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RECEIVED 1999

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April 9, 1999

Joe Vozella, DOE/AIP/POC
Department of Energy
Los Alamos Area Office
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Los Alamos, NM 87544

HSWA LANL G/M/S '99

Re: DOE Oversight Bureau comments on the LANL DRAFT Watershed Management Plan, February 9, 1999

Dear Mr. Vozella:

The New Mexico Environment Department (NMED) DOE Oversight Bureau has reviewed the referenced document and is providing the attached comments. We believe the development of a watershed management plan is a significant step toward effective management of the many canyons bisecting Los Alamos National Laboratory. In addition, the plan can be an effective tool to integrate the regulatory drivers addressing contaminant migration. These comments do not represent the regulatory position of NMED.

These comments generally fall into four categories.

1. Evaluation of current watershed health and function including background investigations.
2. Data Quality Objectives (DQOs), including water quality indices selection, analytical method selection, and method detection/quantitation levels.
3. Stakeholder involvement.
4. Compliance and regulatory issues

We appreciate the opportunity to provide input to this Plan. Review of the Plan and comments were provided by Dave Englert, Raymond Montoya, Michael Dale, Bob Weeks, and Ralph Ford-Schmid. We invite discussion of these comments and would be interested in a meeting with representatives of DOE and LANL. Please contact me to schedule a meeting at your convenience.

Sincerely,

Stephen Yanicak

Steve Yanicak,
Point of Contact/LANL,
NMED, DOE OB

SY:rfs

Attachment
cc:

John Parker, Chief, NMED, DOE OB
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NMED DOE Oversight Bureau
Comments on the
LANL Draft Watershed Management Plan (WMP)

General Comments:

1. Evaluation of current watershed health and function.

The Plan does not provide for current watershed health and function assessment. We recommend that the Rosgen Stream Classification (Rosgen, 1996) system be used to evaluate the stability of channel features in each watershed. The WMP should provide for systematic monitoring of these features.

The Plan does not bring together and evaluate the available data on water, sediment, and habitat quality and quantity, along with macroinvertebrate community assessments on a watershed-by-watershed basis. A summary the available data should be incorporated into each canyons "drainage description" section of the Plan and the data should be evaluated for potential near-term problems which may require investigation or interim action. Additional sources of this information are listed after the reference section (page 19).

See specific comments 3,5,8,9,10,15,17,18,20,26,32,33,35,36, and 37 through 51.

2. Data Quality Objectives (DQOs), including water quality indices selection, analytical method selection, and method detection and quantitation levels.

The DQO process should also include discussion of the data requirements of a contaminant transport model. Besides water quantity and quality, these would include sediment quality and characterization. Some factors which may influence contaminant inventory, transport and potential toxicity, include grain size distribution, Total Organic Carbon content, and the amount and quality of Total Suspended Sediment. Minimum Detection Levels (MDLs) and Minimum Quantitation Levels (MQLs) should not only be low enough to protect water quality indices, but also to compare to Ecological Screening levels proposed by the ER Project. This pertains particularly to constituents which are persistent, toxic and tend to biomagnify (for example, organochlorine pesticides, PCBs, and mercury).

See specific comments 1,4,11,12,13,14,16,17,19,21,36, and 53 through 63

3. Stakeholder involvement.

These comments represent NMED's first real involvement in the development of the Plan. The lack of stakeholder involvement (outside of DOE or LANL groups) may result in a Plan which is designed to address a limited perspective or scope.

In developing and implementing this plan, we recommend that LANL bring together stakeholders (for example, representatives from U.S. Forest Service, Los Alamos County,

the Pueblos, Bandelier National Monument, and NMED) to discuss each participant's concerns, needs, and obligations. See specific comment 11.

4. Compliance and regulatory issues

A goal of the NPDES Multi-sector storm water permit monitoring requirements is to verify that Best Management Practices (BMPs) are effective at controlling releases of contaminants to "Waters of the US". The WMP proposes to monitor "Waters of the US" for exceedances of water quality criteria and only in a reactive manner, investigate upstream inputs.

Multi-sector permit compliance will probably require monitoring of storm water runoff quality from individual sites or clusters of sites prior to their joining with Waters of the US. Multi-sector permit compliance requires quarterly visual examination of storm water quality to assist with the evaluation of pollution prevention plans.

We recommend a monitoring approach which combines a balance of sub-basin monitoring, visual examination of storm water quality, and monitoring of clusters of sites with high and medium erosion potential scores, particularly if sites with high contaminant inventory or concentrations are within the clusters. See specific comments 1, 4, 6, 22, & 53.

Specific Comments: All excerpts from the Watershed Management Plan are in italics and DOE Oversight Bureau comments are in normal font.

1. Section 1.2 Program Missions and Objectives; Page 1-1, bullet 2
Establish an information system in which all watershed protection data will be stored and which will be accessible to different LANL groups and external stakeholders.

Will this information be available to all stakeholders, considering that not all stakeholders have access to FIMAD and other data storage systems? The data should be provided in a user friendly and/or universal format.

Interaction between the watershed and the FIMAD databases should be assured. It should be possible to query the database to identify clusters of sites with elevated erosion potential and high inventory or high concentrations of contaminants. It should be possible to determine monitoring locations that can be used to evaluate BMP effectiveness, identify additional BMP requirements, or determine BMP maintenance needs.

The DOE Oversight Bureau has collected considerable data on surface water quality at LANL. This includes data on snowmelt, storm water, spring discharge quality and flow rates, and water quality in perennial reaches (for example, Upper Pajarito, Cañon de Valle, Los Alamos, Guaje) of interrupted and intermittent streams at LANL. We recommend that the WMP integrate NMED data into their information system.

We also recommend that the data generated by the Spring Snowmelt Runoff Survey (1993 & 1994), by Advanced Aquatics Technology (AATA International Inc.), conducted at LANL, also be integrated into the information system.

2. Section 1.2 Program Mission and Objectives; Page 1-3, First Bullet
Provide additional surface water monitoring and documentation to support and enhance current watershed protection efforts, measure program performance, and provide a long-term monitoring network.

Surface water monitoring will also provide support for the development and validation of a contaminant transport model for LANL. The plan should include the development of such a model as an objective and discuss the application of the model to the ER Project.

3. Section 1.3.1 Natural Resources Management; Page 1-3, Paragraph 2, Sentence 3
Furthermore, the Laboratory is considering initiating the development of a Biological Resources Management Plan and a Forest and Wildfire Management Plan within the next year.

The relationship of these plans, including the Threatened and Endangered Habitat Management Plan should be considered in the WMP. Upon implementation, these plans have the potential to modify physical, biological and ecological balances of these watersheds. A schedule for completion and implementation of these plans should be part of a comprehensive watershed management plan.

4. Section 1.3.4 The Environmental Surveillance Program; Page 1-5, Paragraph 1, Sentence 1
The environmental surveillance Program is responsible for annual environmental surveillance and compliance monitoring at the laboratory.

Will the environmental surveillance monitoring, outlined in the Plan, meet HSWA compliance monitoring requirements? The WMP should insure that all data acquired will meet the data quality needs of HSWA (Module VIII, Q.C. Contamination Characteristics; 3. Surface Water Contamination) and NPDES.

The ER Project is developing water Ecological Screening Levels (ESLs) which in some cases may be lower than the WMP Lab-wide Default Surface Water Protection Indices (Table 2.2-1). These ESLs may require lower minimum quantification levels than those proposed by the WMP and therefore alternate (better) analytical methods. In most cases, the LANL ER Project water ESLs would be preferred over State of Arizona *effluent dependent* and *ephemeral* standards for use as surface water protection indices.

5. Section 1.3.5 The NPDES Storm Water Program; Page 1-5, Paragraph 2, Sentence 4
The WMP provides the mechanism to effectively monitor the numerous industrial activities that occur at the laboratory.

Monitoring of industrial activities should include all impacts to ecological components of the watershed. Ecological components consist of physical, chemical and biological attributes of a watershed. The WMP should include site assessments which recognize all of these components.

6. Section 1.3.6 Draft LANL-ER-SOP-2.01 Surface Water Site Assessments; Page 1-6,

Paragraph 1, Sentence 3-4
The SWAT role is to provide recommendations from the draft SOP 2.1 findings for the installation of BMPs that may be needed to address erosion at PRSs. These recommendations are then provided to the ER Project and Facility Management for evaluation and implementation if necessary.

The Surface Water Assessment Team (SWAT) evaluation should identify locations to monitor the runoff from clusters of sites determined to have elevated erosion potential assessment scores, particularly if sites with high contaminant concentrations or inventories are within the cluster.

Does the SWAT team have a method for evaluating and documenting the effectiveness of BMPs at PRSs? We recommend quarterly visual examination of storm water quality to assist with the evaluation of pollution prevention plans. This is a low-cost method for evaluation of BMP effectiveness and need for additional BMPs or maintenance of existing BMPs (FR Vol. 60, No. 189, September 29, 1995).

7. Section 1.3.6 Draft LANL-ER-SOP-2.01-Surface Water Site Assessments; Page 1-6, Paragraph 2, Sentence 1
While draft SOP 2.01 focuses on minimizing contaminant migration from PRSs via surface water runoff, the Watershed Management Program, through coordinated decisions on locations of upstream monitoring stations, focuses data collection activities downstream of PRS's at drainage confluences and the Laboratory's eastern boundary.

Drainage confluences may increase the amount of sediment transport capacity in a stream. As stream power increases, sediment transport also increases and the data collected below drainage confluences may provide misleading information about the effectiveness of upstream BMPs. If monitoring is conducted just above confluences the amount of sediment being transported through a particular drainage may be more accurately estimated. These data may provide valuable information on water storage, sediment transport, stream power, and effectiveness of upstream BMP's on the same drainage.

8. Section 2.0 Watershed Management Approach; Page 2-1, Paragraph 2, Sentence 3
This approach proposes additional surface water and sediment data collection activities needed to meet the objectives of the program.

This approach proposes more monitoring and evaluation of chemical attributes in a watershed but does not address the lack of information on physical watershed conditions such as channel stability. Information on the physical characteristics of watercourses may reveal predictable changes in channel adjustment processes and eliminate unnecessary maintenance or replacement of incompatible stream controls.

9. Section 2.1 Strategy for Surface Water Protection; Page 2-1, Paragraph 1, First two sentences
The Strategy for watershed protection at LANL includes: (1) the identification of drainage's affected by LANL operations; (2) the understanding of that effect in terms of water quality protection; (3) the implementation of planning and management practices;

and (4) the identification of and implementation of appropriate remedial or mitigative measures. The laboratory intends to implement this watershed management approach by coordinating environmental management activities to address high priority issues affecting water quality.

Strategy One: A drainage that is not affected by LANL may provide very valuable information for erosion control, biologic potential, channel stability and a reference for comparing hydrologic regimes. The plan should include a reference drainage.

Strategy Two: Water quality protection should be evaluated in terms of holistic assessments which take into consideration designated uses and a streams potential in stable reaches which have similar characteristics in terms of physical, chemical and biological condition. Site specific uses or values should be included in the plan and an understanding of all effects can best be identified by comparing similar undisturbed reaches to impacted areas.

Strategy Three: How will LANL prioritize implementation of remedial actions. A matrix approach should be considered to clearly identify weighting factors used to identify and prioritize high priority issues.

10. Section 2.1 Strategy for Surface Water Protection; Page 2-1, Paragraph 3, Sentence 5
These two sources of data are envisioned to provide information regarding the current status of the laboratory's drainages and sub-drainages.

It may not be possible to describe current status of the laboratory drainages unless a comparison is made to a reference reach which provides information such as stability, function, water quality, nutrient concentration and sediment transport. LANL should develop baseline assessments, comparing to a suitable reference watershed, to establish current status of the laboratory's drainages.

11. 2.2.1. Data Quality Objective Process, Page 2-4, second paragraph, First & Second Sentence
The output of Step 1 for this Watershed Management Plan is embodied in the strategy described in Section 2.1 and included as Appendix A. The strategy describes the problem as the potential presence of contaminants in the watersheds that could now, or in the future, pose a risk to human health or the environment.

The DQO process described by the EPA guidance (EPA 1994, QA/G-4) suggests that "the first step in a decision making process is to define the problem that has initiated the study. Since most environmental problems present a complex interaction of technical, economical, social, and political factors, it is critical to the success of the process to define the problem completely and in an uncomplicated format. A problem will have the greatest chance of being solved when a multi-disciplinary team of technical experts and stakeholders can help to recognize all of the important facets of the problem and ensure that complex issues are described accurately." Members of the planning team should be expanded to include representatives from other stakeholders in the project, including the NMED, EPA and surrounding pueblos.

The Plan's decisions and watershed protection criteria describe a variety of technical questions that should be addressed, and yet only water quality compliance DQOs were described. The parameters required to provide information for the decision rules were not fully described. The Plan should specify those parameters, their action levels, and tolerable error limits on the proposed methods and schedules required to determine these measurements.

12. Section 2.2.2 Decisions; Page 2-5, Paragraph 1, Sentence 2
These drainages encompass locations where mobilization of contaminants from operational and legacy sources may occur and potentially impact surface water quality.

The goal of step 2 of the DQO process is to identify the question and identify alternative actions. Since primary and secondary contaminant sources have been described, additional decision statements should be included, such as whether or not contamination is present in the watercourse. If contamination is detected then decisions regarding risk, extent, and possible remedies for each watershed reach can be addressed.

If measurements are made above action levels, the Plan should describe a systematic process that addresses management actions which will identify possible errors in the analytical data, additional monitoring requirements, appropriate canyon and PRS evaluations. That process should include evaluating the management actions after completion, such as continued monitoring of BMPs for their effectiveness.

13. Section 2.2.2 Decisions; Page 2-5, Last paragraph in section, Last sentence
The DQO process is used to ensure that the types of data collected will be directly comparable to the action levels that are specified.

The DQO process should reassess Method Detection Limits (MDLs) for PCB (Table 5.3), Organochlorine Pesticides (Table 5.4), and others, as many are greater than the action levels specified in Table 2.2-1.

14. Section 2.2.3 Watershed Protection Criteria; Page 2-5, Criterion 1, Paragraph 2, Sentence 5
Surface water protection indices will either be adopted from applicable regulations and standards or developed for LANL-specific scenarios, i.e. surface water occurrence, natural background concentrations, sediment movement, etc.

Surface water protection indices should be based on designated or attainable uses for that area of the watershed. Development of LANL-specific indices should be coordinated with the ER Project (using the ECORISK database [ER ID package 186]) and other stakeholders, including NMED.

15. Section 2.2.3 Watershed Protection Criteria; Page 2-6, Top paragraph
..., natural background concentrations,...

LANL should determine background concentrations for each type of surface water: perennial flow, and snow-melt and storm-water runoff. Pat Longmire, CST-7, has

conducted a pilot study to determine background water quality in Pajarito and Los Alamos Canyons. We recommend that LANL consider this data set for background applications.

16. Section 2.2.3 Watershed Protection Criteria; Page 2-6, 2nd bullet
If the 5-year (minimum of 5 samples) trend relative to canyon-specific baseline of mass transport.....

Five samples may not capture the range of storm water flows and contaminant variability. Please re-evaluate the (5) minimum sample number to assure that decisions to reduce monitoring frequency are based upon a realistic understanding of the flow, contaminant loading, and canyon-specific variability.

17. Section 2.2.3 Watershed Protection Criteria; Page 2-6, Criteria number 2, First paragraph, Second sentence.
A mandate of the ER Project is to determine the nature and extent of contaminants in sediments, calculate the risk posed by those contaminants, and conduct remedial actions, if necessary.

Chemical and physical reference values should be established. For example, NMED-HRMB has tentatively approved background concentrations in sediment developed by the ER Project. These values could be used for comparing contaminant concentrations in suspended sediment determined by the WMP monitoring.

18. Section 2.2.3 Watershed Protection Criteria; Page 2-6, Criteria Number 3
Laboratory operations should not change the flow regime such that contaminant transport is increased.

This criteria only addresses potential changes to current watershed conditions. This assumes that the current watershed condition is not contributing to degraded habitat or contaminant transport. Each watershed should be evaluated for conditions (for example, high percentage of impermeable surfaces, history of flash flooding, channel stability, actively eroding contaminated sediments) which may result in habitat degradation or contaminant transport.

For example: Upper Sandia Canyon experiences flash flooding. According to our calculations, a 100 yr. rainfall event would generate runoff volume of 23.3 ac-ft to the culvert at the head of the wetlands in Sandia Canyon. These high flows can cause erosion of contaminated, unstable, wetland deposits through channel incision, mass wasting, and head cutting. In 1996, the Environmental Restoration collected three samples of storm water runoff from the TA-3 area. Their data indicate three to six ppm total PCBs (Arochlors 1254, 1260) in contaminated suspended sediment are entering the watercourse upstream of the wetland. Draft ER Project (1997-1998) data show high levels of chromium, and elevated levels of PCB and mercury in actively eroding Sandia wetland sediments.

This indicates <u>current</u> watershed conditions need to be evaluated, adverse conditions

identified, and appropriate measures implemented. For example, the installation of wet ponds, dry ponds, and grit chambers in drainages feeding upper Sandia Canyon would reduce peak flows, filter, and promote the settling out of contaminants before entering the main stream. Once identified, eroding contaminated sediments should be stabilized or intercepted downstream by installing a check dam or by implementing a similar strategy.

19. Section 2.2.3 Watershed Protection Criteria; Table 2.2-1. Laboratory-Wide Default Surface Water Protection Indices, Page 2-7 through 2-9

Please indicate whether surface water protection indices are measured as totals or dissolved (as noted in the inorganic compound surface water protection indices). This would apply to radionuclides, high explosives, pesticides, PCB, organics, and semi-volatiles.

Table 2.2.1 should include a criteria for gross beta of 50 pCi/L [proposed EPA Screening Level (LA-13343-ENV, 1996)].

To be protective of alluvial, perched-intermediate and main aquifers, the Sr-90 criteria Derived Concentration Guideline (DCG) of 1000pCi/L should be replaced with the EPA Maximum Contaminant Level (MCL) for Sr-90 of 8 pCi/l. This would apply to other radionuclides (for example, uranium, radium) that have proposed or established MCLs.

The DCG values listed are for individual radionuclides. For known mixtures of radionuclides, the sum of the ratios of the observed concentration of each radionuclide to its corresponding DCG must not exceed 1.0 (DOE, 1993).

The table of indices should include an indicator of elevated gross gamma activity.

The ES report include SALs and fallout background levels for most radionuclides and radioactivity in sediments. These should be compared with ER Project generated values and the appropriate values used as indices. Please add a table defining the reference levels used for comparing sediments.

20. Section 2.2.3 Watershed Protection Criteria; Page 2-10, Criterion 4, Bullet 1
If the size, number, or habitat characteristics of wetlands are significantly degraded, then actions to restore and protect the wetlands will be implemented.

The term *significantly degraded* implies that these wetlands are compared to some existing condition which defines its potential. Wetlands should be compared to existing functional wetlands in the same eco-region.

21. Section 2.2.3 Watershed Protection Criteria; Page 2-10, Criterion 5, Bullet 1
If the quality of surface water in a drainage significantly degrades the characteristics of the habitat of a threatened or endangered species, then action will be taken to identify the source of water quality decline and mitigate or remediate.

If the potential habitat of a threatened or endangered species is identified, then surveys of

the area to identify impacts should coincide with the expected dwelling, roosting, nesting, or migration time period in which the species is expected to be present.

To evaluate significant degradation of threatened or endangered species habitat, reference conditions should be described.

22. Section 3.1.2 Hazardous and Solid Waste Group (ESH-19); Page 3-3, 2nd paragraph, 2nd sentence
ESH-19 will also provide guidance on establishing acceptable surface water protection indices where existing standards or regulatory limits are not applicable to the LANL watershed i.e., they are below natural background levels or apply to perennial reaches.

Any determination that existing New Mexico standards are not applicable to LANL watercourses should be discussed with NMED prior to implementation.

Site-specific standards based upon background levels of constituents or periodicity of flow found in LANL watercourses may be justified but should be addressed through the Water Quality Control Commission (20 NMAC 6.1.1107 Use Attainability Analysis)

23. Section 3.1.4 Environmental Restoration Project (EM Program); Page 3-4; First complete sentence.
The ER Project conducts contaminant migration studies in the vicinity of PRSs to determine the need for implementing BMPs or other corrective actions.

Please provide some examples and details of these contaminant migration studies.

24. Section 5.0 Background; Page 5-1

Watershed management activities should include TA-57 (Fenton Hill).

25. Section 5.2.1 Surface Water; Page 5-1, Second Paragraph, First sentence
...Cochiti Reservoir, which began filling in 1976.

According to Graf, 1993 (page 112), Cochiti Dam was closed in December, 1973; not 1976 as stated.

26. Section 5.2.1 Surface Water; Page 5-5, Second Paragraph

The description does not accurately depict the hydrologic conditions that exist in the upper on-site portion of Pajarito Canyon. For example, Homestead Springs flows at about 5.3 gpm (Blake et al., 1995), while Starmer Spring normally discharges at about 30 gpm to Starmer Gulch. These springs, and others, co-mingle at the Pajarito Canyon and Starmer Gulch confluence. These springs supply enough water to support a perennial reach which extends to at least the mouth of Twomile Canyon. See LANL's Pajarito Canyon characterization work plan (LANL, 1998) for an up-to-date and accurate hydrologic description of the watershed. We recommend that the Canyons group description of Pajarito Canyon be utilized as it is more accurate and up-to-date.

27. Section 5.2.2 Groundwater; Page 5-5, First Paragraph, Second Sentence
The water table is projected to lie at depths ranging from 1200 ft along the western margin of the Laboratory.....

Recent data obtained during the drilling of R-25, near the western boundary of the Laboratory, show that the so-called regional aquifer may be as shallow as 750 ft below ground surface, and the water (750-1900 ft) may be of fairly recent origin based upon tritium concentrations (> 10 pCi/L).

28. Section 5.2.2 Groundwater; Page 5-5, First Paragraph, Fifth Sentence
Springs along the west face of White Rock Canyon are considered to be discharge locations for the regional aquifer because of similar water chemistry.

Water chemistries for the White Rock Canyon springs vary between one another, and do not always match those of deep aquifer ground water beneath the Pajarito Plateau.

29. Section 5.2.2 Groundwater; Page 5-7, Second Paragraph, Second Sentence
Alluvial perched zones are known to exist in.....

This statement is only partially correct: alluvial ground water also exists in Pajarito Canyon and Canon de Valle.

30. Section 5.2.2 Groundwater; Page 5-7, Third Paragraph, Second Sentence
Intermediate perched zones are known to exist .....

It should be noted that boreholes which were drilled in Sandia Canyon were placed in an area that is normally dry except possibly during large runoff events. They were drilled in areas where unsaturated conditions would probably be encountered. We suggest that there is an alluvial aquifer in Sandia Canyon from TA-3 to about 1 mile west of TA-72. Alluvial ground water probably seeps or moves into the Cerro Toledo interval at some point west of TA-72; at this point, ground-water flow direction probably varies dramatically.

Ground water in Canada de Buey exists within the Bandelier Tuff (e.g, CDBO-6 and CDBO-7).

31. Section 5.2.3 Water Balance; Page 5-7, Second Paragraph

The referenced model provides a preliminary understanding of surface-water infiltration and ground-water seepage beneath the canyon bottoms. However, the plan should provide for model refinement to include flows from DP Canyon, outfalls and springs (Skate Rink Spring), and hydrologic conductivity distributions.

32. Section 5.3 Climate and Meteorological Monitoring; Page 5-10, Fifth Paragraph

LANL needs to increase the number of rain gauges so that precipitation and runoff relationships can be determined. For example, localized storm events centered at the town site contribute large volumes of runoff to Los Alamos and Pueblo Canyons which probably exceed that of other locations given the same area (due to higher runoff coefficients for the town site). The town site area needs at least two gages. We recommend that LANL assess other areas of the lab where there is inadequate rain gage coverage.

33. Section 5.5 Soils; Page 5-14, Fifth Paragraph,

Please provide a summary of available soils and sediment information. This should include existing analytical parameters, locations, and sampling schedules.

34. Section 5.6.2 Fauna; Page 5-18, First Paragraph, Fourth sentence
ESH-20 personnel have prepared lists of species known to occur in the Los Alamos area and have identified habitat for Federal and state-listed Threatened or Endangered species as part of the HMP, 1996.

This section lists many studies conducted by ESH-20. Are these studies intended to be used as reference or baseline conditions? How will these parameters be incorporated and monitored as requirements of the WMP?

35. Section 5.6.3 Wetlands; Page 5-19, Only paragraph

Have these wetlands been characterized for quality and function? How will they be monitored to meet the requirements of the WMP?

36. Part II, Drainage Work Plans

The ER Project Canyons work plan descriptions are the most complete and up-to-date descriptions available. These should be incorporated into the WMP.

The "sampling frequency" (Sections 6 through 13) is inadequately described as four times per year, as flow is available, or whenever there is flow. Will samples be divided into strata that have relatively homogeneous characteristics and represent flow conditions? Will samples be time or flow weighted, sampled during early or late stage of flow events or will composites be taken to represent entire flow periods? LANL should fully describe the sampling protocol and flow events they will use as representative of the flow regimes.

Watercourse characteristics, such as flow pathways, discharge sinks, and others (see "Influence of Hydraulic and Geomorphic Components of a Semi-Arid Watershed on Depleted Uranium Transport", by Naomi M. Becker), that influence flow in canyons should be described and monitored. This information is useful in determining appropriate locations and sizing of gaging stations and interpreting the final data.

The Laboratory should include minimum-maximum measurements of quantity and quality for surface water and sediments from Environmental Surveillance and Environmental

Restoration activities. These measurements would be helpful in determining the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision. It was not clear if the error rates were included. (DQO Process, Chapter 6)

37. Section 6.1.1 Los Alamos Canyon; Page 6-1, Second Paragraph, Second Sentence
The canyon cuts into the Tschicoma Formation.....

The canyon also cuts into the Santa Fe Group.

38. Section 6.1.1 Los Alamos Canyon; Page 6-1, Third Paragraph, Fifth Sentence
In most years, snowmelt adds enough water to the reservoir to overflow and support flow onto the western portion of the Laboratory.

For most years (Water Years 1992 through 1998, except for 1996), snow melt during the spring supplied enough runoff to support flow across the LANL boundary (State Route 4 & confluence with Pueblo Canyon) .

39. Section 6.1.1 Los Alamos Canyon; Page 6-1, Third Paragraph, Sixth Sentence
Skating Rink spring, west of the county-operated skating rink, flows intermittently and provides a small component of surface water to the stream.

From August 23, 1995 to the present, a total of 43 field observations were made at the spring, and flow was present during each observation. Therefore, we suggest that the spring is perennial. Hydrochemical characterization efforts, such as low-level tritium analyses, should be used to determine if the spring is natural or from a man-made source (leaking water-line near holding tanks).

40. Section 8.3.1 Hydrology; Page 8-4, First Paragraph

Gage E202 is in need of repair. Flow from upstream of the gage exits the man-made levee and spreads out over the canyon flood plain where it infiltrates. Some of this water flows back into the active channel just past or downstream from the gage. Therefore, discharge data do not reflect the actual amount of flow. All weirs should be sized appropriately to effectively monitor the range of storm water flows, and maintained to assure the gages are generating accurate flow data.

41. Section 8.5.1 Proposed Sampling Locations; Page 8-7, First Paragraph, Item 2.

To correlate to previously obtained historical data, we suggest that this gage be placed near old GS-2 in middle Mortandad.

42. Section 8.5.1 Proposed Sampling Locations; Page 8-7, First Paragraph, Item 3.

It is our understanding that station E196 monitors surface water which drains to effluent Canyon, not Ten Site Canyon.

43. Section 8.5.1 Proposed Sampling Locations; Page 8-9 First Paragraph, Item 4

Because the channel from TSGS-1 to the Mortandad Canyon active channel has aggraded, we suggest that ESH-18 evaluate the channel and relocate the gage appropriately (for example, this gage could be moved 100 ft west).

44. Section 9.5.1 Proposed Sampling Locations, Threemile Canyon; Page 9-9, Item 1.

We suggest adding flow meters at the TA-18 Spring (perennial) and Threemile Spring (ephemeral). Data derived from these springs will be useful for developing water budgets or balances and contaminant transport information for the Pajarito Canyon watershed.

45. Section 10.1.1 Water Canyon; Page 10-1, Second Paragraph, Sentence one
On a regional scale, Water Canyon is an interrupted stream attributable to several perennial springs.....

We recommend that LANL add a flow gage at "Big Spring" which supplies the bulk of recharge to Water Canyon west of LANL. The spring is located in a small northern drainage to Water Canyon. Prior to the fall of 1996, the spring supplied water for the TA-16 gallery. In the fall of 1996, a large tree fell and broke the pipe approximately 600 ft downstream of the spring discharge point. Since then, the water flows at about 100 gpm to the canyon bottom and rapidly infiltrates. The hydrologic conditions in Water Canyon will continue to change through time. Discharge data from this spring will be needed for water-balance determination.

46. Section 10.1.1 Water Canyon; Page 10-1, Third Paragraph, Second Sentence
At this point, there is a small perennial spring, known as Spring 5AA.....

For the past five years, discharge from Spring 5AA has been restricted to a small pool at the spring source.

47. Section 10.1.3 S-Site Canyon; Page 10-3, First Paragraph, First Sentence.

ER documents show this canyon as "Martin Spring Canyon" (informally named).

48. Section 11.1.1 Ancho Canyon; Page 11-1, Second Paragraph, Second Sentence

Prior to the fall of 1998, flow from Ancho Spring reached the Rio Grande; however, field observations made on September 24, 1998, indicated no-flow existed at the mouth of Ancho Canyon.

49. Section 11.3.2 Surface Water Quality; Page 11-3, Only Paragraph

In 1995, runoff samples collected at Ancho Canyon near Bandelier showed elevated levels of strontium-90 (50.9 pCi/L), total uranium (9.47 ug/L), gross alpha (23 pCi/L) and beta (73 pCi/L). OB collected samples during a storm event on August 29, 1995 in North Ancho Canyon (informally named) near TA-39, and dissolved gross alpha was measured

at 65 pCi/L and dissolved gross beta at 98 pCi/L. These data are consistent with LANL's 1995 data. Samples collected by LANL during 1996 may have been predominantly derived from flow originating in Ancho Canyon, which contains fewer contaminant sources than North Ancho Canyon.

50. Section 12.1 Drainage Description; Page 12-1, Second Paragraph, Third Sentence

This statement is incorrect. Spring 9 is not located in Chaquehui Canyon; rather it is located on the east facing slope of above White Rock Canyon. From 1994 to 1998 the spring was observed to be flowing to the Rio Grande at about 10 gpm.

Spring 9A flows to Chaquehui Canyon from the south-facing canyon slope; however, field observations and documentation show that in the years 1994 through 1998, flow did not extend to the Rio Grande. These observations support earlier or historical accounts by Purtymun, 1995.

51. Appendix A; Watershed Protection and Management Strategy, Strategy Section; Page 8, Third paragraph, Third Sentence
Ultimately, the continuous data record will demonstrate the status of water quality and document ***that*** *contaminants in concentrations that could threaten human health or the environment are* ***not*** *being discharged across the Laboratory boundary, and demonstrate the success of BMPs and other remedial actions upstream.* (Emphasis added)

This statement draws an *a priori* conclusion about the condition of water quality at the laboratory boundary and the success of BMPs and remedial actions. If **that** is replaced with whether and **not** is dropped, the statement will be more appropriate, and not draw any conclusions prior to the collection of a continuous data record.

While the quality of water discharged past the Laboratory boundary is important, the concentrations of contaminants in any watercourse on Laboratory property should not threaten human health or the environment.

52. Appendix A; Watershed Protection and Management Strategy, Strategy; Page 8, Fourth paragraph, Third Sentence
Data from these monitoring stations will augment hydraulic and water contaminant trend analysis and modeling for the Laboratory watershed, and offer predictive information on the nature of point and non-point sources of water contaminants upstream in the sub-drainage, and environmental impacts downstream.

Please elaborate on the modeling efforts, and state which group will be investigating and evaluating the model(s) and what models are being considered.

It is our understanding that funding for several ongoing watershed studies, conducted at Bandelier National Monument and at LANL by EES-5, has been eliminated. These studies have important implications for soil and contaminant-transport model development at LANL. We believe that the watershed management effort and the ER Project's ability to predict and model contaminant transport from SWMUs, through the canyons, and

eventually offsite would be enhanced by incorporating these study's findings into their modeling efforts.

We recommend that funding for these studies be reinstated.

53. Appendix A; Watershed Protection and Management Strategy, Strategy Section; Page 9, First complete paragraph, Second Sentence
These Laboratory criteria will be as stringent as current criteria in regulatory standards, and may be more stringent, depending on Laboratory goals. These criteria ..... are envisioned to serve as an indicator for the potential exceedence of water quality standards at the confluence of sub-drainages with major drainages.

The Laboratory criteria should be more stringent than the regulatory standards if they are to be used as an indicator for potential exceedence of regulatory criteria. The Laboratory should be pro-active and not postpone remedial investigation or actions until criteria are exceeded.

For some constituents such as PCBs and Hg, minimum reporting limits (MRLs) are higher than the regulatory criteria or known effects levels. For such constituents, alternative analytical methods should be considered (for example, congener-specific Draft EPA Method 1668 [PCB] & ultra-clean EPA Method 1631 [Hg]) that will quantify constituents at appropriate levels.

To control analytical costs a limited suite of PCB congeners can be analyzed by using DRAFT EPA Method 1668. Quantitation of Aroclor profiles can also be accomplished using regression equations (Newman and others, 1998) at much lower congener concentrations.

54. Appendix A; Watershed Protection and Management Strategy, Strategy Section; Page 11, First complete paragraph under criteria and decision rule 1, Third Sentence
Based upon this data, this criterion is not currently being exceeded.

The mercury, selenium, and gross alpha criterion [20 NMAC 6.1 § 3101 (K & L)] have been exceeded in several canyons, based upon Environmental Surveillance Program and DOE Oversight Bureau sampling data.

55. Appendix B: Analytical Requirements For Surface Water Samples, Section 1.0; Page B-1, First Bullet

We recommend LANL use the most recent edition of Standard Methods for the Examination of Water and Wastewater (19th Edition, American Public Health Association, 1995 or better yet the 20th edition which is currently available).

56. Appendix B: Analytical Requirements For Surface Water Samples, Section 1.0; Page B-1, Fifth Bullet
.... *high explosives by SW-846 Method 8330*

We recommend that the salting-out extraction procedure for the Low-level Method (1-50μg/L) be used instead of the High-level Method as indicated in Appendix B, Table 5.6.

58. Appendix B: Analytical Requirements For Surface Water Samples; Page B-2, Section 3.2.1 Dissolved Analytes, First sentence

Please specify the type of filter to be used. This is important because >90% of hydrophobic organic constituents (such as, DDT) can be lost by filtration with glass fiber filters (Word, et al., 1987). Metals can also be adsorbed during filtration (Gardner & Hunt, 1981).

We recommend that glass filters <u>not</u> be used for filtering samples for dissolved analysis. Regardless of type of filter used, we recommend that 100 mL of sample be run through any filter prior to collection of the sample. This will help fill any active binding sites in the filter and reduce the possibility of underestimating the concentration of dissolved analytes.

59. Appendix B: Analytical Requirements For Surface Water Samples, Section 4.2 Method Detection Limit; Page B-3, Only Paragraph

Please include precise definitions of terms used [e.g., Method Detection Limit (MDL), Estimated Quantitation Limit (EQL), Laboratory Control Samples (LCS)] for both organics and radionuclide measurements. For example, is the term Method Detection Limit defined in the same way as the EPA term Method Detection Level per 40 CFR 136 Appendix B? The definitions should include a statement concerning the range for quantitation as some methods may require multiple dilutions to produce accurate results at high concentrations.

60. Appendix B: Analytical Requirements For Surface Water Samples, Section 4.2 Method Detection Limit; Table 4.2

Table 4.2 lists the method detection limit for mercury as 0.2 µg/L(200 ppt).

The most sensitive currently approved methods for mercury are capable of achieving a quantitation level of 200 ppt (FR/Vol. 63. No 100 page 28869). This level is recognized by EPA Region VI as the Minimum Quantitation Level (MQL) for mercury using EPA Method 245.1. EPA Region VI describes the relationship between the Minimum Quantification Level and the Method Detection Level (MDL) as MQL = 3 x MDL. If the terminology and the relationship are correct, then the Method Detection Level would be approximately 70 ppt.

EPA Region VI has also stated that the Method Detection Level (MDL) is approximately three times the standard deviation obtained from replicate methods, or that value determined to be statistically significant from the measurement of a reagent blank.

We recommend that LANL clarify their use of the above terms and follow EPA guidance in the use of methods with the appropriate detection and quantitation levels.

We recommend that LANL develop the capability (or obtain a contract laboratory) to use EPA Method 1631: Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence (FR Vol. 63, No. 100, May 26, 1998; pp 28867-28884). EPA Method 1631 measures mercury reliably at the low levels associated with ambient water quality criteria for mercury (FR Vol. 64, No. 43, March 5, 1999; pp 10596 - 10597). LANL may be required to use this method to demonstrate compliance with NPDES effluent limits (LANL's permit is currently up for re-issuance).

This method is particularly suited to determinations of "background" mercury concentrations and for development of future site-specific (LANL) criteria. The Surface Water Quality Bureau has provided training for LANL ESH and ER Project personnel on the "ultra-clean" sampling techniques necessary for EPA Method 1631 and would provide additional training upon request.

61. Appendix B; Analytical Requirements for Surface Water Samples, Section 5.2 Method Detection Limit; Page B-16, Table 5.2

Please identify Method number.

62. Appendix B; Analytical Requirements for Surface Water Samples, Section 5.2 Method Detection Limit; Page B-16, Table 5.3 - (PCB-1221,1248, &1254)

Please identify method number

63. Appendix B; Analytical Requirements for Surface Water Samples, Section 5.2 Method Detection Limit; Page B-17, Table 5.4 - (α-Chlordane; γ- Chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; Endrin; Heptachlor epoxide).

Please identify method number and define what the asterisk means.

The MDL listed for organochlorine pesticides is inappropriately high. The MDLs listed in Table 5.4 are approximately 30 times greater than EPA Region VI MQLs for organochlorine pesticides.

We recommend that Method 6630 C - Liquid-Liquid Extraction Gas Chromatographic Method II (APHA, 1995) be used instead, as the MDLs produced by this method are 1 - 2 orders of magnitude lower.

64. Appendix B: Analytical Requirements for Surface Water Samples, Section 5.2 Method Detection Limit; Page B-18, Table 5.6

The Method Detection Limits (MDLs) listed in Table 5.6 for Nitroaromatics and Nitramines (high explosives), are the same as the EQLs listed by EPA for the High-level Direct Injection Method SW 846, Method 8330 (EPA 1997).

LANL should use these high level methods (and subsequent high EQLs) only for screening purposes or where high concentrations of high explosives are expected (for example,

process water, Cañon de Valle waters or SWMU leachate).

We recommend that LANL use the salting out extraction procedure for low concentration (parts per trillion) of explosive residues (EPA, 1997; Method 8330, Sec. 7, pp 6-7). LANL should use methods which provide EQLs less than Screening Action Levels (RDX-0.6 μg/L) or MCLs (RDX-2.0 μg/L) for any target analytes.

References

APHA, 1995. Standard Methods for the Examination of Water and Wastewater, 19th Edition, American Public Health Association.

DOE, 1993. DOE Order 5400.5, Radiation Protection of the Public and the Environment, U.S. Department of Energy

EPA, 1997. Test Methods for Evaluating Solid Waste, Volume I, Section B, Chapter 4, Organic Analysis, Method 8330, pp. 1-21

EPA QA/G-4, 1994. Guidance for the Data Quality Objectives Process, No. EPA/600/R-96/055, September 1994

Gardner, M.J. and Hunt, D.T.E., 1981. Adsorption of Trace Metals During Filtration of Potable Water Samples With Particular Reference to the Determination of Filterable Lead Concentration. Analyst 106B, 471-478.

Newman, J.W., Becker, J.S., Blondina, G., Tjerdema, R.S., 1998. Quantitation of Aroclors using Congener-Specific Results. Environmental Toxicology and Chemistry, Vol. 17, No 11, pp. 2159-2167

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, 1481 Stevens Lake Road, Pagosa Springs, Colorado

Word, J.Q., Ward, J.A., Franklin, L.M., Cullinan, V.I., Kiesser, S.L. 1987. Evaluation of the Equilibrium Partitioning Theory for Estimating the Toxicity of the Nonpolar Organic Compound DDT... Final Report Submitted by Battelle Washington Environmental Program Office to the USEPA, Criteria and Standards Division, Washington, DC, 60 pp.

Sources of Additional Data

ESH-18 water quantity, quality and sediment data, including NPDES point source and storm water monitoring data. Though the Advanced Aquatics Spring Snowmelt Runoff Survey (1995, "DRAFT") was not published, the data generated is valuable and should be included and evaluated.

ER Project water quality data (1994 - 1998 data submitted to NMED, 12/23/98, EM/ER:98-485) including Pat Longmire, CST-7, surface water background pilot study data.

ER Project soils and sediment data (including soils, sediment, and water "background") data.

ER Project Canyons Group descriptions of historical releases, current conditions, and hydrologic characterizations.

NMED, DOE OB and ESH-20 water quality, benthic macroinvertebrate community, and habitat assessment data.