of needing to be assessed by the project. It has NO capability or credibility or scientific foundation for rejecting any nuclide or chemical from further study. There simply isn't enough data and the conceptual understanding of the site is too poor to do this. For credibility, it is essential that the database used by the Inventory team be constantly open to outside examination (preferably via the web) as it proceeds through draft stages Initial response to issue: It is true that the database discussed on July 14,1999 was incomplete in terms of the waste inventory for all individual waste sites. The sum of the inventories represented however was very close to the known amount of radioactive material produced at Hanford. As a result the information is useful for taking a first look at which contaminants are likely to be of concern because of the mass on site, their mobility and their toxicity, and hence their likelihood to create impact. Supplement to initial response: Additionally, it is important to remember that the SAC Rev. 0 performance assessment is a ""proof of concept"" approach to verify it can be used effectively to represent the behavior and impacts associated with the selected contaminants of concern. While there was a basis for the identification of these top ten constituents, it is readily recognized that this is in fact a subset of the total constituents that may impact human health and the environment. Future assessments, such as SAC Rev. 1 will incorporate lessons learned from SAC Rev. 0 and recommended performance parameters stemming from interface meetings with the regulatory community and stakeholders. Consequently, future performance assessments may address a broader suite of constituents, including differences in spacial and temporal parameters. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved

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SAC 99-035	Dirk Dunning	Oregon Office of Energy	9/2/99	Project Openness	"During the presentation of the inventory conceptual model, the project staff presented the database and made conclusions from it. Simultaneously they refused to allow access to the database. For credibility, it is essential that the database used by the Inventory team be constantly open to outside examination (preferably via the web) as it proceeds through draft stages. It is unacceptable to use any database for any type of decision making in this project that is not fully open to review by anyone interested at any time."	The database was created to serve as a basis for discussion. The discussion at the July 14 meeting pointed out serious flaws in the site-specific information in the database. When the database for the SAC Rev 0 analysis is developed it will be publicly available	Pending Assignment
SAC 99-036	Dirk Dunning	Oregon Office of Energy	9/2/99	Declassification and Release	"DOE is currently working to declassify the large historic holdings at Hanford. This declassification effort does release records for public access, though there are several problems that need to be remedied. Because of the immense need for information and record access by this project, Openness, declassification and record release are properly major elements of this project. Older record declassification efforts failed to clear the records for access, as they did not do the full suite of privacy act and other reviews necessary for release. These need to be done. In addition, it is essential that the records and information be made truly accessible to the broad public, not just to those who can physically come to the Hanford reading room and manually thumb through physical documents."	The issue is not currently within the scope of the GW/VZ Integration Project.	Pending Assignment
SAC 99-037	Dirk Dunning	Oregon Office of Energy	9/2/99	Inventory Knowledge Scanning old records	"There is a very large need to scan in all old historic records (including records not legally defined as records) to find as much information as possible about the potential location, form and fate of wastes at Hanford."	This issue is not currently within the scope of the GW/VZ Integration Project.	Pending Assignment
SAC 99-038	Dirk Dunning	Oregon Office of Energy	9/2/99	Data Mining	"In addition to declassification and scanning of old records (including records not legally defined as records), there is a strong need for data mining and indexing tools to allow the rapid and reliable location of records and information needed for cleanup and for inventory recreation. PNNL developed just such a tool - SPIRE now Starline) for the Government. It is both appropriate and essential that these tools be applied to the mountain of historical paper and other records at Hanford. It is vital that this begins immediately. The need for this information is at the beginning of the project more so than at later stages. It is also important that whatever tools are used or developed, that they must be fairly fault tolerant. Scanning of old records will induce a number of artifacts ranging from microfiche and microfilm decay spots, hand markings, typestyle changes, dot matrix printings to simple scanning errors on spelling and type recognition. Despite these failings, the system should have a high rate of success in identifying important records and information and of clustering these records for review."	It is not within the scope of the GW/VZ Integration Project to develop such tools. The concept will be passed to PNNL.	Pending Assignment
SAC 99-039	Dirk Dunning	Oregon Office of Energy	9/2/99	Other means for Scanning and Data Mining	"Other Federal agencies, particularly the intelligence agencies, have expended large sums of taxpayer money developing data mining and data handling tools. DOE should actively seek to determine what tools these agencies may have which can be adapted for use at Hanford. These tools include both multi-spectral scanning tools better character recognition tools and data analysis tools. All are needed."	This issue is not currently within the scope of the GW/VZ Integration Project.	Pending Assignment
SAC 99-040	Dirk Dunning	Oregon Office of Energy	9/2/99	Satellite and Overflight Photos	"As a matter of routine, other Federal agencies have overflown the Hanford site and mapped it in a variety of light, radio and radar spectra. DOE should actively pursue obtaining as much of this information as possible and having it declassified. The older photographic records should be helpful in identifying burials and other disposals, as well as in showing the timing of various actions. Early in the Clinton Presidency, the President signed an executive order directing the agencies to do precisely this. DOE was unwilling to do so at the time. This Executive Order has since been weakened, but DOE still needs to aggressively pursue this information. If it is not forthcoming, DOE should seek the assistance of the President in obtaining the information."	"This issue is not within the scope of the GW/VZ Integration Project. It is not apparent that such information is available or that it would significantly help the inventory effort if it was. There would need to be an extensive effort to exploit such information, with questionable return on investment. This issue will be referred to DOE for investigation of feasibility and value."	Pending Assignment
SAC 99-041	Dirk Dunning	Oregon Office of Energy	9/2/99	MACTEC B&T	There is a large need to complete the MACTEC-ERS work for B and T tank farms		Pending Assignment
SAC	Dirk	Oregon	9/2/99	MACTEC	There is a large need to follow up on the recommendations from the MACTEC-ERS tank farm		Pending

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
99-042	Dunning	Office of Energy		Records	reports to analyze the old tank farm records for gamma logging to gain a better understanding of the fate and movement of wastes in and under the tank farms.		Assignment
SAC 99-043	Dirk Dunning	Oregon Office of Energy	9/2/99	Missing Plutonium	"According to the Secretary of Energy (Hazel O'Leary), there is 1.522 Metric tons of Plutonium unaccounted for at Hanford. This material may be in burial, in tanks, in liquid disposal, and in hold up in process. This represents a huge criticality hazard at numerous locations, an enormous environmental risk and a severe current and future proliferation hazard. This material must be found and accounted for. This will necessitate an in depth characterization and records search effort. This effort must not be limited to trying to account for where people think the material is. The material must be found to a high degree of certainty."	"Initial response to issue: The referenced report is ""Plutonium: The First 50 Years."" In the context of the report, plutonium is referred to as a product, or special nuclear material. DOE has very tight controls on the accounting of nuclear material because of safeguards and security. When the material is technically or economically unrecoverable and intentionally sent to waste, it is referred to as ""normal operating losses."" The plutonium in waste is presented on Table 16 of the report, which is repeated below for plutonium at Hanford. Location Plutonium, kg High-level waste in the tank farms 455 Solid waste in the burial grounds 875 Waste in cribs, trenches, and ponds 192 Total 1,522 kg The plutonium in normal operating losses is consistent with the amounts reported in waste. For example, the normal operating loss of 192 kg in cribs, trenches, and ponds is consistent with the inventory of 190,000 g (rounded) of plutonium that has been reported for TRU contaminated soil under the Hanford ER program. Supplement to initial response: No other response is necessary Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-044	Dirk Dunning	Oregon Office of Energy	9/2/99	"Organic Decay Project Mobilization of Plutonium and other Radioactive, hazardous materials"	"It has long been known that vegetative decay products (including but not limited to humic and fulvic acids and their breakdown products, enzymes and other biologically active constituents) mobilize metals, radionuclides and hazardous chemicals. They do this by a variety of mechanisms including reduction in valence state, chelation, and conversion of form and creation of very fine colloids. The Kd's for fulvic acid are often in the range of 0.06 to 0.08. Humic acid decays to fulvic and related breakdown products. Every common chemical functionality is represented in these molecules making them polyfunctional. They are by their nature biologically available. Argonne National Lab studies of actinide mobility with fulvic acid show them to effectively transport at nearly the same speed as groundwater. Humates are not generally mobile, but do breakdown and become more mobile over time. Materials, which bind to fulvic acid move with the fulvic acid, thereby, reducing high and very high Kd's to very low Kd's."	"Initial response to issue: The ILAW PA plans to use accepted test procedures to determine the pH dependence of waste form release as well as any special dependence caused by humic or fulvic acids. These tests will start once more basic data are obtained from a selected set of glasses thought to be characteristic of the glasses to be produced during ILAW manufacture. The project recognizes that this issue goes beyond how these acids effect glass solubility to how they act as chelating agents for radionuclides and metals. Supplement to initial response: None Output required from issue resolution: This issue will be closed out with the following understanding. The issue has merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification number VZ-04. The DGN document will be updated periodically and provides a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table also provides the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: The scope of this activity is to develop models and data sets to estimate the effects of vegetative decay products (including but not limited to humic and fulvic acids and their breakdown products, enzymes and other biologically active constituents) on the mobilization of metals, radionuclides and hazardous chemicals Timeline showing when work is needed and how long it will take to complete: TBD Ranking of issues vs. other issues and vs. existing work: The overall ranking of importance will be developed during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas."	Resolved: Assigned to Data Gaps and Needs Table
SAC 99-045	Dirk Dunning	Oregon Office of Energy	9/2/99	Actinide Colloids	Plutonium and other actinides form small geometry colloids (oxides principally) over time. These allow for the mobilization of Plutonium and actinides in a manner not represented by Kd's. These processes are time dependent and are not easily modeled by lab measurements taken over short time periods.	"Initial response to issue: Work is underway in several areas to help address these issues: The ILAW PA activity sponsored work on colloidal transport, resulting in the publication ""Colloid Suspension Stability and Transport Through Unsaturated Porous Media."" EMSP #70135. Colloid-facilitated Transport of Radionuclides Through the Vadose Zone. This research will study three major processes responsible for colloid-facilitated transport: formation and mobilization of colloids, association of	Resolved: Assigned to Data Gaps and Needs Table

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						<p>contaminants with colloidal particles, and co-transport of colloids and contaminants in the vadose zone. The results of this research will lead to improved conceptual models of colloid-facilitated transport at the Hanford Site. EMSP #70132. Speciation, Mobility, and Fate of Actinides in the Groundwater at the Hanford Site. The purpose of this research is to provide the basis for accurate modeling and prediction of actinide transport, thus allowing remediation strategies to use in-situ manipulations of geochemical variables to enhance extraction or to retard immobilization in groundwater. The question of what is the potential for colloidal transport in Hanford Site vadose zone and aquifer geologic formations, e.g., Hanford formation coarse- and fine-grained facies, Early Palouse Soil, Plio-Pleistocene (caliche), Upper Ringold, and Ringold Gravel is of interest to the SAC team and other efforts at Hanford. In particular under what conditions could radionuclides and chemicals be transported on colloidal particles in Hanford Site vadose zone and aquifer waters? Do those conditions exist? Supplement to initial response: None Output required from issue resolution: This issue will be closed out with the following understanding. The issue has merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification number VZ-05. The DGN document will be updated periodically and provides a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table also provides the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: The scope of this activity is to develop a white paper to summarize the state of knowledge and uncertainty regarding this issue. Can be combined with other white papers on valence shifting, and humic and fulvic acids. Timeline showing when work is needed and how long it will take to complete: TBD Ranking of issues vs. other issues and vs. existing work: The overall ranking of importance will be developed during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas."</p>	
SAC 99-046	Dirk Dunning	Oregon Office of Energy	9/2/99	Valiance Shifting	<p>"Plutonium and to a lesser degree other actinides shift valence states easily. The electropotential of the half-cell reactions for oxidation/reduction between the various valence states are such that Plutonium easily shifts between valence states. Valence 6+ Plutonium is a very slightly mobile as PuO₂+2 and far more mobile as a chelated fulvic acid PuO₂+2 complex or complexed with DBP and DBP breakdown product. Valence 5+ Plutonium behaves similarly as the PuO₂+ ion. Valence 4+ is effectively immobile as the neutral PuO₂ precipitate. However, this can form colloids and move as colloids and as bound neutral complexes. Valence 3+ Plutonium is anionic, presumably as the PuO₂- ion, which is highly mobile. This valence shifting causes simple Kd models of Plutonium behavior to be grossly inadequate. Also, reduction/oxidation potential is important particularly as it changes over time with slow washing of surface water containing 1-2 ppm humates and fulvates which drives the reduction of the Plutonium to the valence 3+ state. Also, the anion can and likely does bind to fulvates as a highly mobile neutral complex. Also, INEL has determined that Plutonium does undergo valence shifting to the 3+ anionic state and that this state is highly mobile. Indian researchers have similarly determined that Plutonium in aquatic environments tends to shift to the mobile anionic form (>51%)."</p>	<p>"Initial response to issue: If DBP and breakdown products were a significant mobilizing factor, Pu distribution on site should be similar to carbon tetrachloride distribution because they were released together. Field observations from the B-5 Reverse well the Z-1A Crib, and the Z-12 Crib, indicate this is not the case. Supplement to initial response: None. Output required from issue resolution: This issue will be closed out with the following understanding. The issue has merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification number VZ-06. The DGN document will be updated periodically and provides a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table also provides the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: The scope of this activity is to develop a white paper to summarize the state of knowledge and uncertainty regarding this issue. Timeline showing when work is needed and how long it will take to complete: TBD Ranking of issues vs. other issues and vs. existing work: The overall ranking of importance will be developed during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas. "</p>	Resolved: Assigned to Data Gaps and Needs Table

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SAC 99-047	Dirk Dunning	Oregon Office of Energy	9/2/99	Binding Coefficients	"As Plutonium and other actinides tend to be present originally as polyvalent cations, they tend to bind more tightly to organic detritus and breakdown products such as fulvic acid than many other competing cations. This likely increases the mobility of these materials."	"Initial response to issue: Sparse vegetation and low moisture yields extremely low concentrations of humic and fulvic acids. These are the conditions that exist for most of the Hanford Site. The role of humic and fulvic acids in soils in areas along the river with higher levels of vegetative cover will be considered for future data collection. Supplement to initial response: None Output required from issue resolution: This issue will be closed out with the following understanding. The issue has merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification number VZ-07. The DGN document will be updated periodically and provides a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table also provides the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: The scope of this activity is to develop a white paper to summarize the state of knowledge and uncertainty regarding this issue. Timeline showing when work is needed and how long it will take to complete: TBD Ranking of issues vs. other issues and vs. existing work: The overall ranking of importance will be developed during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas. "	Resolved: Assigned to Data Gaps and Needs Table
SAC 99-048	Dirk Dunning	Oregon Office of Energy	9/2/99	Bug and Bunny Pathway	"The project appears to fail to understand the need for the assessment to be comprehensive. Project Management stated that the biologic transport paths are excluded from consideration in by the Systems Assessment capability, that these are ""outside the scope of the project."" This is absurd. No assessment, which excludes any pathway, let alone potentially major pathways without demonstrating that they are unimportant, has any credibility at all. Lacking this in depth analysis and verification of potential alternate pathways, the project fails. It is vital that the project not fail and as a consequence, it is vital that the project take as its default position that the assessment includes all materials, all processes and all pathways until it can be conclusively shown that these materials, processes and pathways do not have a significant impact or effect on the movement of dangerous materials, or on the outcome of the potential risk and impact assessment to any plant community, animal group, the Columbia River ecosystem, or Human Health. There is a long history at Hanford of the movement of wastes through biological transport, including but certainly not limited to: Badger exhumation of waste followed by other animals contaminating over 16 square miles of surface; radioactive excrement found in buildings from rats, mice, voles, rabbits, coyotes, badgers, snakes, swallows, owls and others; radioactive urine from an equally broad set of animals, radioactive ants, gnats, and other bugs; radioactive mulberries; radioactive tumbleweed found across the whole site and off site areas, and numerous others. This is during a time when the site is under highly active institutional control that attempts to control this very hazard actively using burials, barriers, concrete, asphalt, herbicides, pesticides, rodenticides and other poisons. It has obviously failed even with these ""controls."" It must be expected to fail even more severely in the future. Human intrusion and well drilling cap bulldozing and other activities must be expected given the extraordinary length of time the waste will remain hazardous. Over these time periods, biologic transport becomes a stochastic process just as real as chemical transport, through more variables. It must be a major component of the assessment."	"The project understands the need to consider all pathways in a cumulative assessment. The project also embraces the CRCIA principle that in virtually all things a relatively small number of factors dominate the outcome. Some transport paths are not included in SAC Rev 0 so that efforts can be focused on including uncertainty calculations in the pathways that are included. Because the majority of the contaminant inventory will enter the river via groundwater, SAC Rev. 0 will include biological transport within the river, and from the river to the terrestrial environment. The air and additional biological transport pathways will be considered for inclusion in future revisions to the capability."	Pending Assignment
SAC 99-049	Dirk Dunning	Oregon Office of Energy	9/2/99	Uncertainty and Determinism	"The project has so far focused on using deterministic and stochastic models which assume a great many things are known about the source, inventory, form, interaction or lack of interaction, soil structure and composition, movement mechanisms, biologic uptake and impacts of radioactive and chemical wastes. Little of this is actually known. The project is assessing ""uncertainty"" by evaluating the variability of the assumed models based on the parameters input into the model."	"Initial response to issue: SAC 99-049-1 -- The SAC team is committed to examine both parameter and conceptual model uncertainty. The team is currently developing an uncertainty-based approach that propagates uncertainty throughout the simulation. The future risks are clearly not zero, and they are clearly not infinite. SAC 99-049-2 -- Simple models can be assembled that represent the physical possibilities. Such models, if properly parameterized, can give valid information about the lower and	Resolved

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					This grossly understates the true uncertainty and is scientifically invalid for assessment of the true risks. A true uncertainty analysis is essential or the output of the model may have no value itself, no credibility and may seriously mislead the public and decision-makers. Given the very large number of unknowns and the large geographic area of the site, it is all but certain that the propagation of the large uncertainties about these various factors will lead to true outputs in which the value of uncertainty is so large and so much greater than the value of the calculated risk and impact measures that it renders them totally and completely meaningless for any purpose whatsoever. It is vital this not occur. It is vital that the uncertainty be fully and truly examined and propagated through the analysis so that the public and decision-makers can assess whether the model output has any meaning or utility at all."	upper extremes and the distribution of possible results. In fact, simple models are better for this type of analyses than complex ones, because they require fewer assumptions. SAC 99-049-3 -- The propagation of large uncertainties ""will"" lead to the output with ""uncertainty so large and so much greater than the value of calculated risks"" that the analysis is meaningless Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	
SAC 99-050	Dirk Dunning	Oregon Office of Energy	9/2/99	Monte Carlo Models and Uncertainty	"The project staff, public, and decision-makers must understand the severe limitations of Monte Carlo modeling; 1. Monte Carlo is a model. In only presents results based on the mathematical rendering of the conceptual model used. It is limited to only assessing the way that the conceptual model ""wiggles"" as its' input parameters are changed. 2. It does not provide any degree of assessment of the variations of the conceptual model itself. 3. It does not provide insights into the large-scale changes that can occur in outputs with relatively minor changes in conceptual model structure. 4. It does not propagate the natural variation in natural parameters, either as a uniform range, or as a changing gradient through strata. This in turn means that large dispersions that occur due to these factors are not portrayed in the output. 5. Even though simultaneous variation of many parameters occurs, this does not mean that the model adequately or fully represents the interlinkage of parameters and their covariance's. 6. The Monte Carlo output typically is displayed as a range, which often looks like a normal or lognormal distribution. It is vital to remember that this has very little to do with uncertainty and a great deal to do with assessing the ""wobble"" of the model subject to its parametric inputs. 7. The mean or midpoint of these output distributions has little meaning in relation to the reality in the soil, (i.e., there is a tendency for people to over interpret these ranges as being meaningful assessments of the uncertainty, rather than more properly assessing them as being closely akin to probability distributions of where the true mean may lie - assuming the conceptual model and its mathematical implementation are nearly correct and not missing major elements - given the drawbacks and failings associated with the model and the lack of covariant uncertainty and dispersion distribution)."	"Initial response to issue: Three commonly used techniques for performing uncertainty analyses were reviewed when alternate SAC architectures were being evaluated; analytical propagation, Monte Carlo with random sampling, and Monte Carlo with specialized sampling techniques. Based on its successful application to large scale problems (e.g. Yucca Mountain and Waste Isolation Pilot Plant) and especially for problems involving mass transport in groundwater systems, the SAC will employ a Latin Hypercube sampling technique applied with a Monte Carlo analysis. Because it is the preferred approach within the technical community for large scale problems, this approach is being adopted for SAC Rev. 0 and all subsequent revisions of the capability. The applicability and limitations of the Monte Carlo method, as applied to the SAC Rev. 0 will be noted in the application report. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-051	Dirk Dunning	Oregon Office of Energy	9/2/99	DREF	"There is no scientific basis for the use of a Dose Reduction Equivalence Factor in any of the risk calculations. The DREF was artificially and arbitrarily inserted into the dose response equation for radioactive exposures by the International Council on Radiation Protection and its' National Council on Radiation Protection counterpart. Neither of these bodies satisfy the requirements of the Federal Advisory Committee Act for balance, openness or other factors. As a result, the product of these bodies is not usable by DOE or other federal agencies. The DREF was inserted arbitrarily and assigned the value of 2 because the members felt that low dose rate exposure was less harmful than high dose rate exposure. This was assessed to be true because cellular repair mechanisms take place that are/were felt to overcome some of the harm. Though there are such repair mechanisms, these are not limited in their application to radiation induced harm. Cumulative impacts from other mechanisms and other radiation exposure also take their toll on this reservoir of capability. It is inappropriate for any single source of exposure to take credit for this repair ability to allow greater exposure."	"Initial response to issue: The dose and dose rate effectiveness factor (DDREF) is used to correlate the latent cancer fatalities (LCF) risk at low doses with risk factors obtained for high doses. Direct observations of radiation-induced cancer have been limited to high doses delivered over short periods of time, such as those received by the Japanese atomic bomb survivors. Similar effects have not been observed at low dose rates to large groups of exposed individuals. The cellular damage caused at low doses and low dose rates is more likely to be repairable by the human body than a large dose delivered at a high dose rate. The likelihood of multiple ionizing events in critical parts of the cell is increased as the dose and dose rate is increased. At very high doses and dose rates, cell killing can occur. This is a nonlinear effect, i.e.; the likelihood of LCF increases as the dose rate increases for the same collective dose. To account for these biological effects and be consistent with direct observations of individuals exposed to radiation, the health risk factor obtained from exposures at high doses and high dose rates (LCF per rem) is adjusted to more accurately reflect the effects at low doses and low dose rates. Use of a factor of 2 for low linear energy transfer (LET) radiation (such as would occur from external exposure to gamma and X rays) has been recommended by the International Commission on Radiological Protection (ICRP) as a reasonable (but conservative, i.e., low) value, as discussed in ICRP Publication 60 and the Committee on the Biological Effects of Ionizing Radiation (BEIR) V report. This value of 2 has generally been extended to use with the total effective dose equivalent (TEDE), which is the sum of the effective dose equivalent from external exposures and the 50-year committed effective dose equivalent for internal radiation doses. The biological effects of high LET	Resolved

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						<p>radiation (such as would occur from internal doses from alpha particles) are accounted for in the TEDE by use of a quality factor. For example, the quality factor for alpha particles is 20 while that of gamma rays is 1. This approach is also consistent with recommendations of the National Council on Radiation Protection and Measurements (NCRP). It is the policy of the Department of Energy (as identified in Order 5400.5) to incorporate recommendations on radiation protection issued by authoritative organizations such as the ICRP and NCRP. (As a note, the NCRP is an independent scientific advisory organization chartered by Congress to develop recommendations on radiation protection.) For example, this approach was used when calculating the likelihood of a LCF associated with operation of the Waste Isolation Pilot Plant in the recent supplemental environmental impact statement for that project. This approach is felt to be realistic but conservative (i.e., protective), and most representative of current scientific knowledge about the health effects associated with low doses of radiation delivered at low dose rates. For these scientific and policy reasons, we suggest that the SAC consider applying standard, broadly accepted approaches such as described above to estimate radiation risks as part of the integrated assessment process, along with a brief explanation of their bases. Supplement to initial response: There is not an explicit incorporation of the DDREF in SAC Rev. 0. In its place, the human health risk calculations use a stochastic dose-to-risk conversion factor that incorporates the acknowledged wide range of uncertainties about the health effects of low-dose and low-dose-rate radiation exposure. A number of models for extrapolation from the high-dose observations available from the Hiroshima-Nagasaki survivors and therapeutic medical irradiations are available. Some indicate that the effects of low-dose radiation are less severe than from high-dose exposure, and others do not. SAC staff are also keeping abreast of current studies of health effects in populations irradiated in the former Soviet Union. The uncertainty distribution of dose-to-risk conversion factor selected for the SAC Rev. 0 analyses incorporates all of the range of the current observations. In future analyses, this factor may be modified to reflect newer findings. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"</p>	
SAC 99-052	Dirk Dunning	Oregon Office of Energy	9/2/99	Sensitive Species	"For sensitive species, including rare, threatened or endangered species, it is essential that they be assessed and protected as individuals rather than as groups or members of a population. It is essential that all such species be regarded as species for which impacts must be assessed. It is unacceptable to use other species as surrogates for such species."	<p>"Initial response to issue: The risk or impact to species, including threatened or endangered species, are commonly assessed for individual organisms (National Science and Technology Council, Ecological Risk Assessment in the Federal Government, 1999). Individual risks to endangered species are assessed because of the assumption that adverse effects on an individual will have devastating effects on the population (SETAC News, November 1999). At issue is whether populations should also be assessed for species of concern. The use of surrogates for estimating exposure parameters and health responses for threatened or endangered species is acceptable to other Federal agencies, including the U.S. Fish and Wildlife Service. Performing studies on individuals of a threatened or endangered species is unacceptable to Federal and State agencies. Therefore, toxicological information on threatened or endangered species does not often exist (e.g., radionuclides and bald eagles). The use of surrogates or data from prior studies of surrogates will be noted in SAC documentation. Certainly, where prior studies have been conducted on threatened or endangered species, available data will be utilized (e.g., heavy metals and steelhead). At issue is whether surrogates should be used. The Project supports use of surrogate species to study sensitive, rare, and especially threatened, or endangered species. Supplement to initial response: The ecological risk code incorporated into SAC Rev. 0, ECEM, explicitly evaluates individuals of modeled species. The species to be considered in SAC Rev. 0 analyses include those identified in the Columbia River Comprehensive Impact Assessment, Part I, Section 4.1 (DOE 1998). These include the following: Algae: periphyton and phytoplankton Amphibians: Woodhouse's toad (tadpole, adult) Aquatic</p>	Resolved

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						<p>invertebrates: clams/mussels/snails, crayfish, fresh water shrimp, mayfly, and water fleas Birds: American coot, American kestrel, American white pelican, bald eagle, California quail, Canada goose/mallard, cliff swallow, common snipe, diving ducks, Forster's tern, great blue heron, and northern harrier Emergent vegetation: tule Fish: channel catfish, common carp, largescale sucker, mountain sucker, mountain whitefish, Pacific lamprey (juvenile), salmon (eggs, larvae, adults), small mouth bass, rainbow trout (eggs, larvae, adults), and white sturgeon Fungi: as a taxonomic group Macrophytes: Columbia yellowcress and water milfoil Mammals: beaver, coyote, mule deer, muskrat, raccoon, weasel, and western harvest mouse Reptiles: side-blotched lizard and western garter snake Terrestrial vegetation: black cottonwood, dense sedge, ferns, reed canary grass, rushes, and white mulberry. There are two categories of impacts that will be measured in the SAC (Rev. 0) ecological risk assessment that will demonstrate an adverse impact from a contaminant to an ecological receptor. The species of interest will be the Columbia River species as determined in the CRCIA, Part I (DOE-RL 1998a). The metrics include the following: 1. Impacts on individual species will be measured by modeling the exposure of a species to a contaminant, and then comparing the dose or body burden of the species to a toxicity parameter (e.g., the lowest observed adverse effect level [LOAEL]). The results will be location and time specific, and the measure will be no effect, chronic effect, or potential acute effect (using a toxicity benchmark). 2. Impacts on ecosystems will be estimated as a post-processing function by analyzing food web impacts and adverse changes to the ecosystem structure and function. This analysis will be performed after processing impacts and will be based on typical outputs from ECEM. The ecosystem impacts will be described through an analysis of higher-level effects on the structure and function of the Columbia River ecosystem. This analysis will be based on the guild structure of the Columbia River species and on a food web of this ecosystem, which for Rev. 0 will consist of the food web in the CRCIA version of the ECEM. The guild structure combines Columbia River species into groups on the basis of shared aspects of lifestyle, habitat affinities, and trophic relationships. The food web identifies the consumption patterns of the primary species within this ecosystem (i.e., as aspect of the ecosystem structure). The analysis will use the impacts on species (as mentioned above) and be converted to relative losses of numbers (or biomass) through simple population-effect models. Effects on guild members will be tallied to provide an index of relative impact on species guilds within the Columbia River system. Effects on biomass flows within the system will be estimated using a linear algebra model. In this model, the relative consumption fraction matrix of the food web is premultiplied by abundance (kg/m²) and an abundance reduction due to exposure (unitless), and postmultiplied by predator ingestion rate (kg prey/kg predator/day) and time of simulation (days) to obtain mass flows from each prey item to all predators (kg/m²). Effects from different exposures will be apparent as changes in mass flows under those differing conditions over time. Ecological impacts associated with the Columbia River will be based on two runs of the river module: background and non-Hanford contribution, and Hanford Site contribution superimposed over background and non-Hanford contribution. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"</p>	
SAC 99-053	Dirk Dunning	Oregon Office of Energy	9/2/99	Lack of Agreement and Human Health Risk	"Slide 19 of the August 10, 1999 System Assessment Capability Risk & Impacts Technical Element Presentation purports to reduce the scope of evaluation to six bulleted items. There has been no agreement that these items are sufficient, or that other important items have not been excluded."	"Agree, a subset of all possible metrics was selected for SAC Rev 0 to demonstrate the capability. Additional metrics will be evaluated for inclusion in future assessments."	Pending Assignment

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
				Conceptual Model			
SAC 99-054	Dirk Dunning	Oregon Office of Energy	9/2/99	Economic Analysis	"The state of environmental harm economic analysis capability has improved greatly in the last 25 years, particularly following the Exxon Valdez oil spill into Prince Williams Sound, and its' consequent impacts on the Sound. Economic analyses of the costs to the environment are now reasonable and possible and have been done well on a number of occasions. These should be a part of the analysis on this project. However, they should not extend into the use of discounted cash flow analysis or the horribly egregious discounted human life analysis. These are neither valid nor ethical. And, they are particularly flawed for application to time periods spanning longer than decades, let alone millennia."	"nitial response to issue: The economic impacts to be considered in Rev 0 are identified in appendices to the Preliminary Concepts document completed in September 1999 and available on the project web page. Additional economic impact analyses will be considered for inclusion in future assessments. Discounted human life will not be used in the planned analysis. Supplement to initial response: As noted above, discounted human life will not be used, nor will discounted cash flow analyses. The focus will be on economic impacts in the Columbia Basin at whatever time they are predicted to occur. The full list of metrics has been presented in Kincaid et al. (2000), Appendix B. Kincaid, C.T. et al. 2000. Groundwater/Vadose Zone Integration Project System Assessment Capability (Revision 0) Assessment Description, Requirements, Software Design, and Test Plan, BHI-01365, Bechtel Hanford Inc., Richland, Washington. Available at http://www.bhi-erc.com/projects/vadose/sac/sacdocs.html Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-055	Dirk Dunning	Oregon Office of Energy	9/2/99	Tank Wash pH	"It has been documented that the reported pH values for tank waste have no validity. pH analysis is only valid under limited conditions. It is highly subject to ionic interference from high salt strength solutions. pH measurement is highly subject to interference by prolonged exposure or repeated exposure to highly caustic conditions. pH measurement is subject to poisoning by high salt and high pH conditions. The glass of the probes are subject to rapid decay from corrosion and plugging at high pH values and in high ionic strength salt solutions, as well as by organics and precipitates. All of these conditions occur in the Hanford tank waste. In previous discussions with PNNL, it was apparent that none of these were recognized. DNFSB also followed up on this only to learn that the pH readings are indeed invalid. This has serious consequences in the analysis of the chemistry model from Los Alamos. The partition and distribution of various elements and forms is highly subject to pH variation. Since these historic records are invalid, the distributions will forever remain uncertain. It is important that this be recognized and that the model inputs include a reasonable and validated assessment of the uncertainty bounds for the modeling. Work is needed to change the pH measurement procedure to make it valid. This will probably require dilution and comparison against causticity measurements. It will also likely necessitate the fairly frequent measurement of the pH probe millivolt potential against a range of at least seven standard solutions to ensure that the pH probe is still responding linearly and properly."		Pending Assignment
SAC 99-056	Dirk Dunning	Oregon Office of Energy	9/2/99	Kd's Crude	"Kd values used at Hanford are too often crude measurements or values used as surrogates when little or nothing is known about the actual behavior in Hanford soils. These values too often utilize a single Kd value to represent behavior across a broad range of soil types and conditions. When values are measured, they are often assessed from a very few measurements of Kd from a homogenized soil sample. These measurements suffer a number of major failings. 1. The soil is not homogenized. The porosity, permeability and channeling character of the soil form potentially important aspects in the actual movement of the waste, which may be poorly represented by the use of a Kd value, determined on a homogenized sample. 2. The use of a single or limited number of soil samples provides no assessment of the range of distribution or uncertainty in the actual Kd value which would be representative of the real soil structure. The uncertainty that the lab reports for the Kd's is not an uncertainty of the Kd in the actual soil. It is a measure instead of the uncertainty of the lab measurement of the Kd of the homogenized sample. 3. The Kd values reported by the lab at Hanford are highly subject to question. The lab has produced a statistically significant number of statistically significant negative values for Kd on a number of isotopes. The	"Initial response to issue: The Tank Farm Vadose Zone Project has collected subsurface soil samples from the SX tank farm which are likely to have been the most impacted by tank waste. Geochemical studies are being performed to determine the adsorption/absorption of important contaminants of concern to these samples. In addition, the concentrations of such contaminants are various points along their pathway will provide information about the relative rate of movement among contaminants as well as the absolute rate. Physically, a negative Kd is impossible because it would indicate that the chemical species moves faster than the water in which it is transported. Chemical gradients resulting in diffusion could produce this effect but at a negligible level. A negative Kd is an artifact of normal laboratory error and the Kd calculations. For a batch measurement, the Kd is: $Kd = Cs / Ci$ Where Cs = concentration of the solid phase (activity/g) Ci = concentration in solution (activity/ml) Kd = distribution coefficient (ml/g) The solid phase activity is almost never measured directly but is calculated from the difference between the input solution concentration (Co) and the equilibrium solution concentration (CI) when in contact with the solid phase. If the Kd is near zero, these two numbers are nearly equal. Their difference is the normal lab error for the two measurements. This	Resolved: Assigned to Data Gaps and Needs Table

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					lab has responded to this by discarding the negative values and substituting zeros. This is unacceptable. If the lab actually measured negative Kd's, then this is meaningful and should be used in the models. If they did not measure actual negative Kd's, then the entire lab analysis procedure is thrown into question and ALL of the labs Kd values must be subjected to serious scrutiny. This latter situation implies that there is something dramatically wrong with the analytical procedures or methods used for measuring Kd and that none of the reported values should be accepted. 4. Kd's are only useful for modeling the movement of wastes when the soil is relatively uniform and the wastes are in near infinite dilution with chemical makeup and distribution similar to that used in the measurement of the Kd behavior of the soil. This is decidedly untrue of a large number of wastes and waste sites at Hanford. Wastes, which are highly concentrated, heated, oxidizing, reducing, or otherwise away from the norm, cannot be reasonably modeled by use of Kd's determined in near infinite and near normal water conditions. These wastes have the capability of chemically interacting with and destroying the soil structure. This in turn can lead to some materials binding to soil components and then being freed as small colloids. It can also lead to the destruction of soil components that chemically change the waste and the soil, such as acid destroying caliche and both mobilizing Uranium as a oxycarbonate complex while also destroying the caliche which would otherwise impede waste movement. 5. Use of multizone Kd's is equally invalid. The waste movement itself could well be causing the waste to behave as if it had different Kd behavior. As a result, the Kd moves with the waste."	error could result in CI being greater than Co resulting in a negative Kd. If the scientists making the determinations are technically rigorous in reporting their work, the negative values will be reported. This is what Kaplan and Serne did in their report. At the same time they noted that ""negative Kds are physically impossible and represent analytical or laboratory error."" Supplement to initial response: None. Output required from issue resolution: This issue will be closed out with the following understanding. The issue has merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification number VZ-09. The DGN document will be updated periodically and provides a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table also provides the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: Work is underway to initiate the development of a Kd database. We recommend that a white paper be prepared that reviews and evaluates this extensive database to summarize the state of knowledge and uncertainties regarding the Kd approach used in SAC Rev. 0 with recommendations on how to improve this approach for SAC Rev. 1. Timeline showing when work is needed and how long it will take to complete: The draft distribution coefficient database is scheduled for completion by September 28, 2001. Preparation of the white paper is TBD. Ranking of issues vs. other issues and vs. existing work: The preparation of the database is already underway. The overall ranking of importance for the white paper will be conducted during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas."	
SAC 99-057	Dirk Dunning	Oregon Office of Energy	9/2/99	Barrier Long Term Loss of Integrity	"The project and DOE appear prepared to assume that surface barriers will have long lives and will last until they decay of their own accord. This fails grossly to consider either the historic failure of barriers under the RCRA program or the human destruction of barriers soon after project completion. EPA has experienced a high rate of ""premature"" failure of barriers under RCRA from natural causes that were not fully considered in the design of the barrier systems. These failures include slumping, biologic intrusion by plants and animals, flooding damage, erosion, animals causing ruts and many other factors. The U.S. has also suffered a number of barrier failures from human intrusion. The most classic example of this was when the local school board condemned the property that Hooker Chemical had used as a chemical disposal facility and capped at Love Canal, New York. The locals then graded the site and built a school on it. In this process, they violated the integrity of the barrier. Long term institutional control is not possible, unless the barrier system itself is designed so as to actively discourage human intrusion in, on or through it. Even short-term institutional control (30 to 100 years) is highly questionable. The SAC analysis must take all of these into consideration and assess the impacts of these failures as a major aspect of the analysis. It is unacceptable to treat this as a later add-on exception analysis or intruder scenario. These intrusions will occur and must be expected."	SAC Rev 0 will use the Hanford Site Disposition Baseline (As defined in the CRCIA Part II document) for the Rev 0 analysis including assumptions about longevity of barriers. Alternatives to this baseline will be considered in future assessments performed using the SAC	Pending Assignment
SAC 99-058	Dirk Dunning	Oregon Office of Energy	9/2/99	Linear Model	"The SAC, Rev. 0 model as currently proposed is a highly linear, over limited, over reduced subset of the actual model elements needed. Everyone involved from management, decisions makers, through the experts, the stakeholders, the Tribes and the public must be made aware that NO aspect of the outputs from this model will be useable for any purpose, except potentially to gain some small insights into some important parameters needed for the rev 1 model."	The limitations of the analysis will be included in the documents presenting the results of the analysis	Pending Assignment
SAC 99-059	Dirk Dunning	Oregon Office of Energy	9/2/99	Base Assumptions	"The SAC model presumes to use a series of baseline assumptions, which have no justification and no validity. These are predominantly arbitrary assumed end states, which lack any basis in legal decision making."	SAC plans to use the approach proposed in the CRCIA Part II document for developing a baseline set of assumptions for the initial assessment. This approach was called the Hanford Site Disposition Baseline in that document.	Pending Assignment
SAC	Dirk	Oregon	9/2/99	Groundwa	"The Groundwater element of the model has to date failed to assess and validate its assumption	"Initial response to issue: None Supplement to initial response: This issue is being addressed as part	Resolved

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99-060	Dunning	Office of Energy		ter Inputs	that the flows in Cold Creek and Dry Creek are as low as the modelers presume and that no other flows into the site from faults occur. There is no reason to believe that there is not substantial input of water into the unconfined aquifer from the Rattlesnake, Yakima and Umtanum faults, as well as the Cold Creek and May Junction faults. These are major faults in the groundwater modeling effort. Cold Creek and May Junction faults. These are major faults in the groundwater modeling effort. Cold Creek and May Junction faults. These are major faults in the groundwater modeling effort. Cold Creek and May Junction faults. These are major faults in the groundwater modeling effort."	of the ongoing development of the Hanford Sitewide Groundwater Model, specifically with regard to alternate conceptual models being developed to evaluated uncertainty in the model. Alternate conceptual models that include water inputs from the basalt-confined aquifers at geologic faults, erosional windows, and through dense basalt layers are currently being developed and calibrated. Output required from issue resolution: Current status of issue and provision of any existing resolutions: Ongoing effort. Scope of work to resolve the issue: Timeline showing when work is needed and how long it will take to complete: Ranking of issues vs. other issues and vs. existing work: TBD"	
SAC 99-061	Dirk Dunning	Oregon Office of Energy	9/2/99	Groundwater Flow	The groundwater model proposes to treat the May Junction and other faults faces as if they are smooth transitions rather than as the course discontinuities cross connecting layers that they really are. This may create large errors in the model output.	"Initial response to issue: None Supplement to initial response: This issue is being addressed as part of the ongoing development of the Hanford Sitewide Groundwater Model, specifically with regard to alternate conceptual models being developed to evaluated uncertainty in the model. Conceptual models that represent alternate interpretations of the May Junction fault are planned as part of this effort. Output required from issue resolution: Current status of issue and provision of any existing resolutions: Ongoing effort. Scope of work to resolve the issue: Timeline showing when work is needed and how long it will take to complete: Ranking of issues vs. other issues and vs. existing work: TBD"	Resolved
SAC 99-062	Dirk Dunning	Oregon Office of Energy	9/2/99	Groundwater Specific Flow Channels	"EPA and DOE have both now confirmed that it has long been known those groundwater flows in high flux channels through the soil of widely varying character. EPA conceded that the plume line models which show uniform flow boundaries in the 100 area and elsewhere on the site are artifacts of the computer tools used and have little to do with the actual flow of wastes and the actual plume distributions. This dramatically changes the conceptual models for the entire Hanford site. It should also have been expected based on the hydrologic and geologic history of the site, the former location of the Columbia River channel, the flow features from the flood events at the end of the last Ice Age and other factors. All of these need to be reflected in the site conceptual groundwater and vadose zone models."	Need clarification of issue. Please provide sources where EPA/DOE made statements so that this issue can be adequately addressed.	Pending Assignment
SAC 99-063	Dirk Dunning	Oregon Office of Energy	9/2/99	Clastic Dikes and Flow Channels	"In the last few years, the expert panels have pointed out the likelihood of rapid waste movement through specific soil features. Included in these are clastic dikes and other features. Little is known about the actual size, distribution and behavior of these features at Hanford or of the interaction of Hanford wastes with these features. This must be remedied."	"Initial response to issue: Karl Fecht et al recently published an extensive review (BHI-01103) of clastic dike information, ""Clastic Injection Dikes of the Pasco Basin."" Work performed by the ILAW PA on clastic dikes is published in the geology and far-field hydrology data packages for the 2001 ILAW PA. This work is continuing in FY2000. The ILAW PA activity is also sponsoring work on extending ground-penetrating radar to deeper depths. These ILAW PA tasks are being performed in cooperation with EMSP awards. Relevant EMSP activities include: EMSP #70069. Fast Flow in Unsaturated Coarse Sediments. This research will improve our understanding of unsaturated flow in coarse- to very coarse-textured sediments. Through development of new conceptual models and laboratory experiments on fast flow processes, results will help to predict contaminant transport in vadose environments. EMSP #70149. The Dynamics of Vadose Zone Transport: A Field and Modeling Study Using the Vadose Zone Observatory. This research program will characterize vadose zone fluid flow and contaminant transport processes for the purpose of making improved estimates of contaminant release rates and fluxes across the vadose zone to the water table at DOE sites. EMSP #70187. Quantifying Vadose Zone Flow and Transport Uncertainties Using a Unified, Hierarchical Approach. The research project will develop and demonstrate a general approach for modeling flow and transport in a heterogeneous vadose zone. The approach will use geostatistical analysis, media scaling, and conditional simulation to estimate soil hydraulic parameters at unsampled locations from field-measured water content data and a set of scale-mean hydraulic parameters. The research will help to elucidate relationships between the quantity and spatial extent of this characterization data and the accuracy and uncertainty of flow and transport predictions. EMSP #70193. Influence of Clastic Dikes on Vertical Migration of Contaminants in the Vadose Zone at Hanford. This research will investigate the possibility that clastic dikes at the Hanford Site provide preferential pathways that enhance the vertical movement of moisture and contaminants through the vadose zone. The new characterization techniques to be demonstrated in the project could be applied at other contaminated vadose zones at Hanford, as well as at other sites where vertical faults influence the contaminant	Resolved

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						transport through sediments. EMSP #70219. Fate and Transport of Radionuclides Beneath the Hanford Tank Farms: Unraveling Coupled Geochemical and Hydrological Processes in the Vadose Zone. This research will provide an understanding and predictive capability of coupled hydrological and geochemical mechanisms that may be responsible for the enhanced migration of radionuclides in the vadose zone at the Hanford Site. Unsaturated flow and transport experiments, combined with multiple tracer strategies and novel surface analyses, will provide knowledge in previously unexplored areas of vadose zone contaminant transport EMSP #70267. A Hydrologic-Geophysical Method for Characterizing Flow and Transport Processes within the Vadose Zone. This research will analyze flow within a mid-scale hydrologic test to determine the amount of transport within the vadose zone. This project will employ numerical and experimental tools being developed under a previously funded EMSP proposal. Results will help to better understand flow and transport modes within the vadose zone at DOE sites, including the influence of natural heterogeneities and man-made structures. Supplement to initial response: None Output required from issue resolution: This issue will be closed out on the basis of the ongoing work within EMSP to address key aspects of the issue. A summary of the ongoing work is described in the initial response to the issue. Current status of issue and provision of any existing resolutions: This issue is closed out. Scope of work to resolve the issue: The scope to address this issue is described in the initial response and is on going in other projects and S&T. Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	
SAC 99-064	Dirk Dunning	Oregon Office of Energy	9/2/99	Acoustic Mapping	"Because of the large number of uncertainties about the subsurface at Hanford, it is important that DOE commence an examination of the character and mapping of the subsurface. This should begin with seismic soundings of the entire site looking for detailed information on fault structures, layering and soil types. This should be followed up by well drilling to confirm the information obtained and to provide additional details on areas of particular interest."	"Initial response to issue: Seismic techniques were used during the Basalt Waste Isolation Project to map the location of the top of basalt and to identify fault locations. Results were verified through drilling at a number of locations. This information is included in the current conceptual models for the site. The Tank Farm Vadose Zone Project is looking into how to better use thermal imaging to infer high-heat sources. Supplement to initial response: None Output required from issue resolution: This issue will be closed out with the following understanding. The issue has merit and will be considered for pending future work scope and documented within the Characterization of Systems - Data Gaps and Needs (DGN) Table. The DGN table is under development and should be available for access on the Ground Water Integration Project internet site by late July 2001. Your issue is documented under identification number VZ-10. The DGN document will be updated periodically and provides a common platform for the integration of data issues, gaps, and needs that should be considered in the development and implementation of conceptual models. The DGN table also provides the baseline from which to identify and prioritize future work scope that supports the resolution of key technical data issues. Current status of issue and provision of any existing resolutions: This issue is closed out with the understanding that the need is documented within the Characterization of Systems - Data Gap and Needs table and will be considered for future work scope based on budget and priority constraints. Scope of work to resolve the issue: The scope of this activity is to develop a detailed 3-d model of the subsurface, using all available data, geostatistics, and state of the art mapping technologies. These promise to provide detailed information on where the uncertainties are highest and thus allow targeting of specific locations/information to reduce the uncertainty if deemed appropriate. Timeline showing when work is needed and how long it will take to complete: TBD Ranking of issues vs. other issues and vs. existing work: The overall ranking of importance will be developed during the DWP process where it will be ranked against all other proposed work in the other SAC technical areas."	Resolved: Assigned to Data Gaps and Needs Table
SAC 99-065	Dirk Dunning	Oregon Office of Energy	9/2/99	Connection between Confined and Unconfined Aquifers	"The presence of West Lake, B-Pond and Gable Mountain Pond along with apparent high transmissivity features near Gable Mountain necessitate the exploration of the soil structures in these areas. Information is needed on whether and how extensively the confined and unconfined aquifers may communicate in these areas."	"Initial response to issue: None Supplement to initial response: This issue is being addressed as part of the ongoing development of the Hanford Sitewide Groundwater Model, specifically with regard to alternate conceptual models being developed to evaluate uncertainty in the model. Alternate conceptual models that include water inputs from erosional windows in the vicinity of West Lake, B-Pond and Gable Mountain Pond are currently being developed and calibrated. Output required from issue resolution: Current status of issue and provision of any existing resolutions: Ongoing effort. Scope of work to resolve the issue: Timeline showing when work is needed and how long it will take to complete: Ranking of issues vs. other issues and vs. existing work: TBD"	Resolved

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SAC 99-066	Dirk Dunning	Oregon Office of Energy	9/2/99	Uncertainty	"The project continues to fail to understand the vital importance of uncertainty analysis in the assessment. At a minimum, the models should flow the uncertainty calculations through the modeling. Doing this would rapidly show the accumulating uncertainty and would likely lead to decision makers and regulators understanding that solutions must be implemented with near source controls and that attempts to define levels that can remain and rely on the long path length to the Columbia River cannot adequately assure protection of people or the environment."	"Initial response to issue: The GW/VZ Integration Project and the SAC development team advocate the design and development of capabilities that propagate uncertainty throughout the assessment, i.e., the inventory, the environmental pathways, and the risk and impact response metrics. However, it is envisioned the SAC assessment can be divided into (1) an inventory and environmental pathway component, and (2) a risk and impact component. The former creates multiple realizations of the contaminants in space over time. The latter creates multiple realizations of human, ecological, cultural and socio-economic health in response to the environmental realizations. The project also recognizes that all uncertainties cannot be captured in the calculation. Those that cannot be captured in the calculation must be explained along with the results so that users of the results will recognize the limitations of the results. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-067	Dirk Dunning	Oregon Office of Energy	9/2/99	"SAC, Rev. 0 Mismatches"	"SAC, Rev. 0 is proposed to use a broad mix of 1, 2 and 3 D modeling elements. There is little support for the selection of many of these elements in preference to better or more complete models. Many of these fail to consider the broad range of conceptual model uncertainties that exist. To date the project has failed to explore the board range of these potential alternate conceptual models, many of which have been detailed by the Expert Panels, regulators, and stakeholders, Tribes and the public over the last 15 years."	"Initial response to issue: The selection of codes for the creation of models in SAC Rev. 0 is conditioned on the use of existing technology. This decision was made because of the need to provide a proof-of-principle calculation as soon as possible. Information assembled through the S&T effort and the Characterization of Systems effort will provide insight into alternative conceptual models. This insight will be considered in the acceptance of alternate conceptual models represented in SAC Rev 1, the modeling capability to be used to assist decision making. This preference for existing technology stated, the suite of computational tools selected for SAC Rev. 0 represent the most complete and best known models that could be combined into a 'system' model and achieve a reasonable execution time. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-068	Dirk Dunning	Oregon Office of Energy	9/2/99	Use of Physical Parameters in 1 and 2D Models	"Physical parameters and particularly smeared or lumped parameters like Kd cannot be directly used in 1 or 2 D models without careful examination and proof that they result in representative behavior. Example: The caliche layer allows limited transport directly through the caliche. It also allows transport by lateral movement to fractures and other discontinuities. Modeling this with a 1-D model, which presumes that caliche is impermeable and which ignores the travel through discontinuities, invalidates the whole model."	"Initial response to issue: The GW/VZ Integration Project has adopted a hierarchical approach to the simulation of geochemical phenomena causing the retardation or mobilization of contamination in the environment. This approach is taken because of the complexity and resource requirements of a fully mechanistic approach and because of the potential large number of disposals and remedial actions to be included in the site-wide assessment. Three levels or scales of application are envisioned. (1) At the fine scale ranging from a single sand, silt or clay lens in the environment to the molecular level, the most complete and complex of reactive geochemical models will be utilized to gain knowledge and fully understand the environmental setting. Models at the fine scale will be used to define and support models to be applied at the coarser level. (2) At the disposal or remedial action site-specific scale, (e.g., from the disposal facility to the water table), models combining reactive geochemistry and contaminant transport phenomena may be applied to model the entire environmental pathway. Otherwise they would be applied or to support the application of reduced form models, (e.g., Freundlich, Langmuir, or linear sorption isotherm models), that would be representative and efficient enough to simulate the long-term response of the environment. (3) To the extent possible, site-wide scale assessments, (e.g., the SAC), will rely on direct input from existing projects, (e.g., 200 Area Remedial Actions, ILAW PA, Solid Waste Burial Ground PA), for their releases to the water table. The site-wide assessment will also be responsible for the simulation of many sites not modeled by existing projects. Therefore, reduced form models of geochemical retardation or attenuation will be used to represent contaminant mobility. Simulations conducted at the intermediate or site-specific	Resolved

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						scale will support the use of reduced form models such as the linear sorption isotherm at the site-wide scale. Supplement to initial response: Another tool used by the SAC team to validate model projections is the comparison of model predictions against existing record data. This history matching allows the SAC team to determine how closely the model predictions represent existing record data. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	
SAC 99-069	Dirk Dunning	Oregon Office of Energy	9/2/99	One RAD Environment Standard	"The One RAD per day acceptable standard for exposure to plants and animals has no scientific basis, other than by extension from a gross analysis of population level impacts. It provides an inadequate basis for protecting most plants and animals and should not be used."	"Initial response to issue: SAC ecological risk assessment will not use the one rad per day (rad/d) standard. Research based levels appropriate for each organism will be used (e.g., Lowest Observable Effects Level). This approach is consistent with that used in CRCIA Part I. The standard for radiological protection of the public and the environment, as stated in DOE Orders 5400.1 and 5400.5, is 1 rad/day for aquatic biota and 0.1 rad/day for terrestrial biota for chronic dose rates. This is based on guidance from the International Atomic Energy Agency. The Inventory Scoping Study (Napier et al. 2000) used the more conservative value of 0.001 rad/day per radionuclide as a screen for ecological risk. For a more thorough discussion of the scientific basis for these standards, please see Barnhouse (1995). Supplement to initial response: The project is estimating risk, not comparing to standards except as benchmarks to aid the presentation. The use of LOELs parallels that of CRCIA Part 1. A full description of the ecological model implemented in SAC Rev. 0 has been published in Kincaid (2000). References: Barnhouse, L.W. 1995. Effects of Ionizing Radiation on Terrestrial Plants and Animals: A Workshop Report. ORNL/TM-13141, Oak Ridge National Laboratory, Oak Ridge, Tennessee. A copy of this report can be obtained at: http://www.ornl.gov/~webworks/cpr/rpt/85683.pdf Kincaid, C.T. et al. 2000. Groundwater/Vadose Zone Integration Project System Assessment Capability (Revision 0) Assessment Description, Requirements, Software Design, and Test Plan, BHI-01365, Bechtel Hanford Inc., Richland, Washington. Available at http://www.bhi-erc.com/projects/vadose/sac/sacdocs.html Napier, B.A. et al. 2000. Groundwater/Vadose Zone Integration Project Inventory Scoping Study for the System Assessment Capability, Rev. 1, available at http://www.bhi-erc.com/projects/vadose/sac/InvScope.pdf Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-070	Dirk Dunning	Oregon Office of Energy	9/2/99	Allochthonous Inputs	"The Columbia River element project staff commented that they were excluding allochthonous inputs from their analysis. This would imply that all external carbon sources (and other contaminants) would be excluded other than those that entered the river via the site groundwater. This eliminates the impacts from surface and airborne biologic transport by plants and animals. This is an unacceptable limitation on the model. It would also presumably exclude inputs from migrating fish bringing waste back to the site from downstream, heavy metal inputs from upstream and other inputs. All of these must be assessed. The health of the river cannot be assessed based on Hanford groundwater alone. Doing so would likely invalidate the whole assessment."	"Some transport paths are not included in SAC Rev 0 so that efforts can be focused on including uncertainty calculations in the pathways that are included. Because the majority of the contaminant inventory will enter the river via groundwater, SAC Rev. 0 will include biological transport within the river, and from the river to the terrestrial environment. Background levels of key contaminants and nutrients will also be introduced to the river at the upper boundary of Priest Rapids Dam and the tributaries including agriculture return flows, and the Yakima, Snake, and Walla Walla Rivers. The air and additional biological transport pathways will be considered for inclusion in future revisions to the capability."	Pending Assignment
SAC 99-071	Dirk Dunning	Oregon Office of Energy	9/2/99	River Modeling	"In the 1970s, site staff attempted in vain to model the Columbia River using 2D models. They failed at a time when they had large tracers in the river to validate their models in the form of radioactive emissions and thermal plumes from the reactors. Today, project staff assert they can adequately model the river with 2D models. This must be proven. It is an unacceptable	Information on the proposed approach is provided in appendices to the Preliminary Concepts document completed in September 1999 and available on the project webpage. Additional information will be included in the Assessment Design Document to be completed in 2000. The initial assessment to be conducted with SAC Rev. 0 will test the hypothesis that the Columbia River can be	Pending Assignment

Issue Number	Originator	Organization	Date Submitted	Issue Title	Issue Text	Response to Issue (III)	Issue Status
SAC 99-072	Dirk Dunning	Oregon Office of Energy	9/2/99	In-Situ Inventory	assumption." "The inventory assessment element must account for the present location of all wastes. Too much of the waste already resides in the soil, groundwater and Columbia River to ignore."	simulated as described in the above documents. "Initial response to issue: The inventory task will assemble a holistic inventory of Hanford waste. It is anticipated that the inventory will be improved as errors and omissions are identified Supplement to initial response: Similar to other performance assessments, the selection of sites containing source term material and contaminants due to migration will be limited to the selected constituents of concern. For the SAC Rev. 0 performance assessment, the top ten contaminants believed to have the highest potential impact to human health and the environment were selected for performing the ""proof of concept"" trial run. Consequently, while SAC will focus on a holistic approach to the selection of sites and their impact, the locations will be limited to those areas where the contaminants of concern are known to exist, have existed, or based on operational knowledge, can potentially exist and the appropriate estimated values have been attributed for the purposes of running the performance model. Future performance assessments, such as SAC Rev. 1 will incorporate lessons learned from SAC Rev. 0 and recommended performance parameters stemming from interface meetings with the regulatory community and stakeholders. Consequently, future performance assessments may address a broader suite of constituents, including differences in spacial and temporal parameters. As a result, the parameters selected will have a direct correlation to the locations identified for the performance assessment. Output required from issue resolution: Close out the issue based on the initial and supplemental response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial and supplemental response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-073	Dirk Dunning	Oregon Office of Energy	9/2/99	Site Aggregation	The project has asserted that the uncertainty of the assessment is reduced if the waste sites are aggregated. This is misleading. It presumes that we know how much waste there is and assigns it to locations. The specifics and details can be vitally important and change everything. Aggregation only blurs the risks it does nothing to reduce uncertainty.	"Initial response to issue: The total amounts of waste are much better known than their exact locations. Estimates of risk to specific classes of waste sites some distance away, for instance, with risk near or in the Columbia River from 200 Area sites, the risk is proportional to the total inventory and not waste sites at specific locations. Because SAC Rev. 0 is only attempting to analyze this type of situation, aggregation is a valid method for reducing uncertainty while analyzing groups or classes of waste sites. Supplement to initial response: No other response necessary Output required from issue resolution: Close out the issue based on the initial response. Documentation of response and notification to be made to the issue originator by updating the issues database. Current status of issue and provision of any existing resolutions: Preliminary resolution is to close out the issue based on the initial response. The preliminary resolution has been submitted to the IRC for their approval. Scope of work to resolve the issue: N/A Timeline showing when work is needed and how long it will take to complete: N/A Ranking of issues vs. other issues and vs. existing work: N/A"	Resolved
SAC 99-074	Dirk Dunning	Oregon Office of Energy	9/2/99	Science and Technology	"The Science and Technology needs of the project are dominated by applied science and investigator needs. The S&T program is ill suited to this and will likely develop little science or technology that has any meaningful application to the assessment until the assessment is completed, at which point it will be unusable. More direct project control of the Science and Technology is needed. More characterization and forensic analysis of waste sites is needed in the very near term. Model development in advance of understanding the basic nature of the physical system is both futile and wasteful of time and manpower which could be more effectively utilized in other areas."		Pending Assignment
Vad-1	GAO Report		Mar-98	Understanding Waste Migration	Understanding of waste migration at the Hanford Site is inadequate to support key decisions.		Pending Assignment
Vad-2	GAO Report		Mar-98	Sufficient Data	Sufficient data has not been collected to trace the migration of the tank leaks through the soils.		Pending Assignment
Vad-47	"David		5/11/98	Contamin	Annual performance calibration of spectral gamma logging tools requires the maintenance of the		Pending

Issue Status	Assignment
Response to Issue (III)	
Issue Text	Hanford calibration models.
Issue Title	ant Characterization Logging
Date Submitted	
Organization	
Originator	Shafer (Memo sec 11, pg 2)"
Issue Number	