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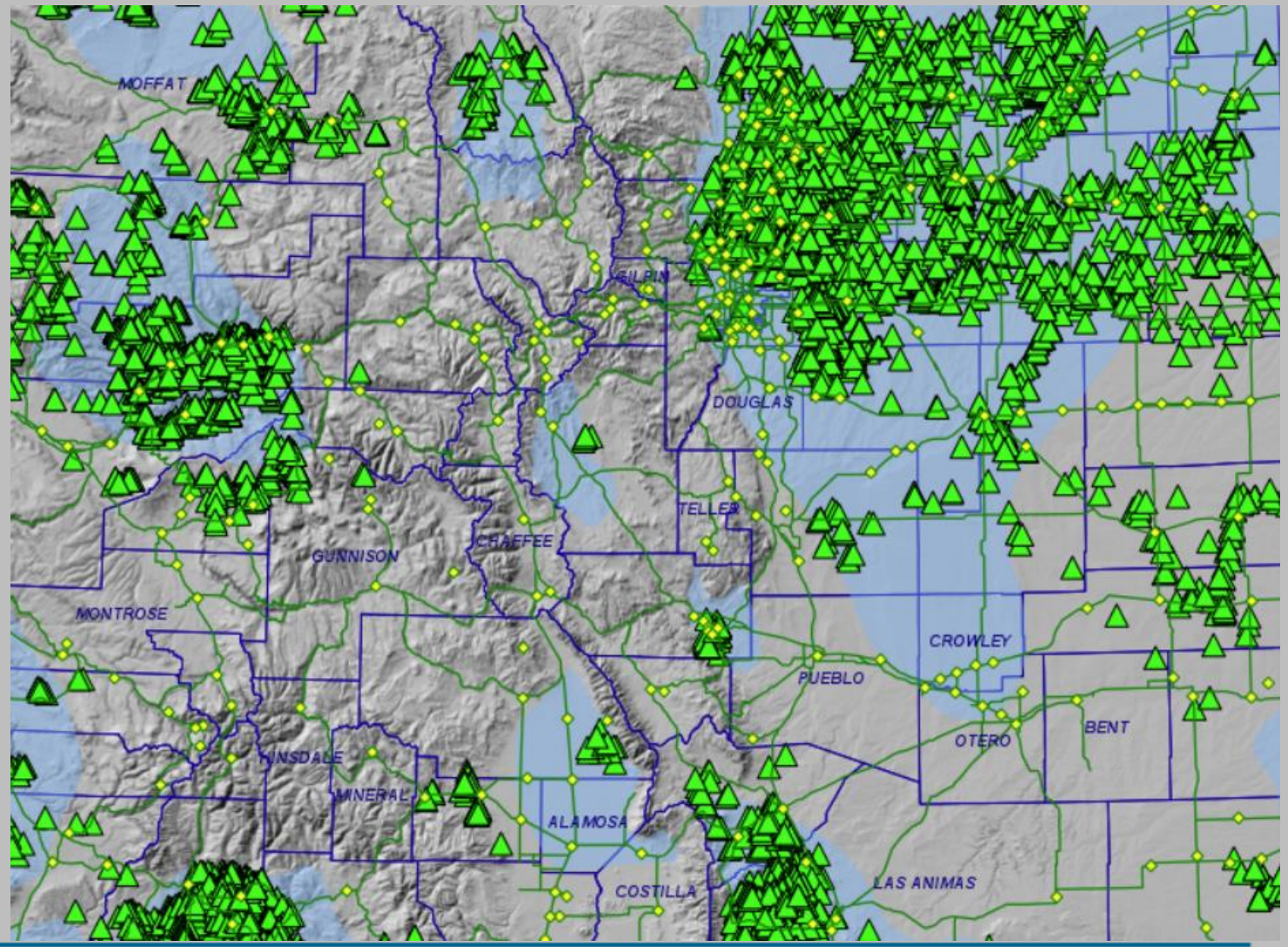
Environmental Impact Prevention – 900 Series

Environmental Impact Prevention

- January 15, 2020
- Three years of experience
- Multiple guidance documents
- Expanded analyte list
- Larger excavation areas
- Multiple visits
- Many spills per year
- Longer time frames



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Closure of Oil and Gas Facilities

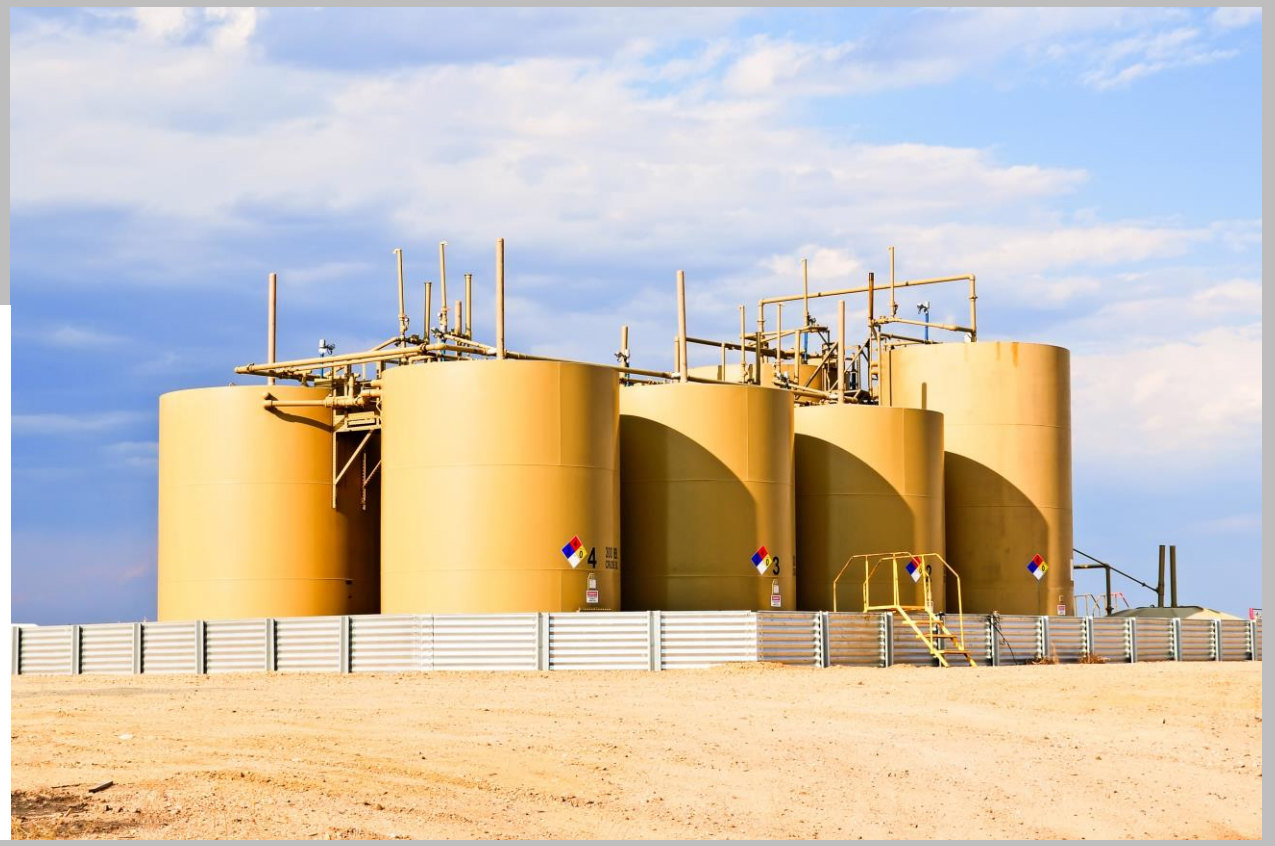
- Tank Batteries (911.a)
- Wellheads (911.a)
- Flowlines (911.a)
- Pits (911.c)
- Any substantial change

PROJECT INFORMATION

Remediation Project #: _____ Initial Form 27 Document #: _____

PURPOSE INFORMATION

- ☐ Rule 913.c.(1): Pit or Cuttings Trench closure.
- ☐ Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- ☐ Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- ☐ Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- ☐ Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- ☐ Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- ☐ Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- ☐ Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- ☒ Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- ☐ Rule 913.g: Changes of Operator.
- ☐ Rule 915.b: Request to leave elevated inorganics in situ.
- ☐ Other: _____



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Closure of Oil and Gas Facilities

- Form 27 Initial (30 Days Prior)
- Equipment decommissioning
- Soil screening/Confirmation sampling
- Photo documentation
- GPS Data
- Laboratory analysis

PROJECT INFORMATION

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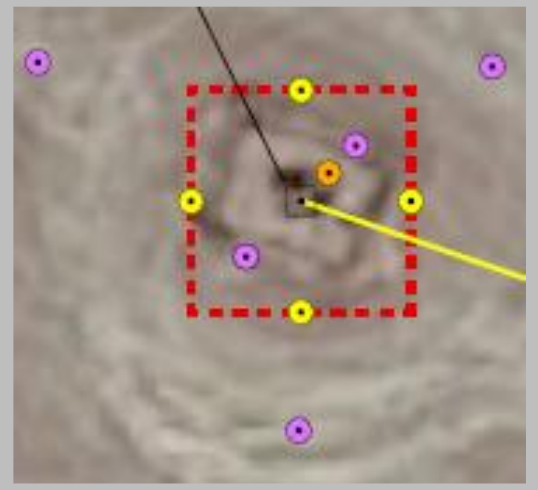
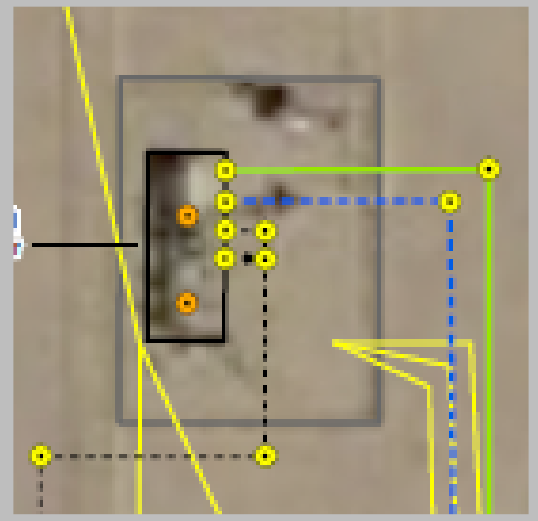
- ☐ Rule 913.g: Changes of Operator.
- ☐ Rule 915.b: Request to leave elevated inorganics in situ.
- ☐ Other: _____





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Spills And Releases

- 912.b.(1)
- Any spill that threatens the public and environment
- One barrel outside containment
- Five barrels inside containment
- Grade 1 Gas Leak
- 10 cubic yards of impacted material
- Impact waters of the state
- Spill with an unknown volume
- Vaporized hydrocarbon mist
- Release of natural gas
- Natural gas impacted groundwater

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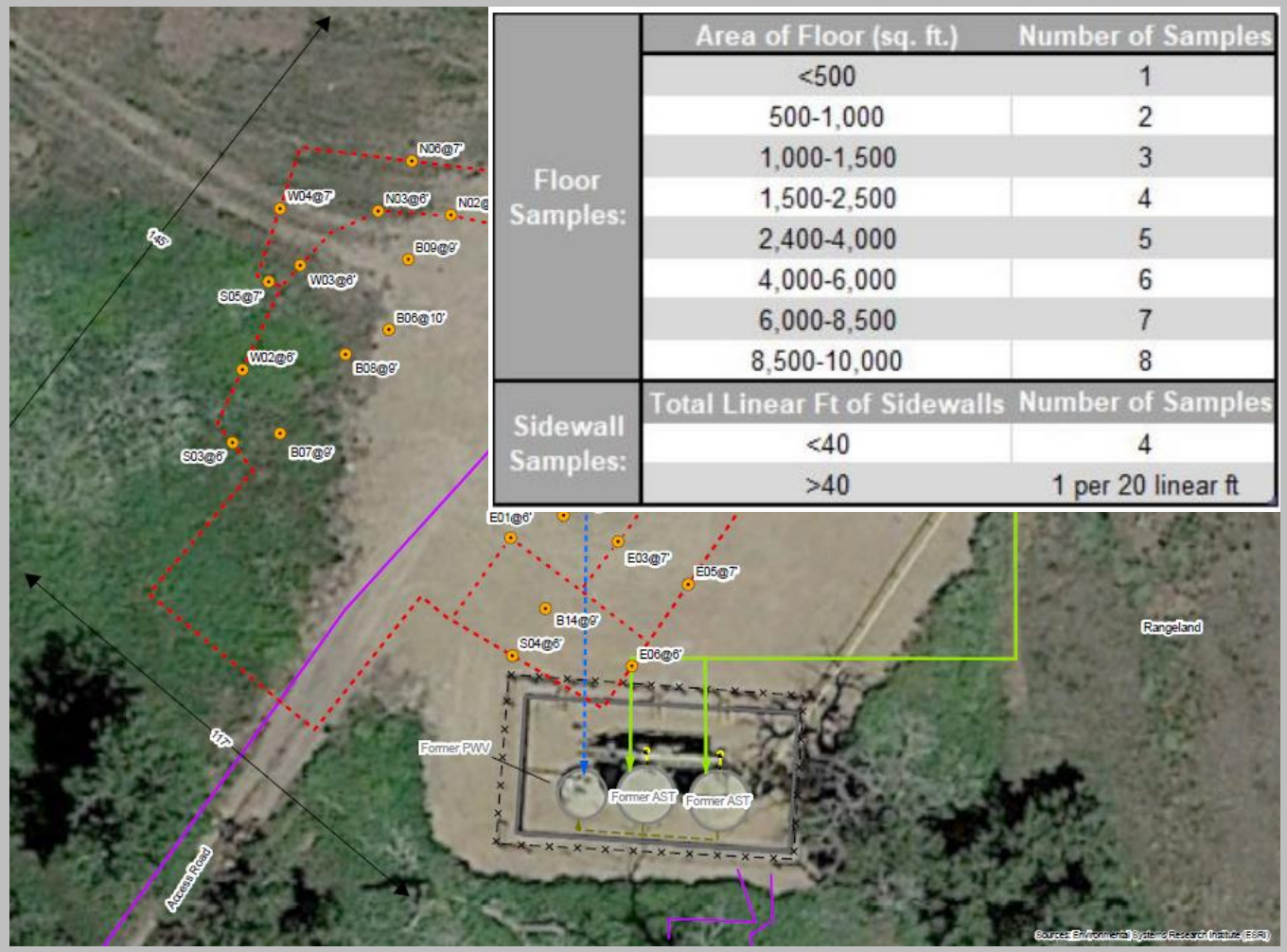
Spills And Releases

- 24-hour notification
- Landowner and local government notifications
- CPW Notification
- Form 19 Initial – 72 Hours
- Form 19 Supplemental – 10 day
- Requirements:
  - Photo documentation
  - Initial mitigation, site investigation, and remediation
  - GPS data
- Form 27 Initial – 90 days if the site is not closed



Floor Samples:	Area of Floor (sq. ft.)	Number of Samples
	<500	1
	500-1,000	2
	1,000-1,500	3
	1,500-2,500	4
	2,400-4,000	5
	4,000-6,000	6
	6,000-8,500	7
	8,500-10,000	8
Sidewall Samples:	**Total Linear Ft of Sidewalls**	**Number of Samples**
	<40	4
	>40	1 per 20 linear ft

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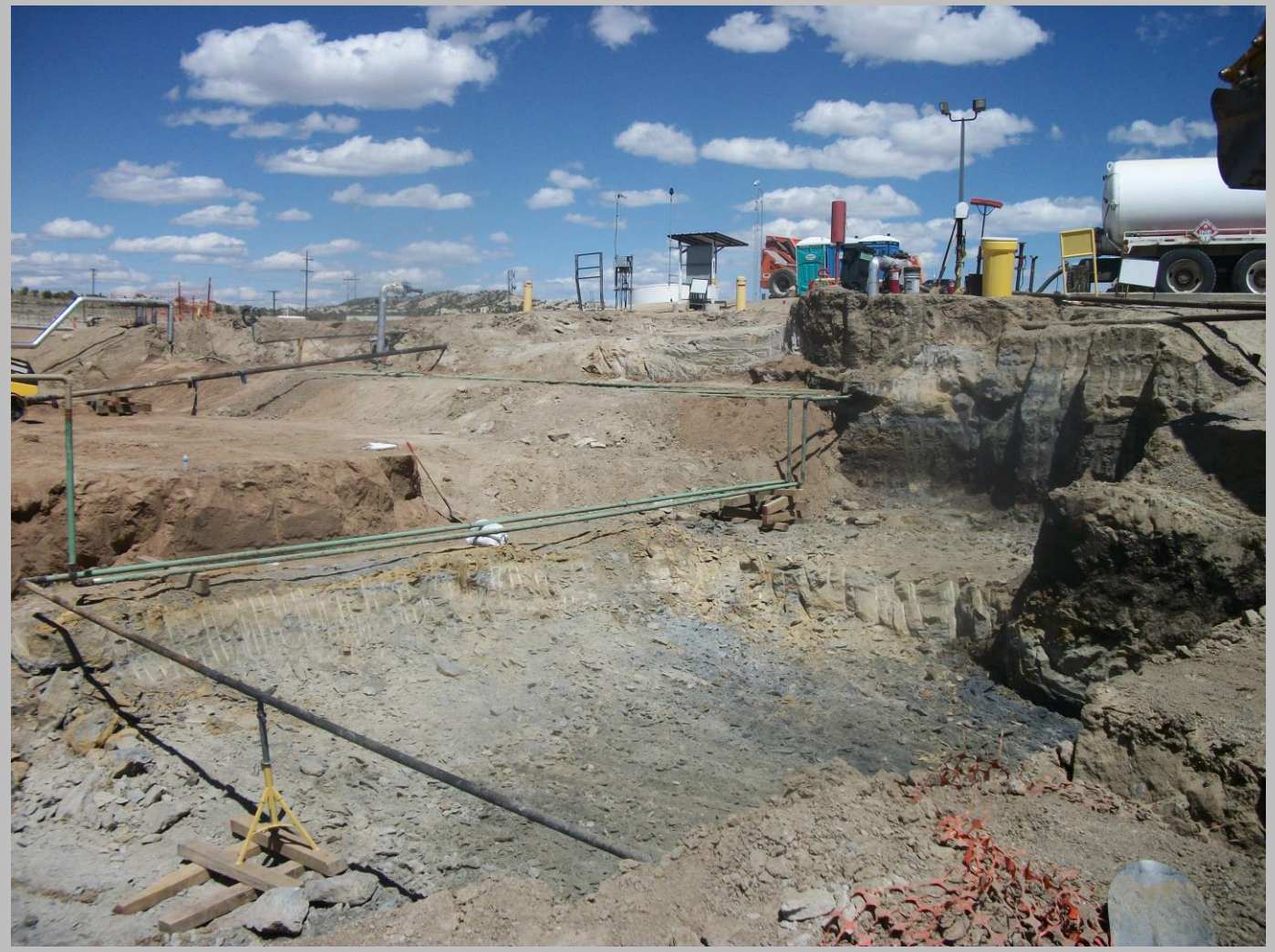
Spills And Releases

- Table 915-1
  - Extended analyte list
  - Protection of GW
  - Reclamation parameters
  - Metals
- Defining the extent
- Background samples
- Challenges
  - Longer sampling time
  - Longer laboratory turn around time
  - Multiple step outs
  - Infrastructure



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Site investigation, Remediation and Closure

- Form 27 – Remediation Plan
- Activities greater than 90 days
- Implementation schedule
- Technologies:
  - Excavation
  - Land treatment
  - Soil vapor extraction
  - Air sparging
  - Injections – Carbon/oxidants
  - Bioenhancements
  - Reclamation plans

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Challenges

- List of Analytes
- More stringent Standards (Protection of GW)
- Laboratory Turn around Times (5 to 10 days)
- Naturally occurring metals
  - Background Samples
  - Highly Variable
  - Arsenic is naturally high
- Timing and workflow

Table 915-1
CLEANUP CONCENTRATIONS

Contaminant of Concern	Concentrations
Soil TPH (total volatile [C_6-C_{10}] and extractable [C_{10}-C_{36}] hydrocarbons)	500mg/kg
Soils and Groundwater - liquid hydrocarbons including condensate and oil	below visual detection limits
Soil Suitability for Reclamation	
Electrical conductivity (EC) (by saturated paste method)[1,2]	<4mmhos/cm
Sodium adsorption ratio (SAR) (by saturated paste method)[1,2,3]	<6
pH (by saturated paste method)[1,2]	6–8.3
boron (hot water soluble soil extract)[1,2,3]	2mg/l
Organic Compounds in Groundwater[4]	
benzene	5µg/l
toluene[5]	560 to 1,000µg/l
ethylbenzene	700µg/l
xylenes (sum of o-, m- and p- isomers = total xylenes)[5]	1,400 to 10,000µg/l
naphthalene	140µg/l
1,2,4-trimethylbenzene	67µg/l
1,3,5-trimethylbenzene	67µg/l
Groundwater Inorganic Parameters[4]	
total dissolved solids (TDS)[1]	<1.25 X local background
chloride ion[1]	250mg/l or <1.25 X local background
sulfate ion[1]	250mg/l or <1.25 X local background

Table 915-1 (continued)

Contaminant of Concern	Concentrations	
	Residential Soil Screening Level Concentrations (mg/kg)[7]	Protection of Groundwater Soil Screening Level Concentrations (mg/kg) Risk Based (R) and MCL Based (M)[7,8]
Organic Compounds in Soils[6, 9, 10]		
benzene	1.2	0.0026 (M)
toluene	490	0.69 (M)
ethylbenzene	5.8	0.78 (M)
xylenes (sum of o-, m- and p- isomers = total xylenes)	58	9.9 (M)
1,2,4-trimethylbenzene	30	0.0081 (R)
1,3,5-trimethylbenzene	27	0.0087 (R)
acenaphthene	360	0.55 (R)
anthracene	1800	5.8 (R)
benz(a)anthracene	1.1	0.011 (R)
benzo(b)fluoranthene	1.1	0.3 (R)
benzo(k)fluoranthene	11	2.9 (R)
benzo(a)pyrene	0.11	0.24 (M)
chrysene	110	9 (R)
dibenzo(a,h)anthracene	0.11	0.096 (R)
fluoranthene	240	8.9 (R)
fluorene	240	0.54 (R)
indeno(1,2,3-cd)pyrene	1.1	0.98 (R)
1-methylnaphthalene	18	0.006 (R)
2-methylnaphthalene	24	0.019 (R)
naphthalene	2	0.0038 (R)
pyrene	180	1.3 (R)
Metals in Soils[1, 6, 9, 10, 11]		
arsenic	0.68	0.29 (M)
barium	15000	82 (M)
cadmium	71	0.38 (M)
chromium (VI)	0.3	0.00067 (R)
copper	3100	46 (M)
lead	400	14 (M)
nickel	1500	26 (R)
selenium	390	0.26 (M)
silver	390	0.8 (R)
zinc	23000	370 (R)

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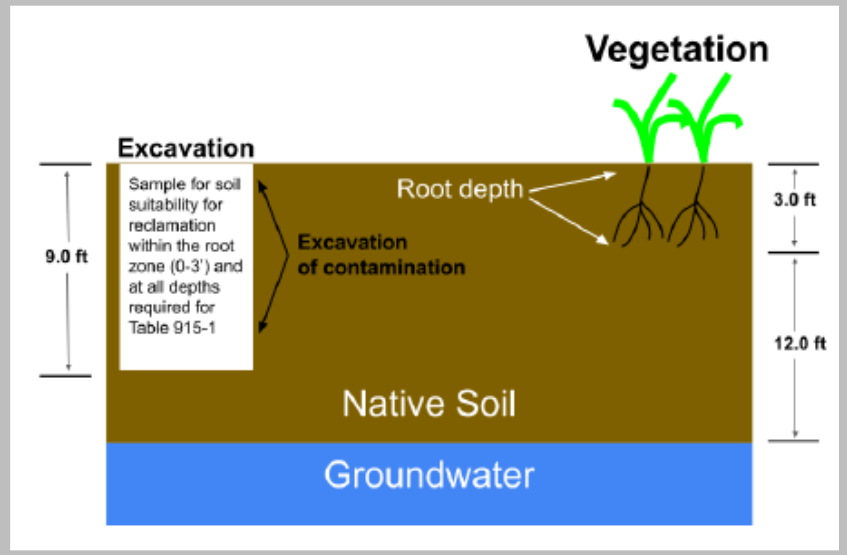
Site Closure

- Reduced analyte list – 915.E.(2)
- Reclamation plans
- Multiple background samples
- Large field staff
- Reporting and data group



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THANK YOU FOR ATTENDING

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