

Case Study 5:



L-Reactor Thermal Effluent

Meeting the CWA Challenge

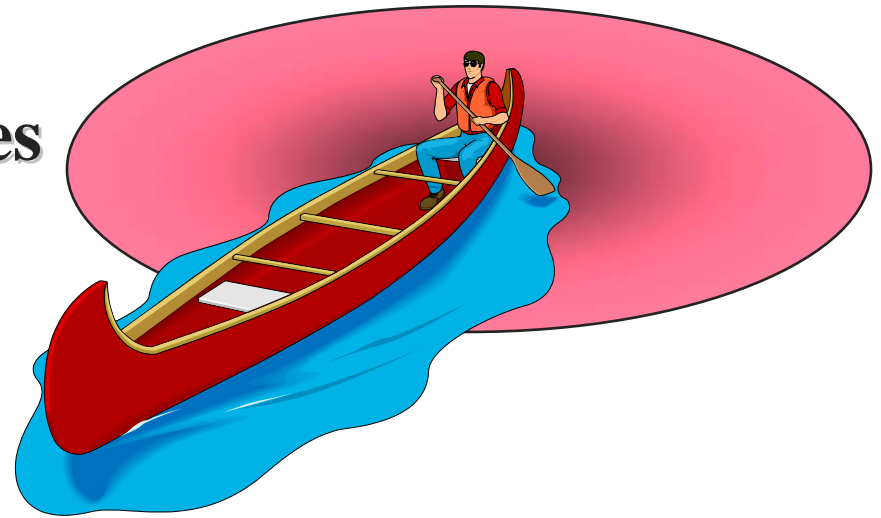
The Clean Water Act (CWA) established a comprehensive Federal/State scheme for controlling the introduction of pollutants into the Nation's water.



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)**



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- **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**

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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



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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**

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- **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**

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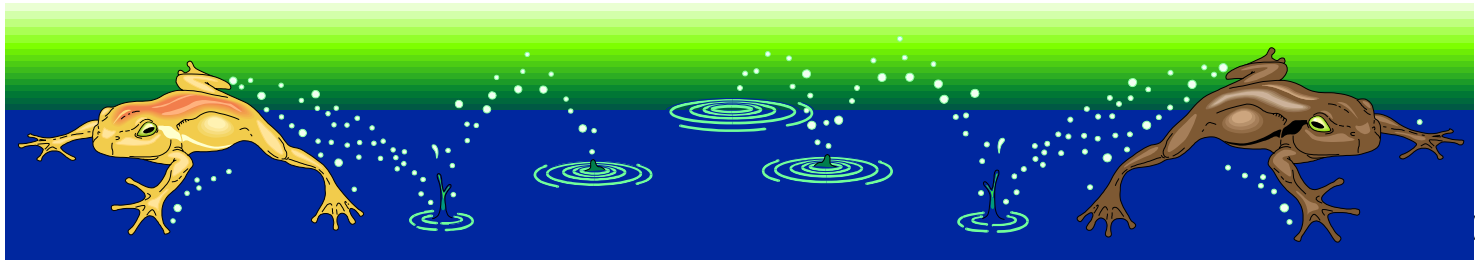


- **The SRS found the standards set in the permit impossible to meet through then current procedures**
- **The SRS entered into a consent order to undertake thermal mitigation studies**

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Possible solutions for compliance:

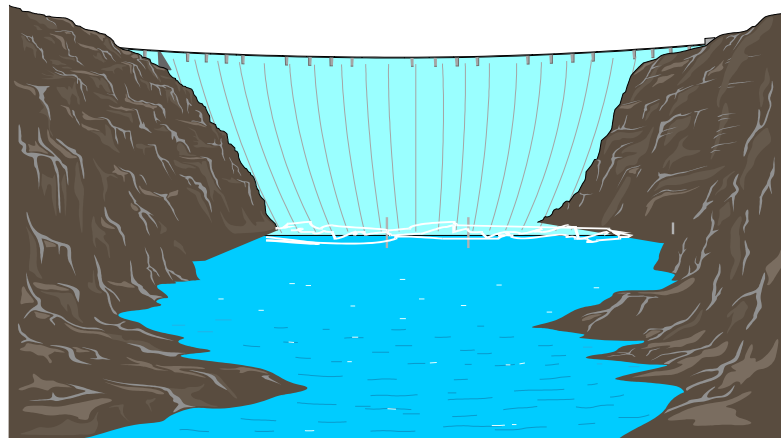
- **Construct off-stream cooling facilities**
- **Obtain a thermal variance (through CWA Section 316(a) study)**
- **Request that the State change the classification of the onsite streams**



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The SRS explored thermal mitigative procedures:

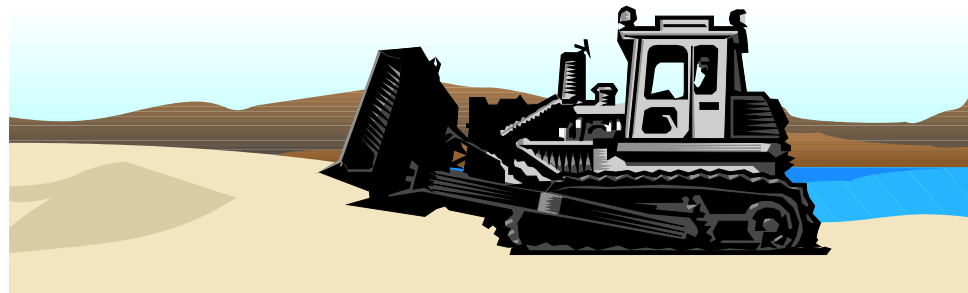
- **Once-through cooling water systems**
- **Recirculating cooling water systems**



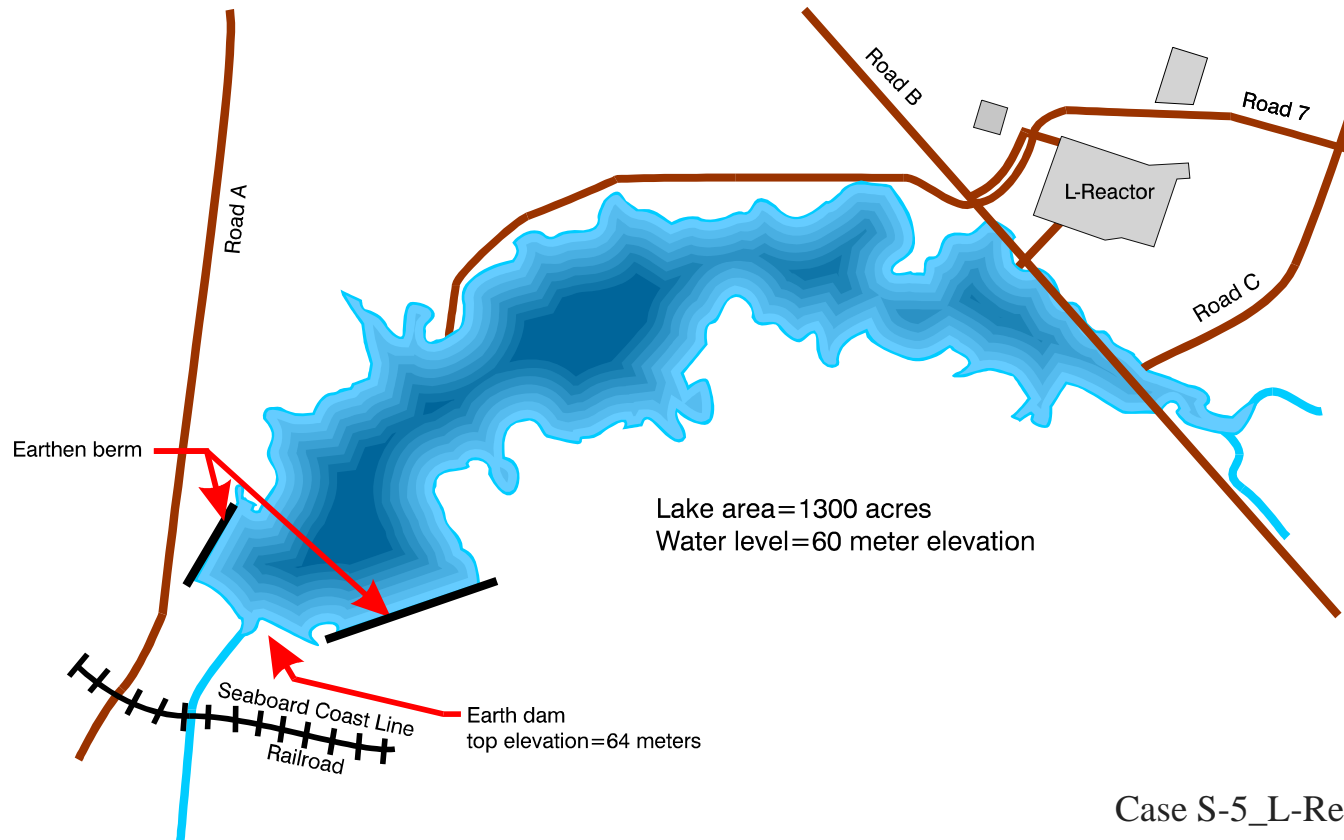
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Due to restart schedule pressure:

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



Graphic of L-Lake

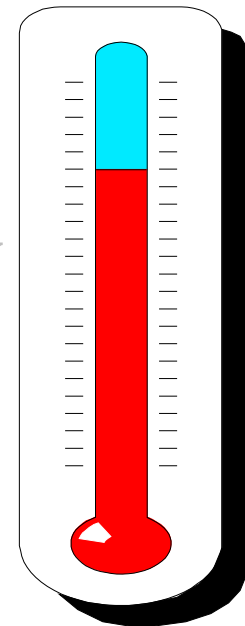


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Once the permit was finalized:

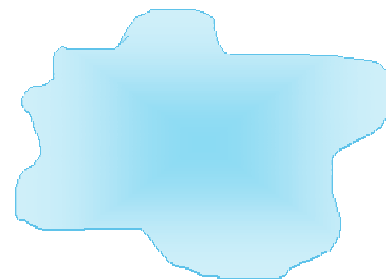
- **The SRS discovered that the lake acreage planned as a cooling area was reduced (by the SCDHEC) by approximately 50 percent**
 - **The south end of the lake's surface needed to be kept at 90 °F or less**



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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**



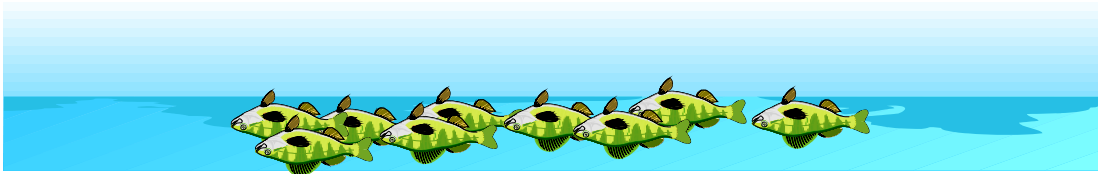
Savannah River Paddle-Wheel Sampler



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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**