

# Case Study 5:



## L-Reactor Thermal Effluent

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# Meeting the CWA Challenge



*The Clean Water Act (CWA) established a comprehensive Federal/State scheme for controlling the introduction of pollutants into the Nation's water.*

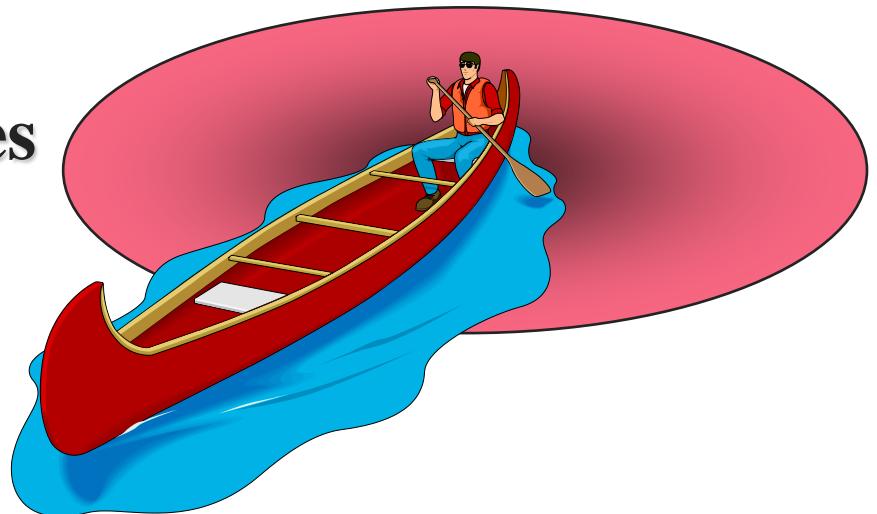


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# **Meeting the CWA Challenge**

A number of comprehensive acts were subsequently designed to control discharges into:

- Surface water bodies and waterways
- Publicly owned treatment works (POTWs)



# **Case Study 5: L-Reactor**



- March 1981 -- the DOE initiated activities to renovate and upgrade L-Reactor
- The SRS utilized water from the Savannah River for secondary cooling purposes (as it had in the past)
  - Water was discharged back to the Savannah River via Steel Creek
  - Discharge temperature (effluent canal and immediate vicinity) ranged from 170 to 180 °F

# **Case Study 5: L-Reactor**



## **Initial NPDES permit:**

- **Issued by the EPA in 1976**
- **Contained a thermal variance statement**
  - **Onsite streams did not have to meet thermal standards until they reached the Savannah River (offsite)**

# L-Reactor



# **Case Study 5: L-Reactor**



## **NPDES permit renewal:**

- The SRS submitted a renewal application to the State in June 1981
  - NPDES authority for Federal facilities was transferred from the EPA to the State of South Carolina in 1980
- The State issued the SRS a draft permit that did not contain thermal variance language

# **Case Study 5: L-Reactor**



- **Discussion ensued between the SRS and the State**
  - **Each side reviewed and discussed the series of events relating to the thermal variance issue**
- **The State eventually issued the SRS a NPDES permit that required thermal compliance at the point of discharge**

# **Case Study 5: L-Reactor**

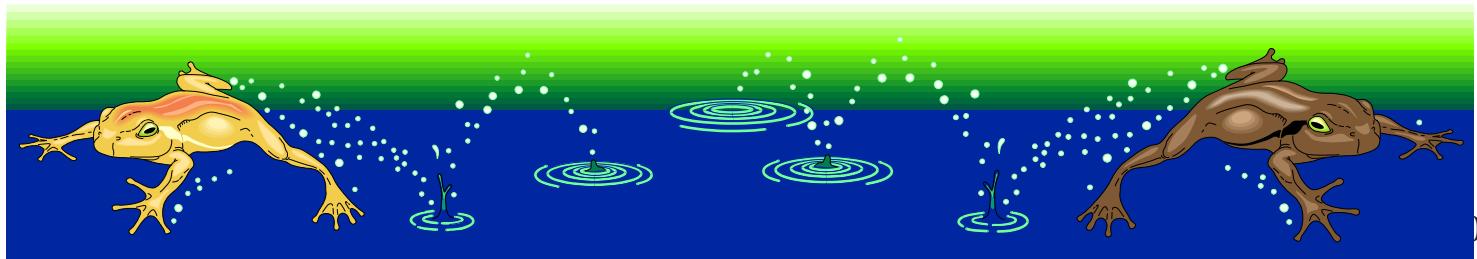


- The SRS found the standards set in the permit impossible to meet through then current procedures
- The SRS entered into a consent order to undertake thermal mitigation studies

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Possible solutions for compliance:

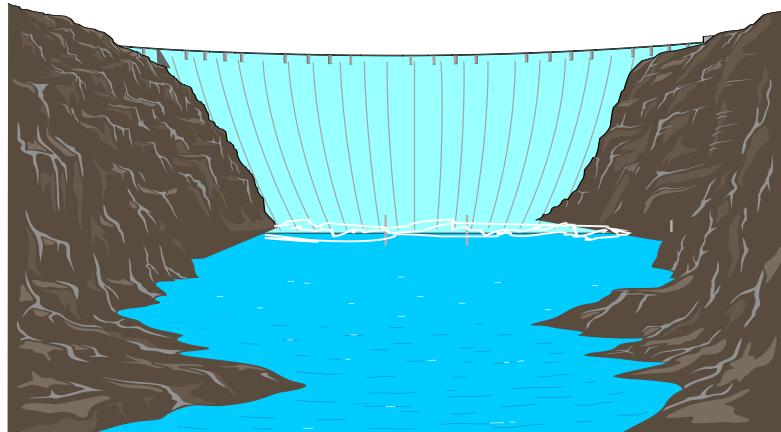
- Construct off-stream cooling facilities
- Obtain a thermal variance (through CWA Section 316(a) study)
- Request that the State change the classification of the onsite streams



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The SRS explored thermal mitigative procedures:

- Once-through cooling water systems
- Recirculating cooling water systems

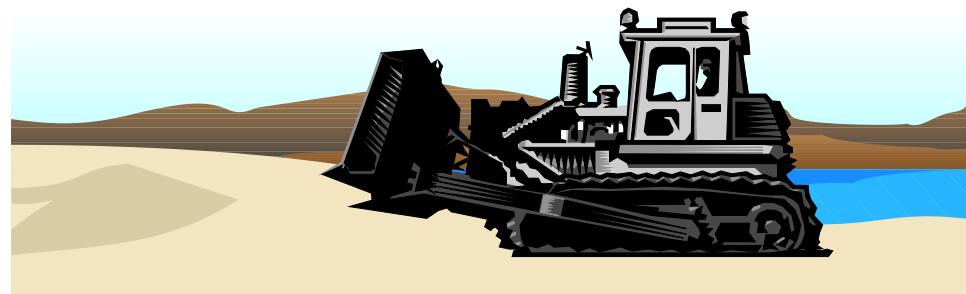


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# Case Study 5: L-Reactor

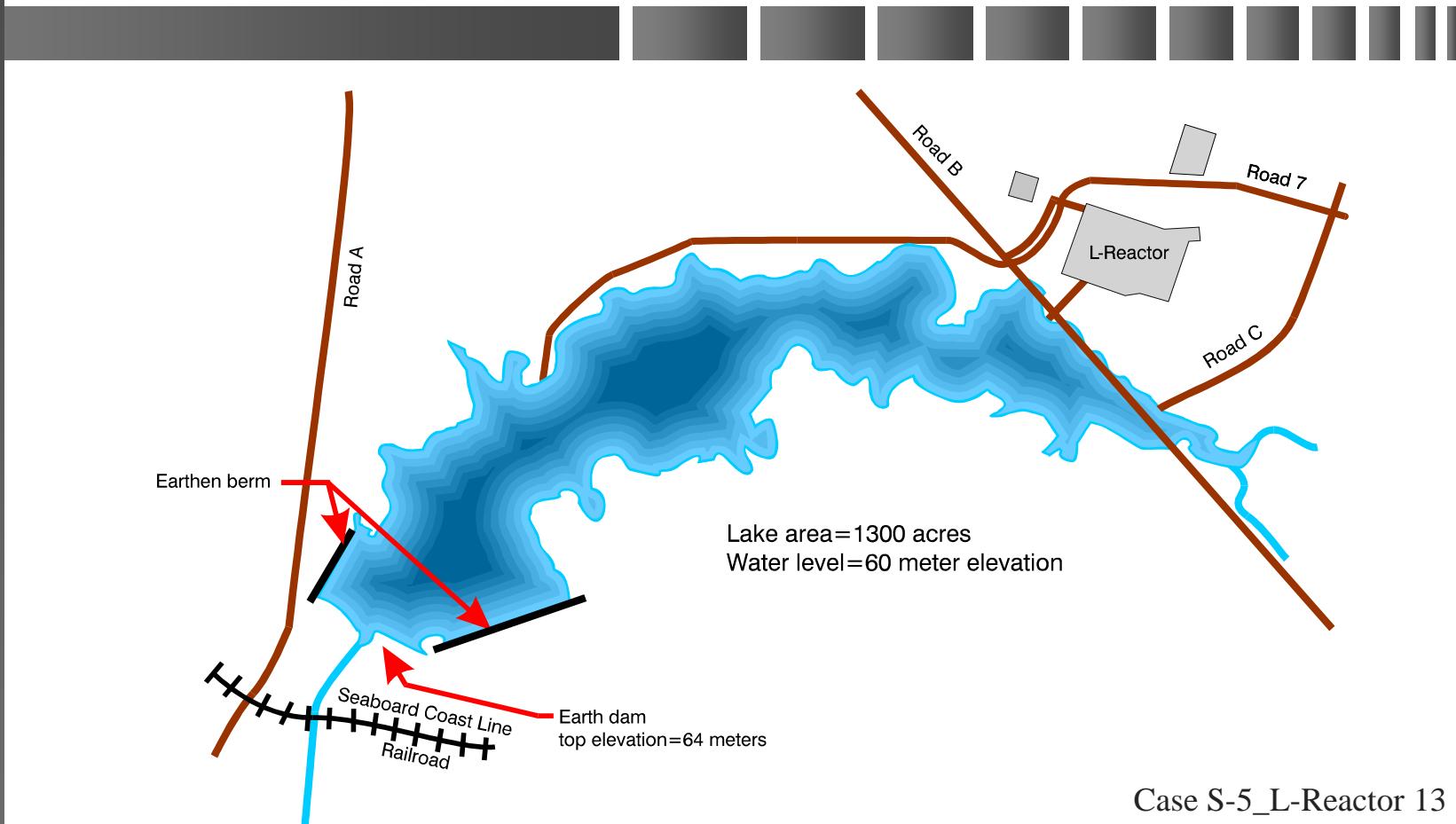
Due to restart schedule pressure:

- Lake construction was begun before the NPDES permit was finalized
  - Complete permit limitations and restrictions were yet to be spelled out in final form



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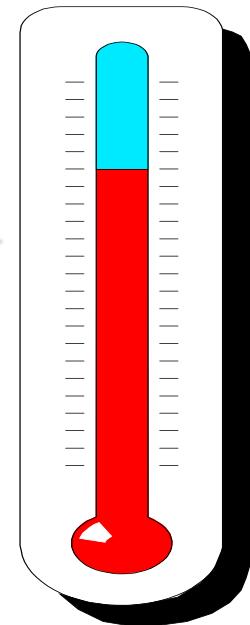
# Graphic of L-Lake



# Case Study 5: L-Reactor

Once the permit was finalized:

- The SRS discovered that the lake acreage planned as a cooling area was reduced (by the SCDHEC) by approximately 50 percent
  - The south end of the lake's surface needed to be kept at 90 °F or less

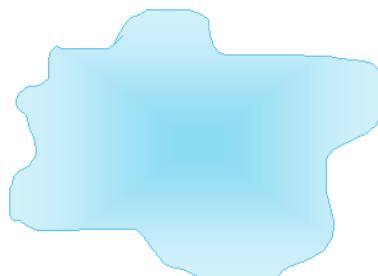


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## Lake size:

- Could no longer support year-round reactor operation
  - Surface temperature of the lake would approach permissible limits during summer months
- The SRS needed:
  - A larger lake, or
  - Additional cooling measures



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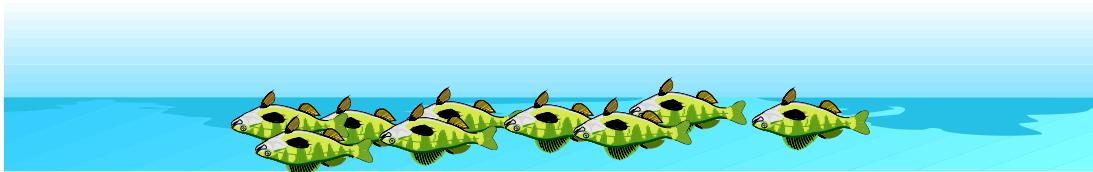
# Savannah River Paddle-Wheel Sampler



# Case Study 5: L-Reactor

## Impact on the lake's aquatic life:

- Reactor restart affected fish that resided in the lake
  - Massive fish kills were reported in 1986, 1987, and 1988
- The SRS entered into a resultant settlement agreement with the State that mandated fish-kill mitigation efforts



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## **Shutdown:**

- **Reactor shut down was initiated in 1988 due to safety issues**
- **During this time, the SRS was actively pursuing mitigative efforts to alleviate/eliminate the fish-kill problem**
- **Shut down was not related to the NPDES permit/thermal effluent issue**