- Arsenic ≤ 5 ppm
- Barium ≤ 100 ppm
- Cadmium ≤ 1 ppm
- Chromium ≤ 5 ppm
- Lead ≤ 5 ppm
- Mercury ≤ 0.2 ppm
- Selenium ≤ 1 ppm
- Silver ≤ 5 ppm

Guidance for Determining Cleanup Levels

This section should be used as guidance for oil and gas operators and Division Staff in evaluating the appropriate cleanup levels for oil and gas exploration and production (E&P) related sites. This guidance also applies to treated oily E&P waste material which is to be applied to soil or buried.

The approach utilizes a ranking system to evaluate the environmental sensitivity of a site. The subsequent score derived from the ranking process is used to determine appropriate cleanup level.

Levels of Environmental Cleanup and Recommended Cleanup Levels for Soils and Oily Wastes

Sensitivity Level	Total Petroleum Hydrocarbon (TPH in mg/kg or ppm)
Level I	0.01 ppm to 9,999 ppm
Level II	10,000 ppm

For sites with a Sensitivity Level I, the cleanup level will be calculated using the formula below. Values of 9,999 ppm and 0.01 ppm TPH are the upper and lower limits of cleanup required.

- 0.009 ÷ fraction benzene in soil = cleanup level in ppm
  - where: 0.009 = attenuation factor
- Example: 0.009 ÷ 0.0001 = 90ppm TPH
  - For a 0.01% benzene level in waste or soil to be abandoned
  - The percentage of TPH which is benzene is an indication of the aqueous solubility of the waste

Summation of Ranking Criteria to Determine Sensitivity & Cleanup Levels

The summation of all of the above ranking scores will yield one value which shall be used to determine the appropriate soil cleanup levels on a case-by-case basis. The sensitivity levels are as follows:

- Level I Sensitivity Cleanup: For scores totaling ≥ 50
- Level II Sensitivity Cleanup: For scores totaling < 50

Sensitivity Evaluation Ranking Criteria and Ranking Scores for Cleanup Levels

Site-Specific Factors	**Ranking Score**
Distance to Groundwater (feet)	
>100	0
100 to 75	5
75 to 50	10
50 to 25	20
25 to 10	30
<10, or recharge area	50
Native Soil Type	
Low permeability	0
Mod. permeability	10
High permeability	20
Annual Precipitation (inches)	
<10	0
10 to 20	5
>20	10
Distance to Nearest Municipal Water Well (feet)	
>5280	0
1320 to 5280	10
500 to 1320	20
<500	30
Distance to Other Water Well (feet)	
>1320	0
300 to 1320	10
<300	20
Distance to Surf. Water (feet)	
>1500	0
1000 to 1500	5
500 to 1000	15
300 to 500	30
<300	50
Affected Populations	
<100	0
100 to 300	5
>300	10
Presence of Utility Conduits	
Not Present	0
Unknown	5
Present	10

Ranking Criteria for Sensitivity Levels

1) Depth to Groundwater

Depth to groundwater is evaluated in feet below lowermost contamination depth. This evaluation must consider the highest seasonal average. In some cases, depth to groundwater and subsurface contamination are both relatively deep. In addition, recharge areas are considered to be as environmentally sensitive as the lowest distance from contamination to groundwater. Sites located in recharge areas may therefore be considered zero feet from contamination to groundwater.

2) Soil Type

The predominant site lithology and native soil type will be determined by soils classified according to the Unified Soil Classification. Permeability of native soils shall be determined according to the following:

a) Low permeability (clay, shale, fat clay, high plasticity clay, elastic silt low plasticity silt, lean clay, silty clay, sandy clay, silty or clayey fine sand, very fine gravelly clay, non-fractured igneous and metamorphic rocks, and consolidated, cemented sedimentary rocks; USC=Pt, OH, CH, MH,OL,CL,ML).

b) Moderate permeability (clayey sand, poorly graded sand-clay mixtures, silty sand, poorly graded sand-silt mixtures, moderately fractured igneous and metamorphic rocks, moderately permeable limestone; USC=SC, SM).

c) High permeability (fine sand, silty sand, sand, gravel, gravelly sand, clayey gravel, gravel-sand-clay-silt mixtures, silty, gravel, highly fractured igneous and metamorphic rocks, vesicular igneous rocks, cavernous or vuggy limestone; USC=SM, SP, SW, GC, GM, GP, GW).

3) Precipitation

Average annual precipitation in a specific area must be identified to evaluate effects of recharge and potential for mobilization of contaminants. Values for average annual precipitation are specific for Utah and represent the annual average precipitation in the desert, mountain, and intermediate geographical regions in the state (Waddell, et.al., 1987). Precipitation information shall be obtained from the nearest national meteorological weather station. Onsite ground cover (e.g. concrete or asphalt) that might prevent infiltration of precipitation is not considered due to the potential for irregularities and fractures in the ground cover that could allow infiltration.

4) Distance to Nearest Municipal Water Well

A municipal water well is assumed to be a well designed to supply groundwater for community consumption. The distances from subsurface contamination to a municipal water well, and corresponding scores shown below, are based on local and regional knowledge of properties of the deep confined aquifers that occupy many of the basins in Utah, and those which are tapped by production wells (Clark, et.al., 1990; Herbert, et.al., 1990, Hely, et.al., 1971). Using calculations for a well producing from a confined aquifer (Bouwer, 1978; Freeze and Cherry, 1979; Driscoll, 1986), the effective radii (r) of one-mile (5280 feet), one-quarter of a mile (1320 feet), and 500 feet induced by a high-capacity municipal well are calculated by applying a pumping rate (Q) of 1500 gallons per minute for 183 days (1/2 year) (t), from an aquifer with a hydraulic conductivity (K) of 100 feet per day (ft/day, clean sand), and an aquifer thickness (or perforated interval, b) of 500 feet, transmissivity (T) of 50,000 ft^2/day (Clark, et.al., 1990; Herbert, et.al, 1990, Hely, et.al., 1971), and a storage coefficient (S) of 0.001. The radii of influence is justified for a pumped or flowing well in a confined aquifer (Bouwer, 1978; Freeze and Cherry, 1979). The Environmental Protection Agency (1980) also suggests a critical minimum distance of 500 feet from a point source of contamination (a landfill, for example) and a down gradient drinking water well.

5) Distance to Other Water Wells

Other water wells will be defined as domestic, irrigation, and stock watering wells that generally have less capacity, and thus smaller radius of influence, than municipal wells. The critical distances of contamination from a low capacity well were also derived and are based on aquifer properties as described in hydrologic information publications for Utah (Hely, et.al., 1971, Waddell, et.al., 1987, Clark, et.al., and Herbert, et.al., 1990). Those properties include a hydraulic conductivity of 100 ft/day, aquifer thickness (or perforated interval) of 100 feet, transmissivity of 10,000 ft^2/day, pumping rate (Q) of 200 gallons per minute, and a pumping period (t) of 8 hours, which would result in a critical radius of influence of 300 feet (Driscoll, 1986), and maximum radius of influence of one-quarter mile (1320 feet).

6) Distance to Surface Water

Surface water bodies include perennial rivers, streams, creeks, irrigation canals and ditches, lakes, and ponds. The critical distance of contamination to a surface water body is based on experimental modeling by Stokman (1987). The model evaluated the changes in benzene concentration in groundwater at varying distances from a release of unleaded gasoline. The model predicted that an initial benzene concentration of approximately three times the MCL was reduced to below the MCL at a distance of 300 feet from the source. Although this distance may not be applicable in all cases, 300 feet is considered to be an appropriate critical distance between a source of contamination and surface water. Approximately three times the most sensitive distance is 900 feet, which is rounded up to 1000 feet.

7) Potentially Affected Populations

The score for affected populations is based on the number of potential receptors within a three-mile radius of a release site, using census plot information. A three-mile radius is based on the ability of contaminants to travel three miles via utility conduits, or by other means. The potentially affected populations include residents, employees, recreational users, and others who regularly enter the area.

8) Utility Conduits

Utility conduits include water distribution lines, sewer lines, septic tanks, buried electrical lines, and any other pathway within 300 feet that may facilitate contaminant migration.

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