



# Watermain Condition Assessment

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9:35 – 10:00



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# Condition Assessment

- All pipes/ pipe materials leak;
- All pipes can break;
  - 1 in 10 leaks will result in a break
- Industry figures show you can expect to find two leaks a mile in DI or CI transmission mains (>16");
- Condition assessment helps you proactively manage pipelines both small and large pipes;
- Control helps you reduce the cost of main breaks

## So What? You might say!!

- Condition Assessment and Repair can help reduce or refocus Capital Investment Program (CIP) \$;
- Condition Assessment and Repair of a pipeline should be typically 10-12% of the replacement cost;
- If the technology or the repair is such that this number grows to >25% - you should replace the line;
- Many criticality analysis programs comparing risk of failure with consequence of failure and they identify the priority pipelines;
- But these are largely desk top studies;
- You need a cost effective means of validating/calibrating the desk top study and the priority list.

# Distribution System Confidence to Make the Right Investments

- Eliminates needs for excavations;
- Eliminates replacement/lining of pipes that are still in good condition;
- Allows for comparison of pipeline degradation over time;
- Provides understanding of actual pipe condition;
- Maximize aging infrastructure investments.

# Tool Box Approach

- **Desktop Studies**
  - Need to rely on information at hand
- **Internal CCTV inspection (Presentation)**
  - Liner, internal visual condition, valves, joints, laterals
  - Leaks, etc.
- **Acoustic Pipe Wall Assessment**
  - *Average* stiffness, thickness
- **In-line Electro Magnetic inspection**
  - Localized defects in metallic pipe
  - Broken wires in PCCP
    - Requires line out of service OR >12" access into pressurized pipe
- **External Magnetic Flux Leakage testing**
  - Testing at excavation *pit*, then predictive model
- **Ultrasonics**
  - In-line wall thickness

# Internal CCTV Inspection:

## Tethered Tools:

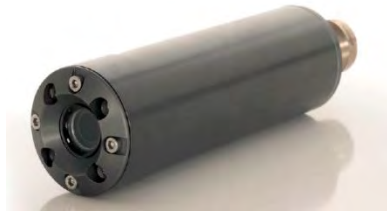


6-in to 12-in

Manual insertion  
300 ft of cable

Insertion through Hydrants and  
pressure fittings (2+ in / 50+ mm)

Live HD video  
Live internal acoustics  
Live pipe mapping capabilities



> 12-in

Flow dependant  
3200 ft of cable

Insertion through pressure  
fittings (2+ in / 50+ mm)

Live HD video  
Live internal acoustics  
Live pipe mapping capabilities



ROV

> 14-in

Dry or with water  
3500 ft of cable

Insertion through  $\geq 12$ -in valve  
opening

Live HD video  
Mapping capabilities

# Equipment Footprint

## Small and Large Diameter tethered tools

### SMALL Diameter :

- **Cable slack** (10 to 15 feet)
- **Working area** in between truck and insertion point

### LARGE DIAMETER :

- **Tripod** (allows cable to be feed vertically inside the pipe)
- **Cable slack** (10 to 12 feet)
- **Working area** in between truck and insertion point

➤ A typical job site will need to accommodate space for the following equipment:

- Truck

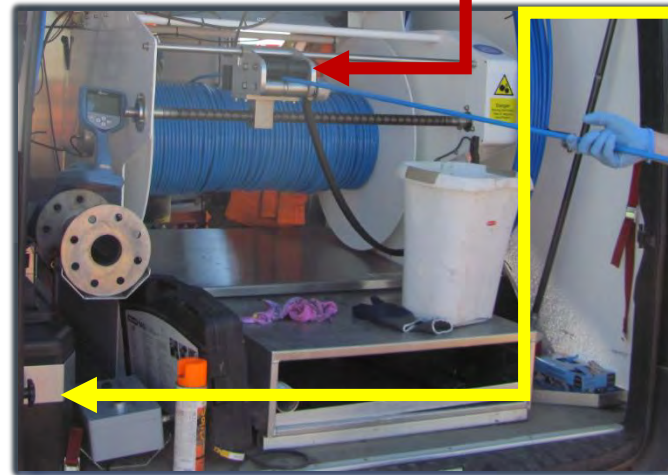




# Disinfection Process for all Technologies



- Prior to installing the launching device and camera head into the potable water network, the equipment is disinfected using a chlorine solution of 1000ppm or 1000mg\L.



Disinfection Chamber

Chlorine tank

- Once decontaminated and installed, the disinfection chamber mechanism cleans the cable as it enters the main.
- Operators wear nitrile gloves when handling the cable.



# Small Diameter Tethered Tool



Distance: 2.3 ft  
19:08:05, 11/02/2016



Distance: 26.5 m  
10:11:23, 9/09/2015



Distance: 163.4 ft  
19:11:54, 11/02/2016

# INSERTION OVERVIEW

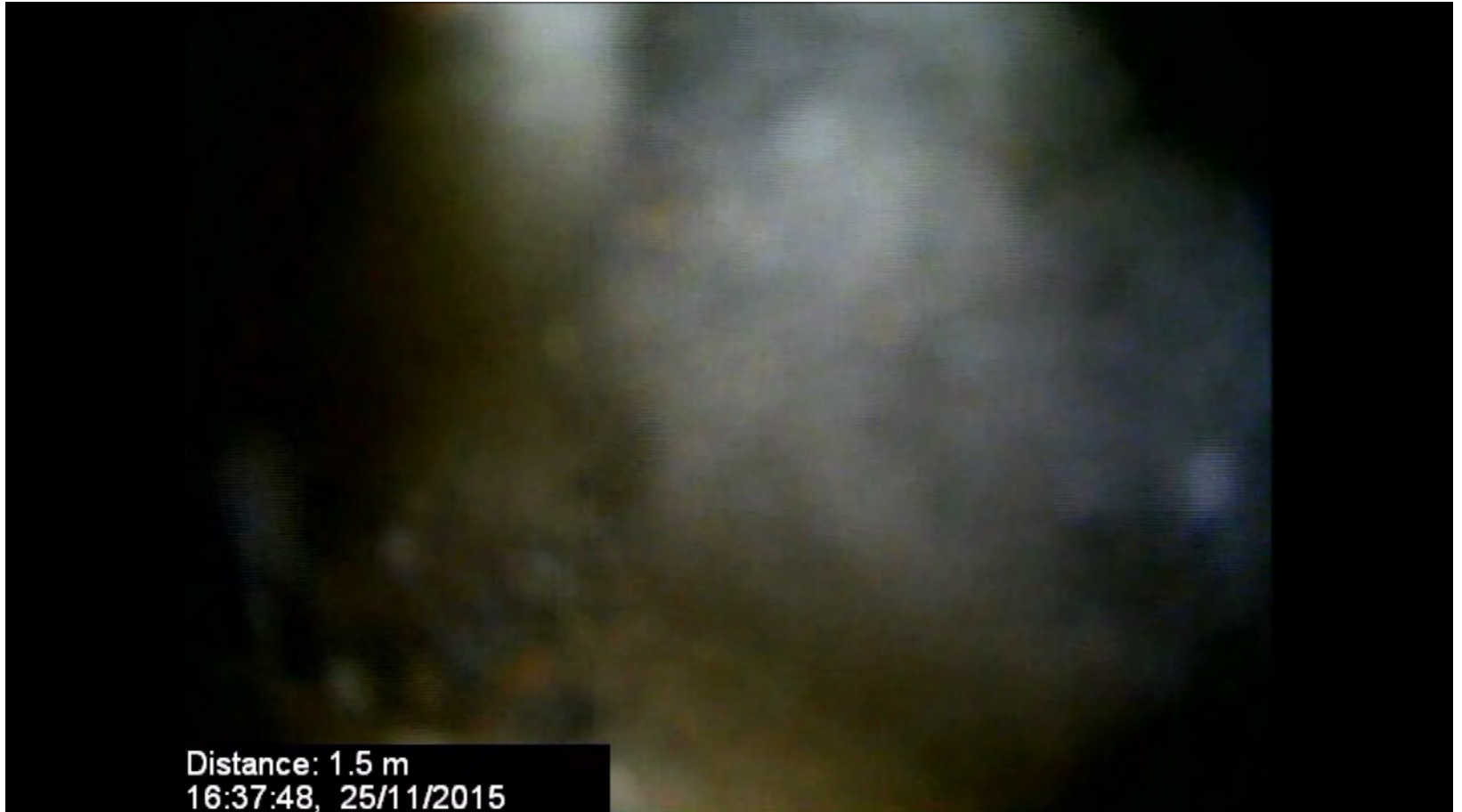
## Small diameter tethered tool

- Insertion is done through an existing hydrant;
- Distances will vary depending on levels of tuberculation and changes in direction;
- Average insertion in each direction of hydrant tee is approximately 150 feet (50 meters);
- An average of 4 hydrant inspections per day

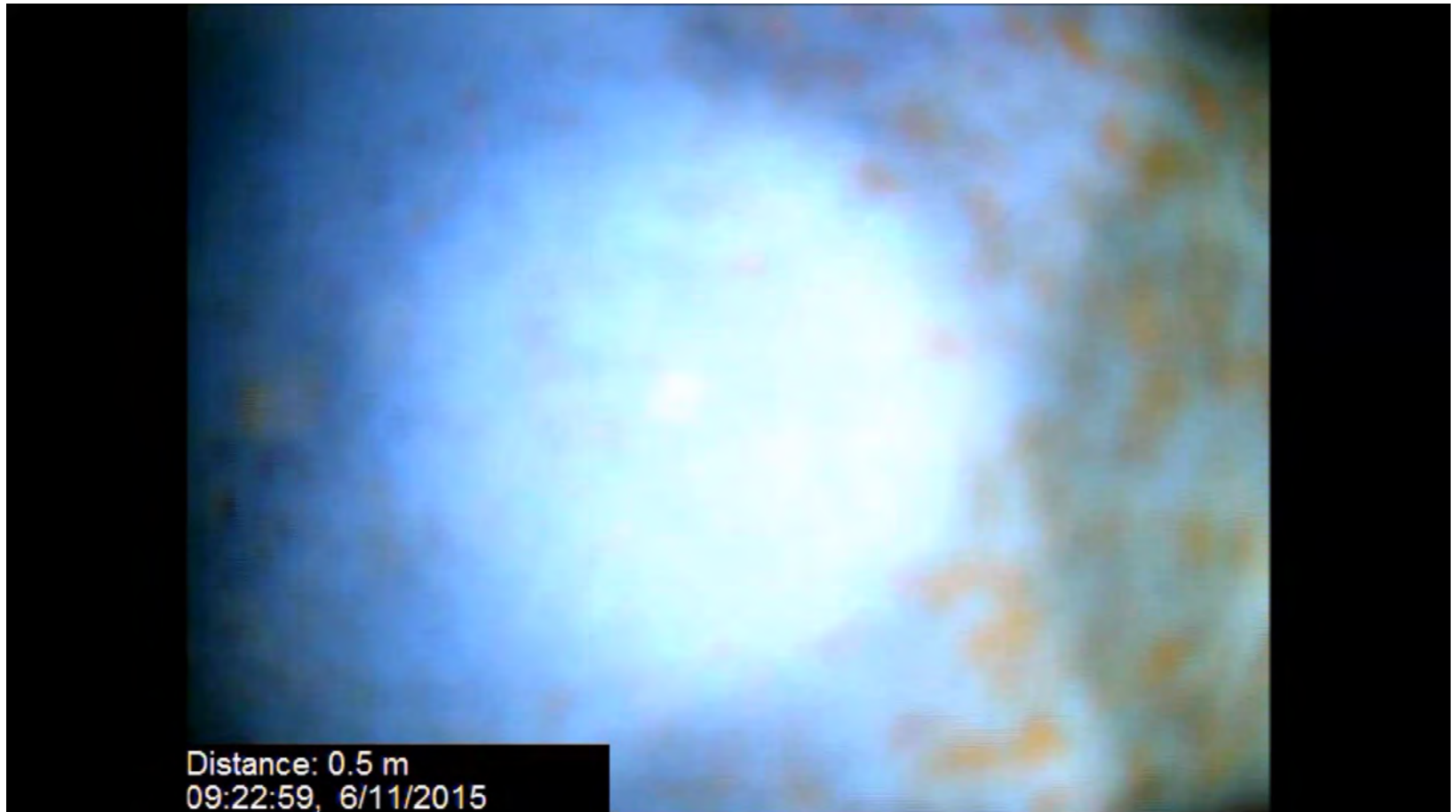




# Bituminous Liner Failure



# Leak Caused By A Pinched Gasket



# Piece Of Pipe Found From Watermain Break

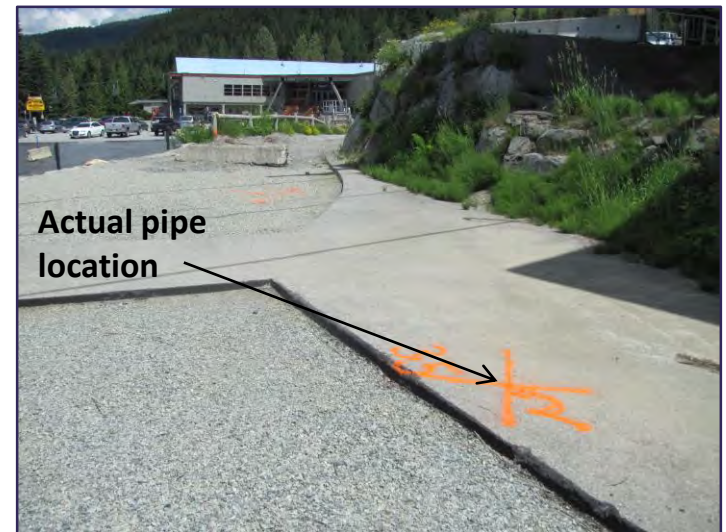




# Pipe Mapping



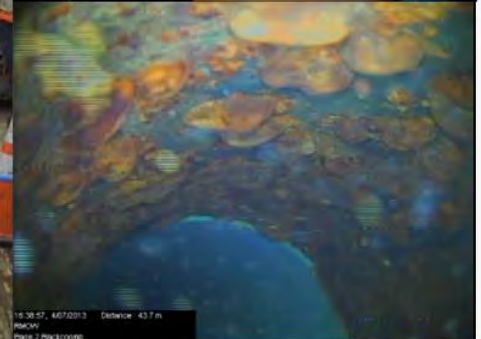
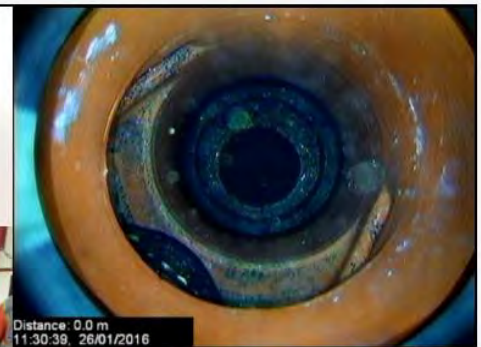
Pipe location  
according to plans



Actual pipe  
location



# Large Diameter Tethered Tool

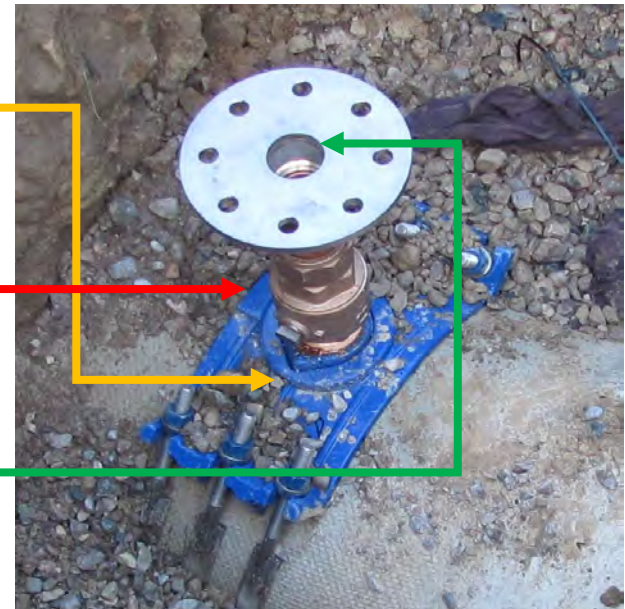




# INSERTION OVERVIEW

## Large diameter tethered tool

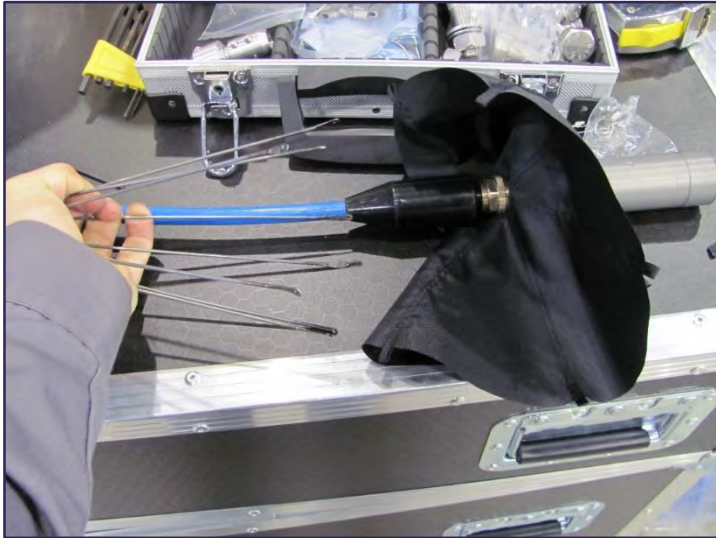
- ▶ The launching device can be installed on a 2 to 4 in. **tap** located at the crown of the pipe.
- ▶ A **ball valve** or **gate valve** will be used to isolate the system from the watermain during installation.
- ▶ A **flange** will be screwed on to the valve to allow the system to be secured in a vertical position over the pipe.



# Mechanical Feature

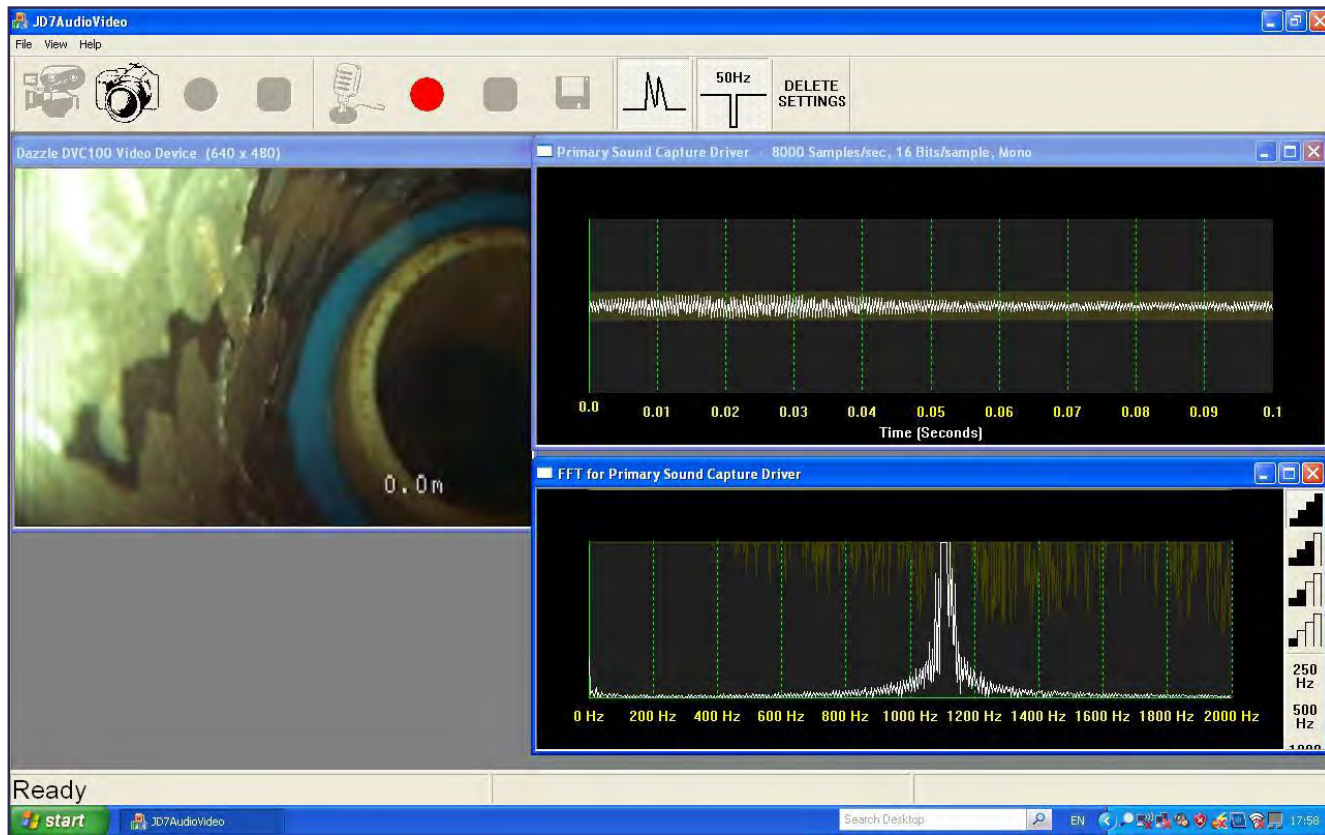


# Large Diameter Tethered Inspection



# TECHNOLOGY OVERVIEW

## Small and Large diameter Visuals



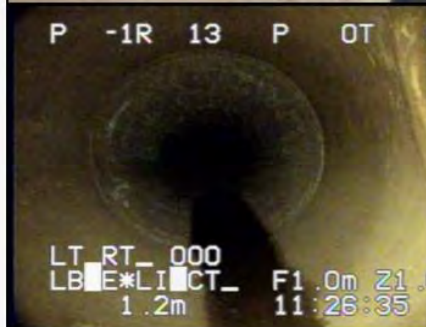
# Small and Large diameter tethered tools

## APPLICATIONS

- ▶ Leaks and air pockets
- ▶ Tuberculation or debris levels
- ▶ Valve status
- ▶ Undocumented fittings
- ▶ Pipeline material
- ▶ Unknown diameter changes
- ▶ Service connections
- ▶ Pipe blockages & flow restrictions
- ▶ Pre-inspection of pipes to be rehabilitated
- ▶ QA/QC of new pipes and of CIPP liners



# ROV



# INSERTION OVERVIEW

## ROV

- The ROV can be inserted into any 12 inch and larger pipe through existing Gate Valves, Butterfly Valves or any open section of pipe that allows for a minimum clearance of 12 inches







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