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# Los Alamos National Laboratory

UNIVERSITY OF CALIFORNIA



Environmental Restoration Project  
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Los Alamos, New Mexico 87545  
505-667-0808/FAX 505-665-4747

Date: September 24, 1996  
Refer to: EM/ER:96-507

Mr. Jim Piatt  
NMED-Surface Water Quality Bureau  
P. O. Box 26110  
Santa Fe, NM 87502

**SUBJECT: ADMINISTRATIVE PROCEDURE EVALUATION AND NOTIFICATION OF POTENTIAL SURFACE AND GROUND WATER CONCERNS AT ER SITES, LANL-ER-AP-4.5, R0**

Dear Mr. Piatt:

Los Alamos National Laboratory's Environmental Management Division (EM) is committed to protecting the State's water quality. In order to assure that this occurs, the Environmental Restoration (ER) Project has been developing procedures and heightening their personnel's awareness to address your Bureau's concerns. To address the potential water quality issues associated with ER sites, the ER Project has developed the enclosed Administrative Procedure, LANL-ER-AP-4.5, R0, entitled "Evaluation and Notification of Potential Surface and Ground Water Concerns at ER Sites." This procedure allows for a systematic evaluation of ER site data and a follow-up evaluation of the site, to be performed by the Laboratory's Water Quality/Hydrology Group. The process will help identify sites that need immediate water quality corrective actions as well as prioritize other sites without the urgency associated with them.

The ER Project is enhancing their surface water protection involvement through other processes as well. Some of them include hiring a full-time water quality expert, supplying water quality training for ER personnel, and meeting monthly with members of your staff to discuss water quality issues.

The Project also implements numerous stormwater and best management practices at their sites. ER also has personnel sitting on the newly developed, Laboratory-wide, Watershed Management Task Force.

EM Division is committed to protect the environment and will continue to find ways to improve and implement processes to assure that State of New Mexico waters are not adversely affected by our mission.

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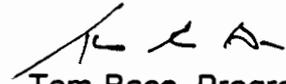
Mr. Jim Piatt  
EM/ER:96-507

-2-

September 24, 1996

Should you have any questions regarding the procedure, please contact David McInroy of the ER Project at 505-667-0819.

Sincerely,



Tom Baca, Program Director  
Environmental Management

TB/DM/rfr

Enclosure: LANL-ER-AP-4.5, R0

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## EVALUATION AND NOTIFICATION OF POTENTIAL SURFACE AND GROUND WATER CONCERNS AT ENVIRONMENTAL RESTORATION SITES

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## **EVALUATION AND NOTIFICATION OF POTENTIAL SURFACE AND GROUND WATER CONCERNS AT ENVIRONMENTAL RESTORATION SITES**

### **1.0 PURPOSE**

This procedure describes the process for determining whether an environmental restoration (ER) site has the potential to adversely effect surface or ground water quality. If that potential is determined to exist, notification to the New Mexico Environment Department's (NMED) Surface or Ground Water Quality Bureau (SWQB/GWQB) is required and corrective actions at the site must be addressed.

### **2.0 SCOPE**

The ER Project at Los Alamos National Laboratory is responsible for investigation and remediation of solid waste management units (SWMUs) under the Resource Conservation and Recovery Act and area of concerns (AOCs) under the direction of the Department of Energy. During these investigation and remediation phases, information may be gathered that indicates that contaminants present at the site might effect surface or ground water quality. Depending on the contaminant found, its concentration, and proximity to watercourses or surface and ground water, it may be necessary to notify the proper SWQB and/or GWQB of your finding and develop an action plan to mitigate the problem. The mitigation could include site restoration and/or stabilization.

### **3.0 DEFINITIONS**

#### **3.1 Aquifer**

An aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs.

#### **3.2 Area of Concern (AOC)**

An AOC means any discernible unit or area that, in the opinion of the Administrative Authority, may have received solid or hazardous waste or waste containing hazardous constituents at any time. An AOC does not appear in the Module VIII of the Laboratory's Hazardous Waste Facility permit.

#### **3.3 Best Management Practices (BMPs)**

A BMP means the implementation of site stabilization, protection or source removal that will inhibit contamination migration. BMPs are generally not final remedies of the site but when implemented can reduce the magnitude of the final cleanup.

### 3.4 Contaminant

A contaminant is an analyte detected at the site above background upper tolerance limits.

### 3.5 Field Unit (FU)

An FU means an aggregation of SWMUs and/or AOCs generally based on geographic location at the Laboratory.

### 3.5 Ground Water

Ground water means water below the land surface in a zone of saturation.

### 3.6 Release

A release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.

### 3.7 Surface Water

Surface water means the bodies of water on the surface, lakes, and streams.

*3.7  
Does not  
clearly include  
ephemeral  
watercourses*

ers,

### 3.8 SWMU

A SWMU means any discernible unit where solid wastes have been or may have been placed at any time, regardless of whether the unit was intended for the management of solid or hazardous wastes. Such units areas include any area where solid wastes have been routinely and systematically released.

### 3.9 Watercourse

A watercourse means any river, creek, arroyo, canyon, draw, wash, or other channel having definite banks and beds with visual evidence of occasional flow of water.

## 4.0 RESPONSIBILITIES

### 4.1 Field Unit Project Leader (FPL)

The FPLs are responsible for:

- Ensuring that the ER Project Water Quality Assessment and Notification Checklist is filled out as described in Section 5.0 of this procedure for sites within their FU.

- Providing to Group ESH-18 the completed Checklist and to continue to work with them to ensure proper evaluation of each site.
- Working with their field project coordinator, ESH-18, and the ER Project Office to determine the need of notification to the SWQB/GWGB and to prioritize corrective actions or BMPs, if needed.

#### **4.2 Field Project Coordinator (FPC)**

The FPCs are responsible for:

- Working with their FPL to identify areas with potential water quality concerns.
- Aiding in the prioritization of water quality corrective actions.

#### **4.3 ER Project Manager**

The ER Project Manager is responsible for:

- Ensuring that this procedure is implemented in order to protect water quality, which could be affected by ER sites.

#### **4.4 ER Compliance Manager**

The ER Compliance Manager is responsible for:

- Working with FPLs, FPCs, ESH-18, and NMED to ensure compliance with intent of all applicable environmental laws.
- Negotiating with NMED Water Quality corrective action schedules, if required.
- Keeping the ER Project Manager informed of potential negative water quality impacts resulting from ER sites immediately upon identification and monthly, thereafter.

#### **4.5 Water Quality/Hydrology Group (ESH-18)**

ESH-18 is responsible for:

- Reviewing of the checklist provided to them by the FUs.
- Assessing the site and completing an ESH-18 evaluation of the site.
- Coordinating with the FUs and ER Compliance Manager prior to notifying NMED of water quality concern.

- Aiding in the selection and prioritization of water quality corrective actions or BMPs if needed.
- Providing review of corrective action or BMP plans.

## **5.0 PROCEDURE**

Streams, watercourses, and ground water quality are regulated by the Water Quality Control Commission (WQCC) Regulations. The water quality standards developed are enforced by the NMED Surface and Ground Water Quality Bureaus and are based on livestock and wildlife watering uses for surface water and ground water for aquifers. These standards have been developed for water, but an evaluation must be made at ER sites with available data, which often does not include water samples that might only be gathered during a storm event. A checklist has been developed to aid in the systematic evaluation of each ER site. This evaluation checklist will aid in the triggering of WQCC 1203 notifications, if necessary, and also in the prioritization of water quality corrective actions and BMPs necessary to protect water quality.

### **5.1 Overview Of Evaluation Process**

ER sites are being investigated at the Laboratory to determine if they present a threat to human health or the environment. As information becomes available, water quality concerns associated with an ER site may become evident. If contaminants are found to exist at the site above screening action levels in soils samples or above WQCC standards in water samples, further evaluation of site conditions must be made. If the topographic and vegetative state of the site suggests that migration of those contaminants could occur, a corrective action must take place.

#### **5.1.1 Process For Evaluation**

The process is a two part evaluation. The first part is initiated by the ER Project and the second part is to be completed by Group ESH-18. This evaluation process is to be applied to all ER sites which have not been recommended for no further action (NFA) under criteria one through three as described in the April 1996, Document of Understanding. These three NFA criteria describe situations where either the site did not exist, there is no waste or contamination associated with the site, or no pathway exists to the environment from the site.

Because of the number of sites remaining in the project that do not fit the NFA criteria described above, sites must be prioritized for evaluation. The first sites that should be evaluated immediately are those adjacent to drainages and canyon systems. After those are completed, the remaining sites should be evaluated.

## **5.2 ER Project Evaluation**

The FPL is responsible for the initiation of the evaluation process. The FPL or their designee shall fill out the form entitled Environmental Restoration Project Water Quality Assessment and Notification Checklist (Attachment A). The following information at a minimum, is to be recorded on Attachment A:

- location or PRS number and a physical description;
- whether or not contaminants have been detected above background UTLs at the site;
- if contaminants exist, provide a list of the contaminants and compare the concentration to SALs for soils and WQCC standards for water samples;
- number of samples taken at the site and media description;
- whether or not there is visible debris at the site and describe;
- whether or not the extent of contamination is known;
- activity identifying contamination; and
- date, time, and the person notified within the Group ESH-18.

Additionally, this checklist lists questions that, when answered, identifies the date the evaluation was made, the person doing the evaluation and whether or not the PRS is in the HSWA Module of the Laboratory's hazardous waste facility permit.

This information that has been compiled provides to ESH-18 enough information to begin their field assessment of this evaluation process.

## **5.3 ESH-18: Water Quality Evaluation**

Upon receipt of the ER part of this evaluation process, a member of ESH-18 will evaluate the field conditions to determine the potential for contaminant migration. Based on the results of ESH-18 field evaluation, water quality corrective actions, and/or NMED notifications may be required. An example of a Water Quality Evaluation form is attached. The following information will be evaluated and documented:

- site topographical features;
- vegetative influences;
- structures present, both man-made and naturally occurring;

- upgradient and downgradient influences;
- other influencing factors such as erosion, soil disturbances etc.;
- contaminants to migrate to water; and
- if the findings warrant notification under WQCC1203.

This part of the evaluation also includes the name of the reviewer and date that the evaluation/site visit was performed.

## **6.0 IMPLEMENTATION OF CORRECTIVE ACTION**

### **6.1 Plans, Reports, and Implementation**

Sites which have positive results on the survey indicating there is a water quality concern, require a plan to be generated outlining corrective action at the site. These corrective actions can be minimal activities such as BMPs, temporarily stabilizing the site until a final remedy can be applied or the final remedy itself. Temporary solutions require routine maintenance to ensure their effectiveness. Final remedies will likely be contaminant removal or the application of an engineered solution, inhibiting contamination migration, protecting state waters. These plans should be reviewed by ESH-18, in order to ensure all water protection requirements are satisfied. Upon completion of the corrective activities (temporary or final), a report should be generated describing the results of the actions.

### **6.2 Prioritization**

Sites which have been identified as having water quality concerns associated with them, must be prioritized to ensure the worst site is addressed first. NMED has expressed concern related to those contaminants which fall into the class of bioaccumulators. Some examples of these type of contaminants are mercury and polychlorinated biphenals. Those sites with the highest potential for contaminant migration also should be taken care of as quickly as possible

### **6.3 Financial Responsibility for Corrective Actions**

The ER Project is responsible for ensuring that historical, inactive sites do not adversely effect the State's water quality. ER will fund all corrective actions and stormwater BMPs at those sites. For those inactive sites which have been created since 1988 and active sites that might currently be effecting water quality, the landlord of those sites or FSS Division will fund those actions.

## **8.0 ATTACHMENTS**

Attachment A – Environmental Restoration Project Water Quality Assessment and Notification Checklist

Attachment B – PRS Water Quality Decision Logic

Attachment C – NMED WQCC Standards

**Los Alamos National Laboratory Water Quality/Hydrology Group  
ER WATER QUALITY ASSESSMENT AND NOTIFICATION CHECKLIST**

Date \_\_\_\_\_ Time \_\_\_\_\_

Data Reviewed by \_\_\_\_\_

Location (PRS number) \_\_\_\_\_ HSWA  Yes  No

Description of PRS \_\_\_\_\_

Has contaminant been detected in surface or groundwater above WQCC Standards or detected in soils above SALs or background UTLs through ER sampling?  Yes  No

Contaminant(s) and concentration(s) identified in soil and/or groundwater

<u>Contaminants</u>	<u>Concentrations</u>	<u>SAL/UTL/WQCC Standard</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Numbers of samples

Sample Description (soil, water (non tclp), depth, surface, aquifer, etc.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ownership: \_\_\_\_\_

Visible Debris identified  Yes  No

Extent known  Yes  No

Activity identifying contamination  Phase one  Phase two  Accelerated cleanup  Other

Water Quality/Hydrology Group Notified

Date \_\_\_\_\_ Time \_\_\_\_\_ Person \_\_\_\_\_

Signature of ER Representative

**Los Alamos National Laboratory Water Quality/Hydrology Group**  
**ESH-18 WATER QUALITY ASSESSMENT AND NOTIFICATION CHECKLIST (continued)**

PRS number \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_

Site Assessment conducted by \_\_\_\_\_

**PRS setting**

**Site topography**

- |  |  |
|--|--|
| _____ on mesa top                              | _____ within the second bench of the watershed             |
| _____ within the rim of the watershed          | _____ within the bottom of the watershed                   |
| _____ within the first slope of the watershed  | _____ within a tributary of a watercourse in the watershed |
| _____ within the first bench of the watershed  | _____ PRS drains to canyon ( ) and/or watercourse          |
| _____ within the second slope of the watershed |  |

**Other factors**

Ground cover (leaves, needles, rocks, boulders, etc.)

\_\_\_\_\_  
\_\_\_\_\_

Canopy cover (natural or man-made etc.)

\_\_\_\_\_  
\_\_\_\_\_

Structures (physical man-made, naturally occurring etc.)

\_\_\_\_\_  
\_\_\_\_\_

Other (erosion factors, soil disturbance etc.)

\_\_\_\_\_  
\_\_\_\_\_

**Is stormwater drainage onto the site a potential contaminant transport mechanism?**

Yes  No

Do roof drains or parking lot runoff drain onto site?

Yes  No

Are natural drainage patterns directing stormwater onto site?

Yes  No

Do NPDES outfalls or stormwater outfalls discharge onto site?

Yes  No

**Is stormwater runoff from the site a potential contaminant transport mechanism?**

Yes  No

Are there obvious drainage channels on or existing the site?

Yes  No

**Los Alamos National Laboratory Water Quality/Hydrology Group**  
**ESH-18 WATER QUALITY ASSESSMENT AND NOTIFICATION CHECKLIST (continued)**

- Is there a potential for sheet runoff?  Yes  No
  - Are there exposed, potentially contaminate soils?  Yes  No
  - Are there cut banks or is arroyo initiation occurring on site?  Yes  No
  - What is the average slope found at the site? (circle one)
- Less than 10%     
  10% to 30%     
  30% to 50%     
  >50%

**Final Water Quality Determination**

- 1. Based on above criteria, does potential exists for contaminants to migrate to surface or ground water?  Yes  No
- 2. Is there debris within or does the potential exist for debris to migrate to a water course?  Yes  No
- 3. Has this information been provided to NMED within a Laboratory document (SWMU Report RFI Work Plan, RFI Report, etc.)  Yes  No
- 4. Based on the above information, it is believed that it is necessary to implement a corrective action or BMP to protect water quality.  Yes  No
- 5. Based on above information, it is believed that it is necessary to notify under WQCC 1203.  Yes  No

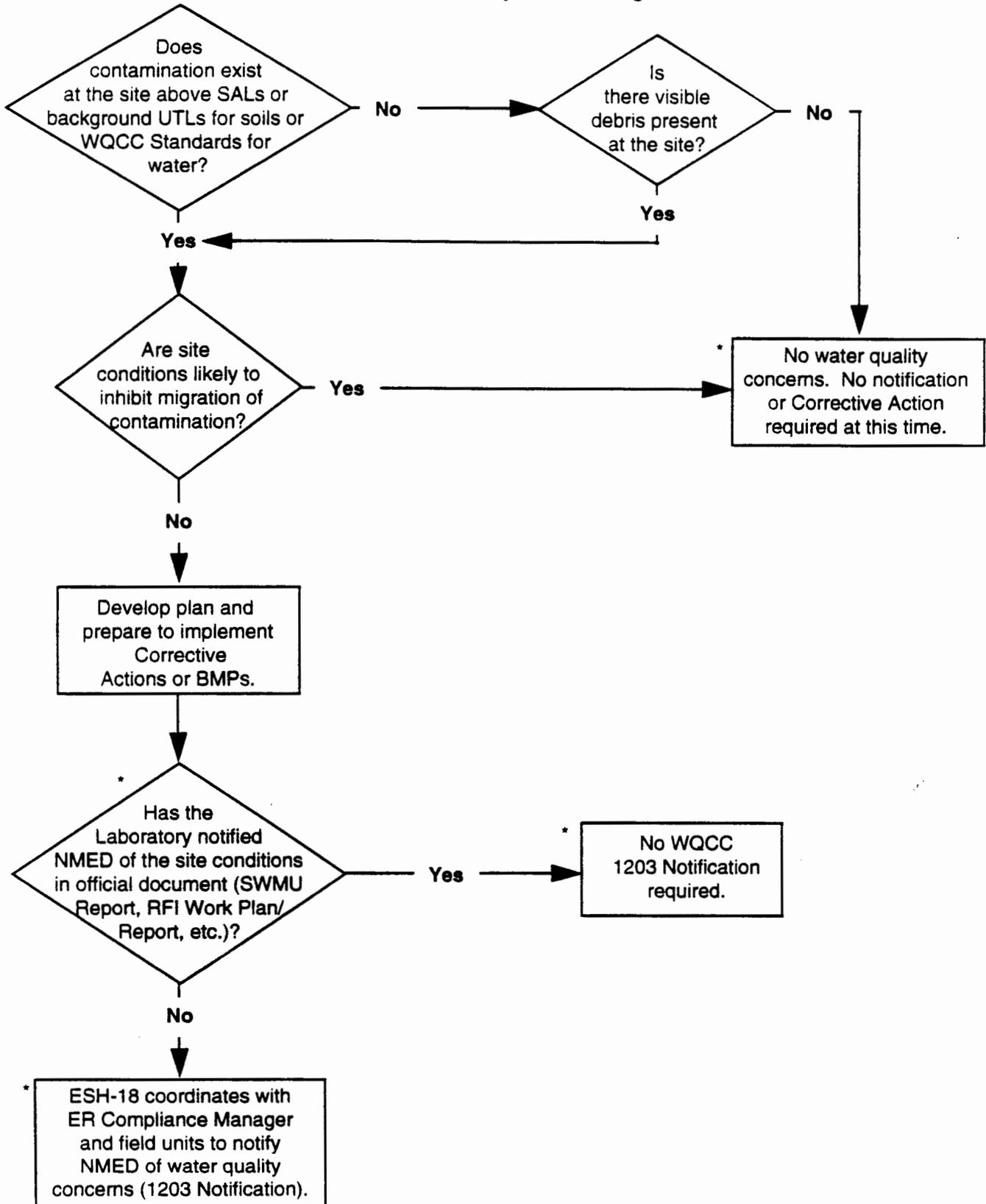
\_\_\_\_\_  
Signature of Water Quality/Hydrology Representative

SWQB notified: \_\_\_\_\_

Date: \_\_\_\_\_

\* Coordinate notification with ER Compliance Manager and Field Unit Representative.

**Los Alamos National Laboratory Environmental Restoration Project  
PRS Water Quality Decision Logic**



\*Notification process for sites being addressed under RCRA currently being negotiated with NMED.

**Water Quality Standards  
Los Alamos National Laboratory Stream Segments**

A. Livestock Watering: The following numeric standards shall not be exceeded

<u>Parameter</u>	<u>Sample Value</u>	
Dissolved aluminum	5.0	mg/l
Dissolved arsenic	0.2	mg/l
Dissolved boron	5.0	mg/l
Dissolved cadmium	0.05	mg/l
Dissolved chromium <sup>2</sup>	1.0	mg/l
Dissolved cobalt	1.0	mg/l
Dissolved copper	0.5	mg/l
Dissolved lead	0.1	mg/l
Total mercury	0.01	mg/l
Dissolved selenium	0.05	mg/l
Dissolved vanadium	0.1	mg/l
Dissolved zinc	25.0	mg/l
Radium-226 + radium 228	30.0	pCi/l
Tritium	20,0000	pCi/l
Gross alpha	15	pCi/l

<sup>1</sup>When a classified water of the State has more than a single designated use, the applicable numeric standards shall be the most stringent of those established for such classified water.

<sup>2</sup>The standards for chromium shall be applied to an analysis which measures both the trivalent and hexavalent ions.

<sup>3</sup>When a point or nonpoint source discharge creates a source of water which could be used by livestock and wildlife in a non-classified, otherwise ephemeral waters of the State, such waters of the State shall be protected for the used of livestock watering and wildlife habitat by the standards applicable to these uses as set forth in Section 3101 of these standards.

B. Wildlife Habitat: The narrative standard has been paraphrased. For exact language refer to 20 NMAC 6.1.

The wildlife habitat standards are narrative and prohibit the discharge of any substance, including but not limited to selenium DDT, PCBs and dioxin, at a level which, when added to back ground concentrations, can lead to bioaccumulation to toxic levels in any animal species. Stream standards of 2 ug/l and 0.012 ug/l are established for selenium and mercury respectively. Discharges to waters which are designated for wildlife habitat uses, but not for fisheries uses, shall not contain ammonia and chlorine at levels which reduce biological productivity and/or species diversity to levels below those which occur naturally. In addition discharges shall not contain Cl<sub>2</sub> in excess of 1 ppm.

C. Radioactivity: The radioactivity of surface waters shall be maintained at the lowest practical level and shall in no case exceed the standards set forth in Part 4 of New Mexico Environmental Improvement Board Radiation Protection Regulations, filed March 10, 1989.

**D. General Standards:** General standards are established to sustain and protect existing or attainable uses of waters of the State. These general standards apply at all times, unless a specified standard is provided elsewhere in this document, to all surface waters of the State. Watercourses shall be free of any water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property. The occurrence of a water contaminant or a deficiency of dissolved oxygen attributable to natural causes or the reasonable operation and maintenance of irrigation and flood control facilities is not subject to these general standards. The foregoing provision does not include major reconstruction of storage dams or diversion dams except for emergency action necessary to protect health and safety of the public, or discharges from municipal separate storm sewers. All the General Standards listed in Section 1102.A-F of 20NMAC 6.1 shall apply.

**GROUND WATER STANDARDS**

Arsenic (As)	≤0.1 mg/l
Barium (Ba)	≤1.0 mg/l
Cadmium (Cd)	≤0.01 mg/l
Chromium (Cr)	≤0.05 mg/l
Cyanide (CN)	≤0.2 mg/l
Fluoride (F)	≤1.6 mg/l
Lead (Pb)	≤0.05mg/l
Total Mercury (Hg)	≤0.002 mg/l
Nitrate (NO <sub>3</sub> as N)	≤10.0 mg/l
Selenium (Se)	≤0.05 mg/l
Silver (Ag)	≤0.05 mg/l
Uranium (U)	≤5.0 mg/l
Radioactivity: Combined	
Radium-226 & Radium-228	≤30.0 pCi/l
Benzene	≤0.01 mg/l
Polychlorinated biphenyls (PCBs)	≤0.001 mg/l
Toluene	≤0.75 mg/l
Carbon Tetrachloride	≤0.01 mg/l
1, 2-dichloroethane (EDC)	≤0.01 mg/l
1, 1-dichloroethylene (1, 1-DCE)	≤0.005 mg/l
1, 1, 2, 2-tetrachloroethylene (PCF)	≤0.02 mg/l
1, 1, 2-trichloroethylene (TCE)	≤0.1 mg/l
ethylbenzene	≤0.75 mg/l
total xylenes	≤0.62 mg/l
methylene chloride	≤0.1 mg/l
chloroform	≤0.1 mg/l
1, 1-dichloroethane	≤0.025 mg/l
ethylene dibromide (EDB)	≤0.0001 mg/l
1, 1, 1-trichloroethane	≤0.06 mg/l
1, 1, 2-trichloroethane	≤0.01 mg/l
1, 1, 2, 2-tetrachloroethane	≤0.01 mg/l
vinyl chloride	≤0.001 mg/l
PAHs: total naphthalene plus monomethylnaphthalenes	≤0.03 mg/l
benzo-a-pyrene	≤0.0007 mg/l
Aluminum (AL)	≤5.0 mg/l
Boron (B)	≤0.75 mg/l
Cobalt (Co)	≤0.05 mg/l
Molybdenum (Mo)	≤1.0 mg/l
Nickel (Ni)	≤0.2 mg/l
Chloride (Cl)	≤250.0 mg/l
Copper (Cu)	≤1.0 mg/l
Iron (Fe)	≤1.0 mg/l
Manganese (Mn)	≤0.2 mg/l
Phenols	≤0.005 mg/l
Sulfate (SO <sub>4</sub> )	≤600.0 mg/l
Total Dissolved Solids (TDS)	≤1000.0 mg/l
Zinc (Zn)	≤10.0 mg/l
pH	Between 6 and 9

<sup>1</sup>These estimated concentrations apply to the dissolved portion of the contaminants specified with a definition of dissolved being that given in the publication "Methods for Chemical Analysis of Water and Waste of the U.S. Environmental Protection Agency," with the exception that standards for mercury, organic compounds and non-aqueous phase liquids shall apply to the total unfiltered concentrations of the contaminants.