

Water Quality Guidelines, Standards, Expectations and Realities

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Erosion and Sediment Control Effectiveness

- Projects spend a lot of time and money on ESC
 - Planning
 - Installation
 - Inspection
 - Maintenance
- But how well are your controls really working ?
- Are you safe from regulatory consequence?

Erosion and Sediment Control Effectiveness

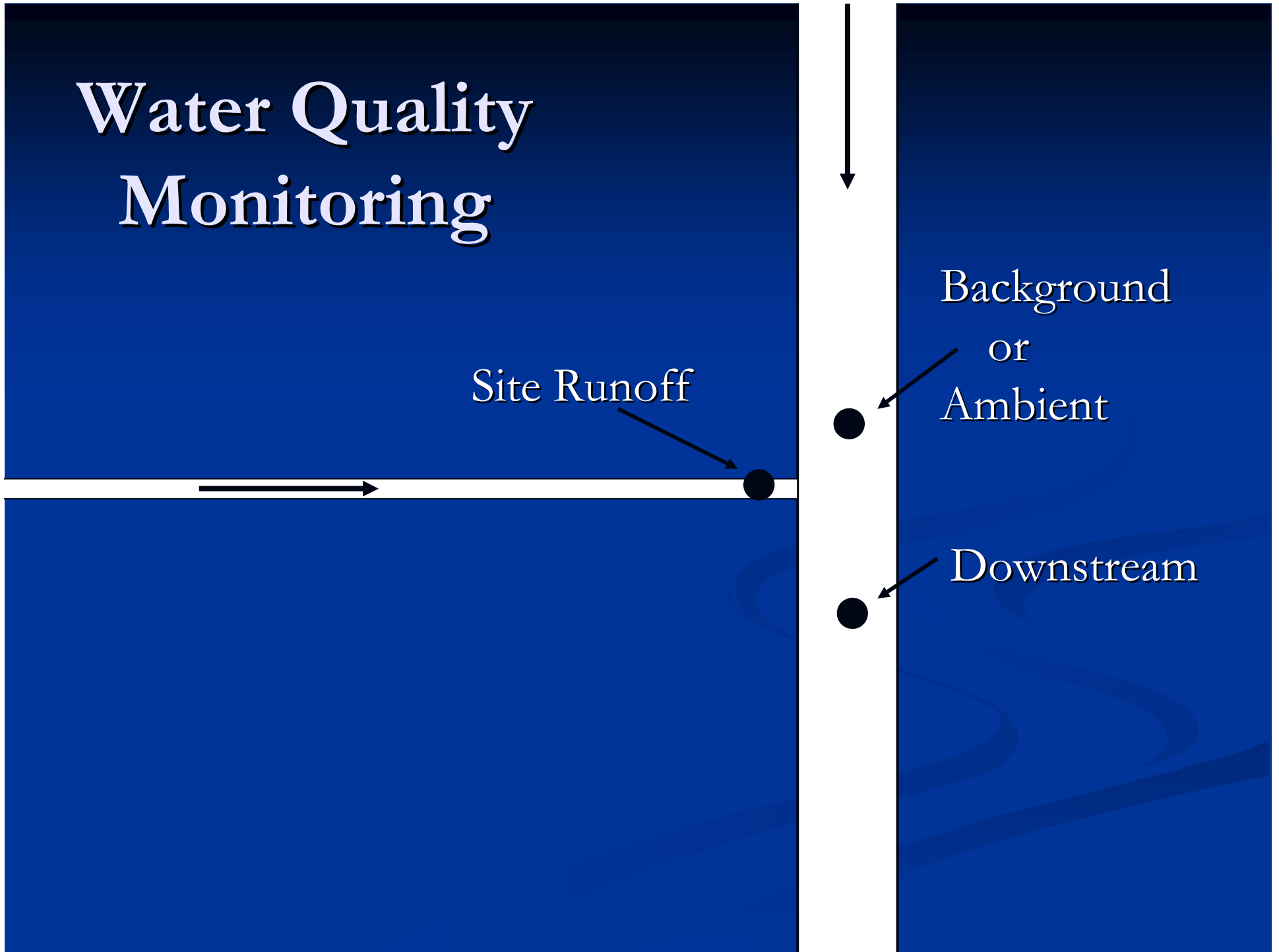
- Use indirect measures of erosion and sediment control efficiency
- Comparative measurements are made upstream and downstream of construction site and at other select locations

Water Quality Monitoring

Site Runoff

Background
or
Ambient

Downstream



Water Quality Monitoring

■ TSS

- Solids in water that can be trapped by a filter
- Sediment, decaying plant and animal matter, industrial wastes
- Measured in lab

■ Turbidity

- Measure of water clarity
- Measured in field using meters





<1 NTU

20 NTU

75 NTU

250 NTU

450 NTU

750 NTU

0 mg/L

40 mg/L

100 mg/L

420 mg/L

1250 mg/L

3300 mg/L

Water Quality Monitoring

- TSS and Turbidity Guidelines
 - Most Canadian jurisdictions have water quality guidelines for TSS and turbidity
 - Guidelines/objectives are not standards
 - If guidelines are exceeded may be an indicator additional mitigation is required

TSS and Turbidity Guidelines

<p>Aquatic Life</p> <ul style="list-style-type: none">- fresh- marine- estuarine	<p>8 NTU in 24 hours when background is less than or equal to 8</p> <hr/> <p>mean of 2 NTU in 30 days when background is less than or equal to 8</p>	<p>25 mg/L in 24 hours when background is less than or equal to 25</p> <hr/> <p>mean of 5 mg/L in 30 days when background is less than or equal to 25</p>
<p>Aquatic Life</p> <ul style="list-style-type: none">- fresh- marine- estuarine	<p>8 NTU when background is between 8 and 80</p> <hr/> <p>10% when background is greater than or equal to 80</p>	<p>25 mg/L when background is between 25 and 250</p> <hr/> <p>10% when background is greater than or equal to 250</p>



<1 NTU

20 NTU

75 NTU

250 NTU

450 NTU

750 NTU

0 mg/L

40 mg/L

100 mg/L

420 mg/L

1250 mg/L

3300 mg/L

Water Quality Guidelines

5 NTU or 500 NTU
(doesn't really matter)

Construction Site
Runoff



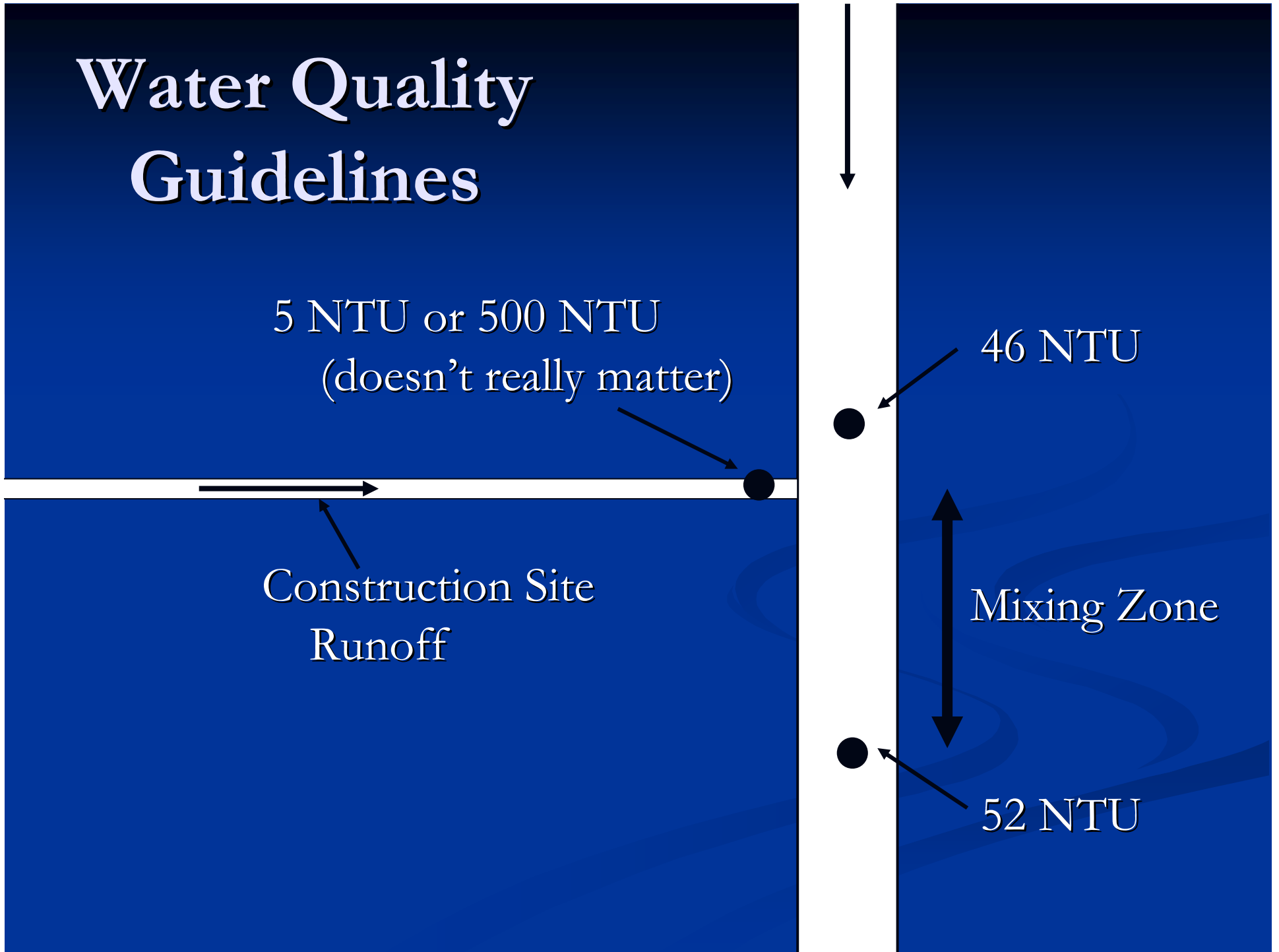
46 NTU



Mixing Zone



52 NTU



Department of Fisheries and Oceans

Water Quality Standards

- Land Development Guidelines for Protection of Aquatic Habitat are being revised
 - New TSS and turbidity standards are being proposed
 - Purpose to help projects understand Federal permissible sediment release
 - In the absence of standard
 - Has been a very difficult question to answer
 - Many projects fall back to provincial guidelines

SUSPENDED SOLIDS STANDARDS

- Runoff water from the development site should contain <25 mg/l of suspended solids above background levels of the receiving waters during normal dry weather operations
- Runoff water from the development site should contain <75 mg/l of suspended solids above background levels of the receiving waters during wet weather conditions.
 - Wet weather conditions are defined as 25 mm of rainfall within the previous 24 hours.

TURBIDITY STANDARDS

- Runoff water from the development site should have a turbidity of <25 Nephelometric Turbidity Units (NTU) above background during normal dry weather conditions
- Runoff water from the development site should have a turbidity of <100 Nephelometric Turbidity Units (NTU) above background during wet weather conditions.
 - Wet weather conditions are defined as 25 mm of rainfall within the previous 24 hours.

Notes on Standards

- Background levels
 - Natural instream suspended solids and turbidity levels measured upstream of any anthropogenic inputs or disturbance
 - Where natural levels cannot be determined, assume a natural background turbidity level for cold water streams in BC of 8 NTU
- All measurements are to be taken at point of discharge from the site (end of pipe)

Notes on Standards

- Standards apply only to short term (<6 month total duration), discontinuous discharges (occurring <50% of total time) over a watershed or catchment area that contributes less than 30% of total watershed flows.
- Where discharges are to particularly sensitive habitats or areas of high management concern DFO may specify more stringent standards.
- Where spawning areas are located in the receiving waters, runoff discharge should not at any time increase suspended solids levels above background levels

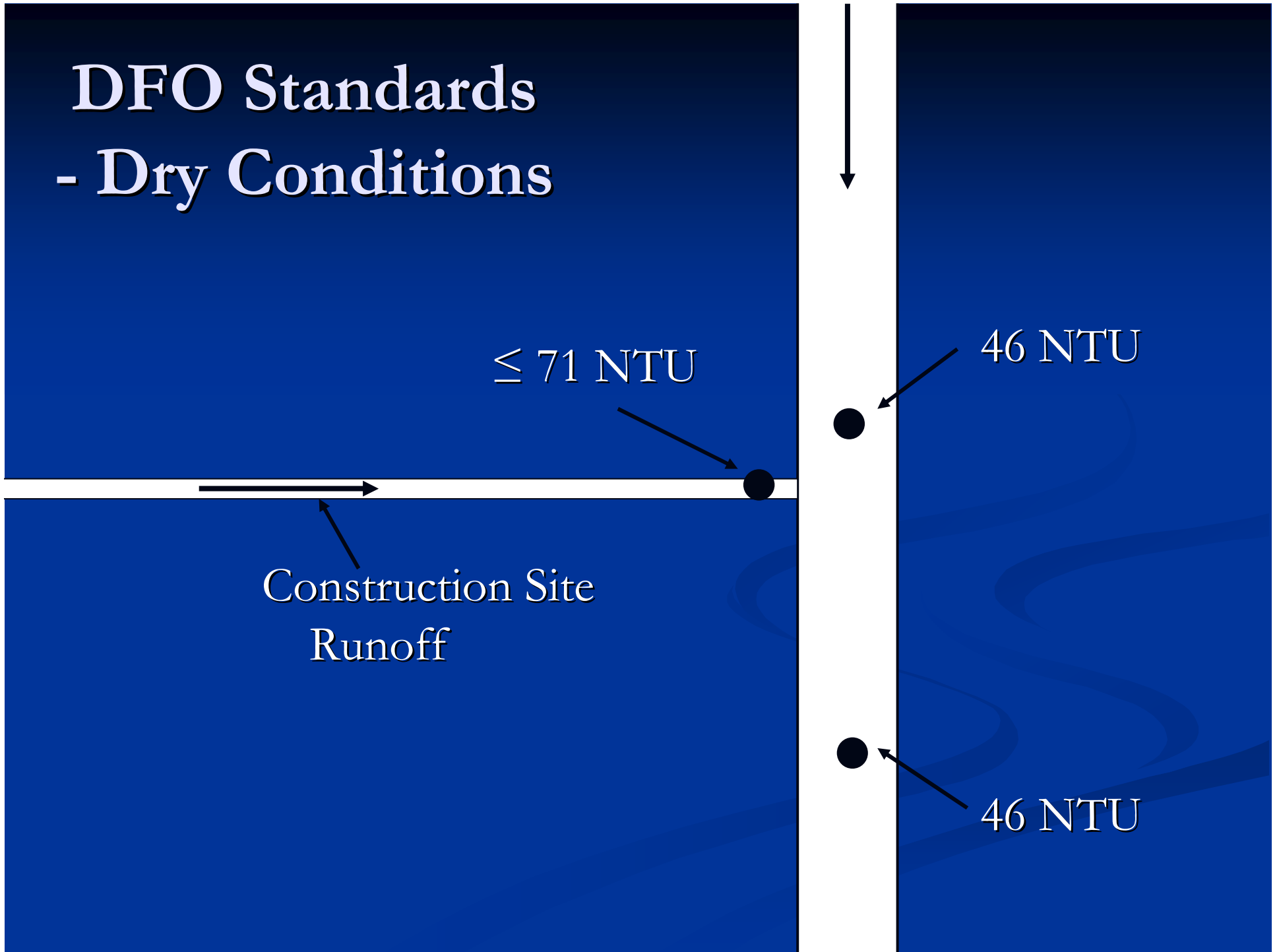
DFO Standards - Dry Conditions

≤ 71 NTU

Construction Site
Runoff

46 NTU

46 NTU



DFO Standards - Dry Conditions

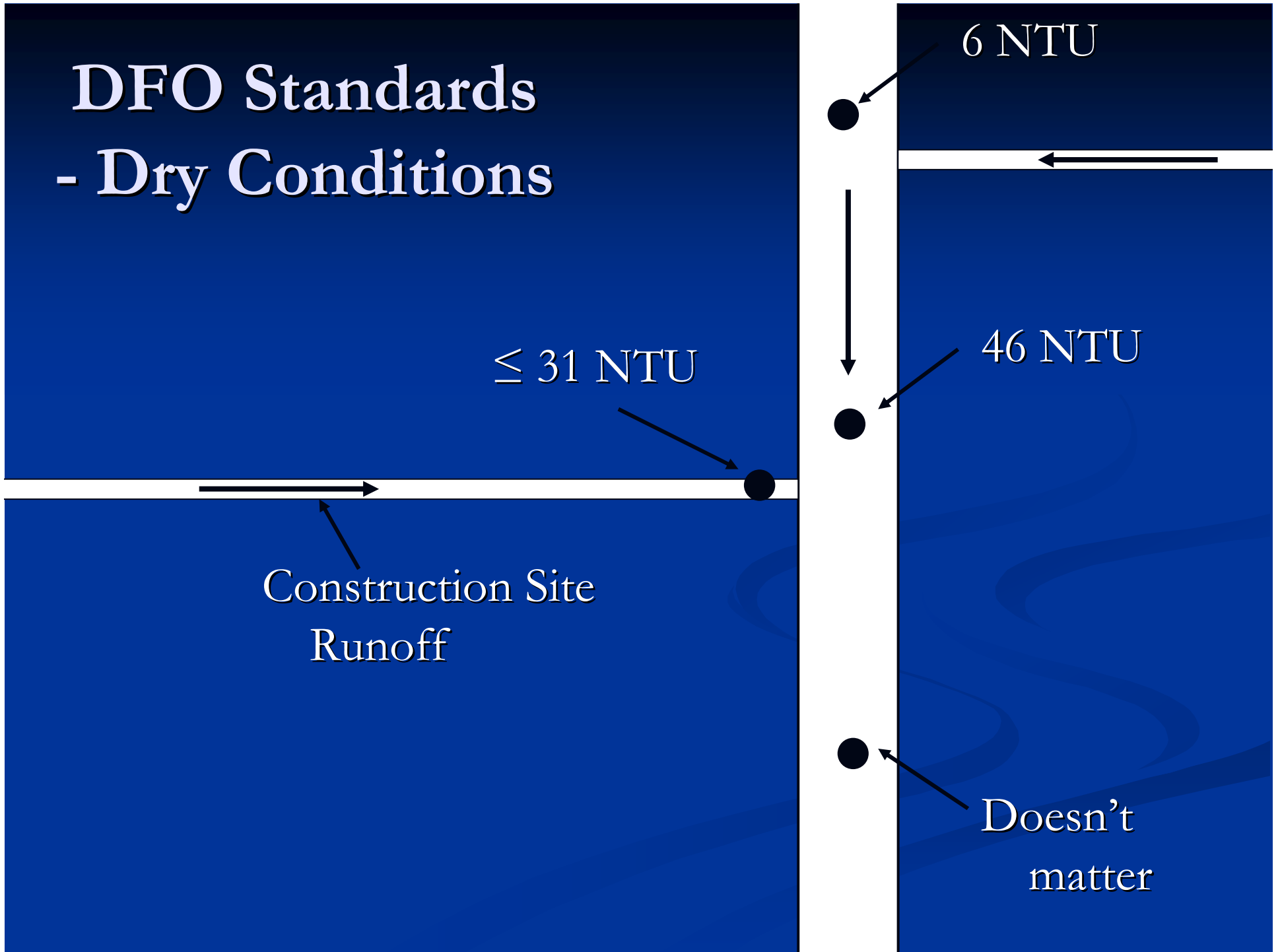
≤ 31 NTU

Construction Site
Runoff

6 NTU

46 NTU

Doesn't
matter



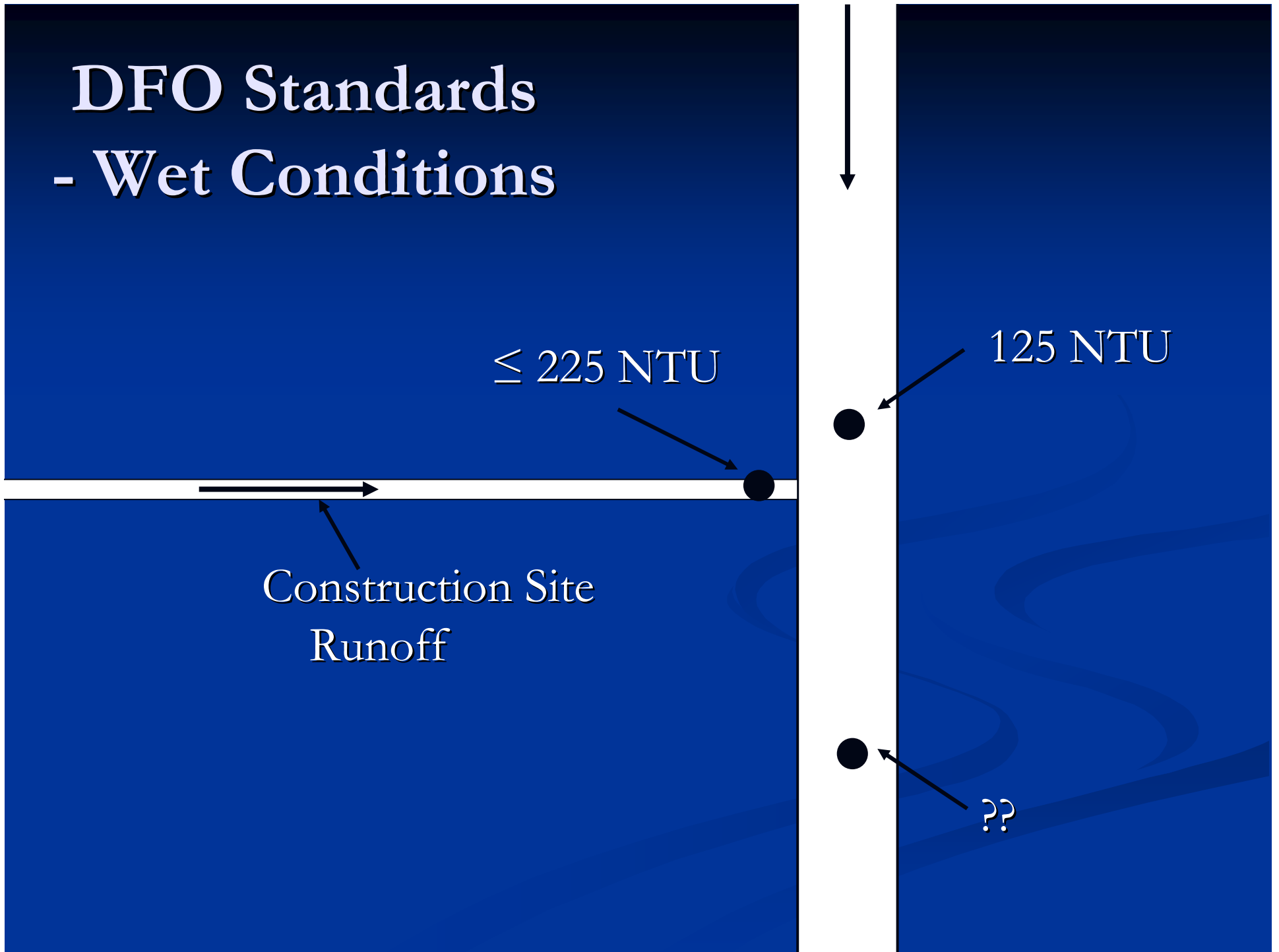
DFO Standards - Wet Conditions

≤ 225 NTU

Construction Site
Runoff

125 NTU

??



DFO Standards - Wet Conditions

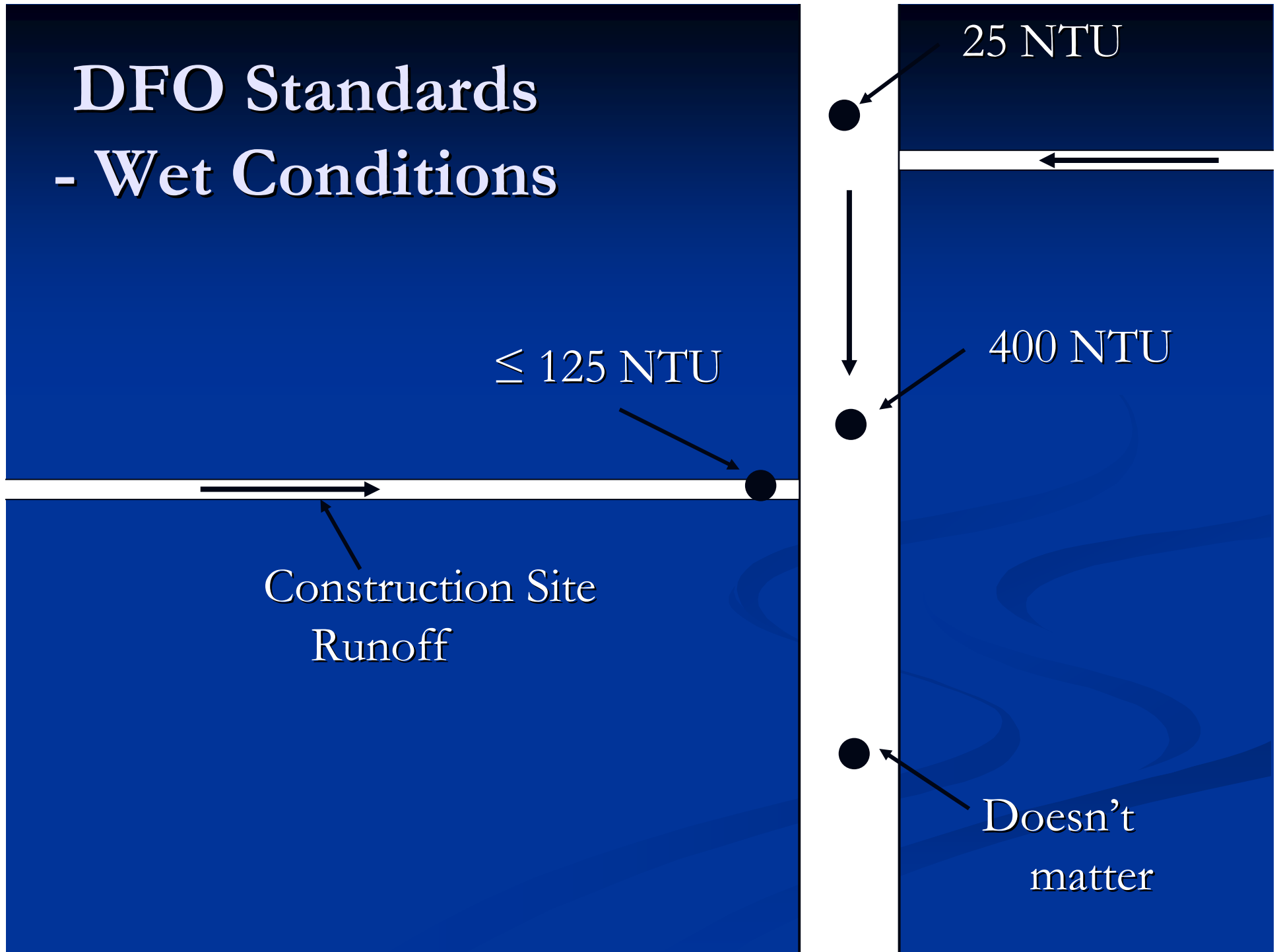
≤ 125 NTU

Construction Site
Runoff

25 NTU

400 NTU

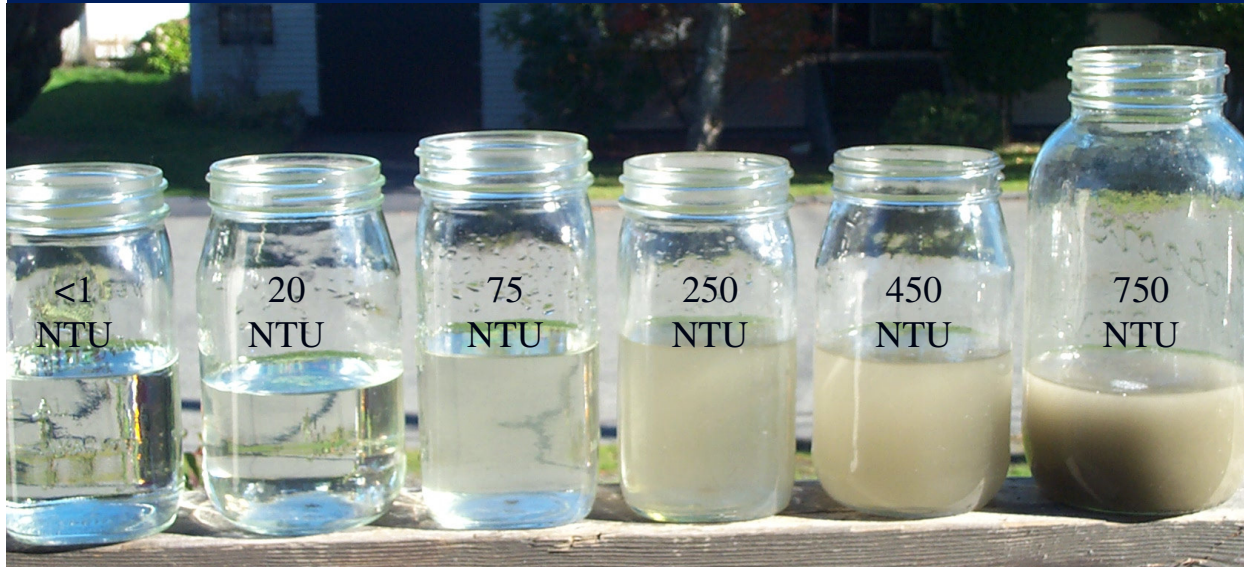
Doesn't
matter



Fisheries Act

- Does not say
 - If you adhere to provincial water quality guidelines you are complying with the Fisheries Act
- Federal Act has precedence
- Federal and provincial approaches to water quality management are fundamentally different

■ Turbidity and TSS



What is the turbidity in the water sample at right?



Conclusion

- Water quality standards for ESC do exist
- Compliance with standards is challenging
- Erosion (source) control must be primary control
 - Sediment (non-source) control must be secondary control
- Subjective measurement of ESC performance is unreliable
- Objective measurement of ESC performance is critical
 - Use a turbidity meter
 - Alternatively, send samples to a laboratory

ESC Training

- Google

- **VIU NREP**