

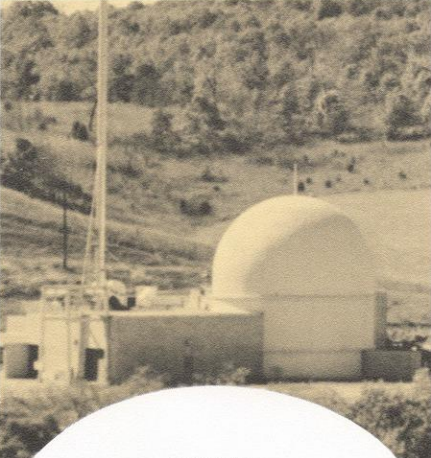


Decommissioning and Disposal of Arkansas Research Reactor Southwest Experimental Fast Oxide Reactor (SEFOR)

**by Steve Mack, Health Physicist
Arkansas Department of Health
Radiation Control Program**



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SOUTHWEST
EXPERIMENTAL FAST OXIDE REACTOR

SEFOR

Internationally Sponsored Research
to Obtain More Energy
from the Atom

A JOINT PROJECT OF

Southwest Atomic Energy Associates
(company names listed on back)

U. S. Atomic Energy Commission

General Electric Company

West German Government



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SEFOR

- A 20 Megawatt (thermal)
- Sodium Cooled Test Reactor
- Fuel = Plutonium Oxide-Uranium Oxide



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- A Pilot test to demonstrate whether liquid metal fast breeder reactors could be used for power production.
- The facility was used to generate physical and engineering data needed to design large-scale liquid metal fast breeder reactor.
- SEFOR was used to verify the theoretically calculated Doppler Effect in an operating fast oxide reactor.
- SEFOR was not used to generate power.



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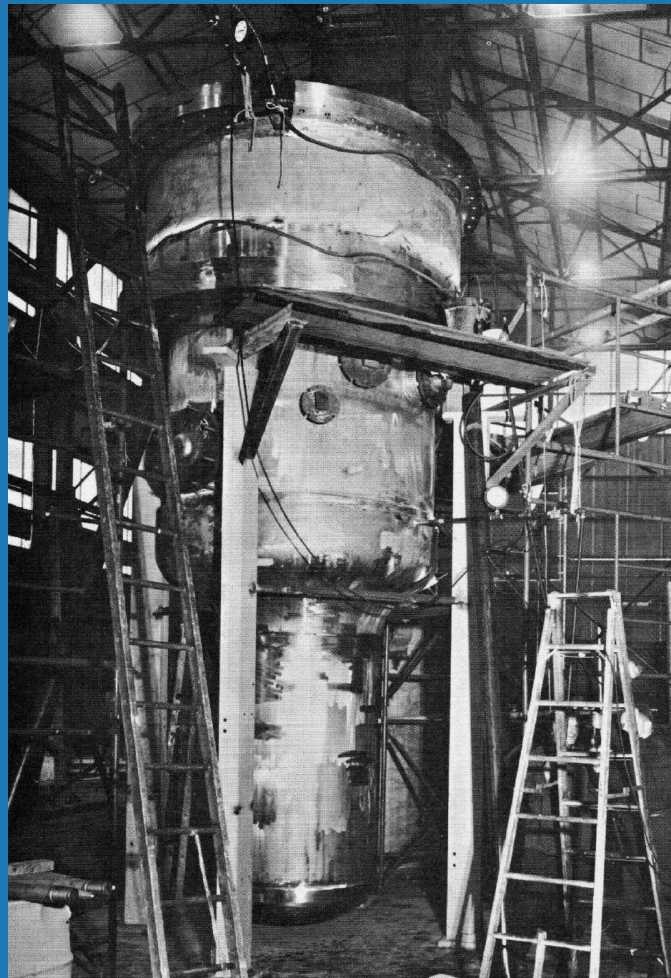
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- Construction complete – 1968
 - Operations began – 1969
- Core loading began – Early 1969
- First full power operation – Early 1971



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SEFOR – Reactor (circa ~1966)





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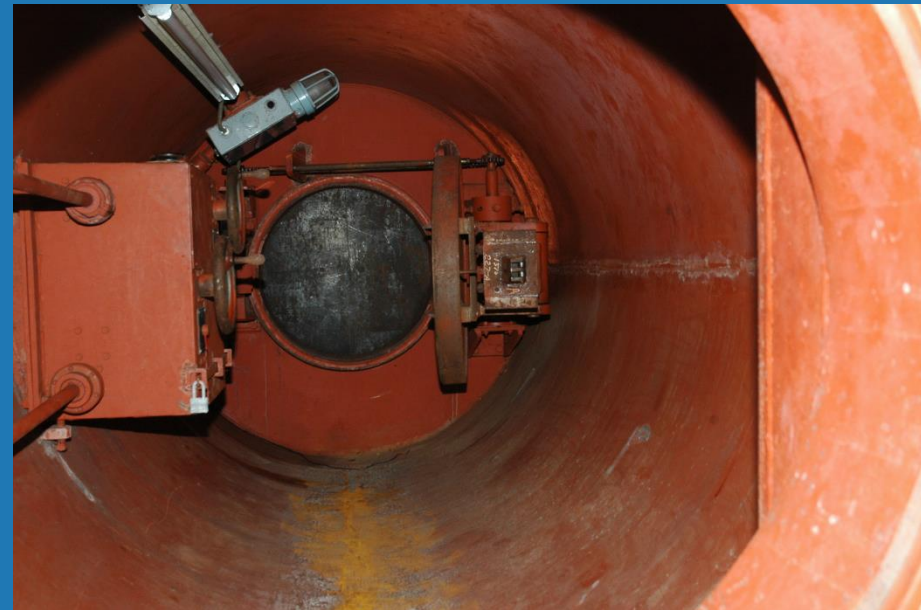
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SEFOR



Escape Trunk



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SEFOR





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- A total of 1288.204 equivalent full power hours of energy were generated by SEFOR
- Total critical time = 3895.1 hours
- Total heat generated = 25,764 megawatt-hours



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- In 1972, after the experimental program was successfully completed, the facility was deactivated and placed in safe storage.
- Fuel Removed.



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- Deactivation completed – 1974
- Arkansas Department of Health issued a possession only license.



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- University of Arkansas – Fayetteville acquired SEFOR – 1975
- Used for instrument calibration and research for less than one-year.



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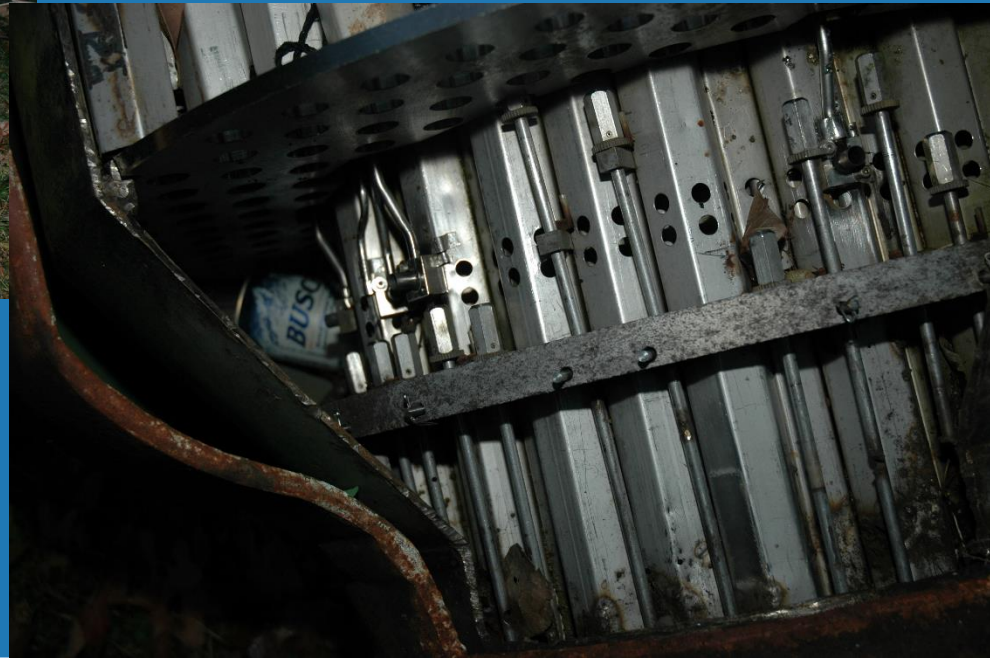
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- Since that time the U of A has acted as a caretaker for the facility.
- Cost of maintaining the facility and the potential liability had made decommissioning the site desirable.
- The U of A had sought out DOE funding for a number of years.



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Challenges to the decommissioning:

- Multiple other contaminants (asbestos, lead, diesel, sodium (cooling system)
 - ADH and ADEQ involvement
- Water, Water, Water
- Public perception

Phase 2 - Asbestos Abatement

~6200 tons removed



Phase 2 - Sodium Passivation

Several hundred pounds of Sodium passivated



Phase 2 - Demolition

~3400 tons of C&D waste removed

~380 tons of scrap metal removed

~4900 tons of backfill material delivered



The End of Phase 2

Sept 11, 2017



Phase 3a – Environmental Cleanup

~81 tons of Soil removed from Burn Pit and Water Tank locations

Burn pit was not a part of the original operations, but due to unauthorized entry and the burning of copper wire.



Phase 3a – Rad Material Removal

~16 tons of LLRW removed



Phase 3b – Containment Bldg Demo

- ~ 1300 tons Asbestos removed
- ~800 tons Scrap Metal removed
- ~10 tons C&D Waste removed





ACCELERATOR

- A Cockcroft Walton accelerator was placed in the Reactor Support Facility Storage Vaults.
- The accelerator was contaminated with tritium.
- This led to contaminated water collecting in lower portions of the facility.



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- Water contained in the vaults was sampled and was found to be below the limits for sanitary sewer release.
- No sanitary sewer on-site.
- Water had to be trucked to the campus for disposal.



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UofA, Don't SEFOR Our Rivers
With 70,000 gallons of Tritium



70, 000 gallons of radioactive
wastewater

MUSKOGEE Phoenix
muskogeephoenix.com

79°

Get extra fuel points! Earn 1 extra fuel point for every dollar you spend. more money save Kroger

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Illinois River spared from radioactive wastewater plan

By D.E. Smoot Phoenix Staff Writer Apr 27, 2017

A proposal to send about 70,000 gallons of radioactive wastewater that has accumulated in vaults at a decommissioned nuclear reactor through a wastewater treatment facility at Fayetteville, Arkansas, set off alarms this week across northeast Oklahoma.

Those alarms were silenced Wednesday — although concerns remain — after it was learned the treated tritium- and asbestos-contaminated wastewater would be discharged into the White River. Much of the municipal wastewater treated at Fayetteville is discharged into a tributary of the Illinois River, a protected stream many consider the “crown jewel” of Oklahoma’s scenic rivers system.

The wastewater has accumulated during the past six years in vaults beneath the Southwest Experimental Fast Oxide Reactor, which operated from 1969 to 1972 before it was decommissioned and sold to the University of Arkansas for res subsequently began dismantl

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Phase 3b - Reactor Vessel Removal

Reactor Vessel weighed ~42 tons





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Removal of Reactor Vessel



Wed 10/17/2018 4:32 PM

Bernard Bevill

TROUBLE IN PARADISE == SEFOR REACTOR NEWS CREATING MAJOR STIR IN NEVADA!

Please see the attached news story from the Nuclear Street dealing with the SEFOR Lift.

In this article, reference is made to the SEFOR reactor core being removed and ready to be shipped to Nuclear Security Site in Nevada.

This in turn has created a substantial stir within the Nevada Governor's office and other Nevada political areas!

It should be pointed that "reactor vessel" was lifted on Monday. The "reactor core" was removed and shipped to an AEC facility when the original SEFOR Owners defueled the reactor back in the early 1970's prior to transfer to UA in 1975.

MEANWHILE, Energy Solutions is actively engaged to correct the misinformation by others.

Dr. Smith and Stephanie should be made aware of this matter.

Should you have ANY questions, please contact.

THANKS!

Phase 3b - Rx Pkg. Transport/Disposal

Total vehicle weight was 160 feet long, 18 feet wide and 407,000 pounds
Traveled through 8 states in 15 days





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SEFOR Rx Vessel Package Leaving SEFOR Site – Nov 29, 2018



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Driver transporting oversized load

arkansasonline.com/news/2018/nov/29/driver-transporting-oversized-load-material-former/


Sections

Arkansas Democrat & Gazette

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Driver transporting oversized load of material from former nuclear reactor in Arkansas issued citation


by Jaime Adame | November 29, 2018 at 1:28 p.m.

0 COMMENTS

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- While in transit, there were daily updates regarding progress and any issues.
- The SEFOR reactor shipment arrived at the disposal facility on the morning of December 13, 2018. (15 days)
 - Except for a ticket in Arkansas, the shipment made the trip with minimal delays or problems.

Phase 3b – LLRW Removal/Disposal

~570 tons of LLRW removed
(30 trucks / 40 containers)





Arkansas Radiation Control

Program – site visit March 26, 2019

On March 26, 2019, the Arkansas Department of Health Radiation Control Program performed an on-site visit of the SEFOR site

The purpose of the visit

- Obtain split samples with EnergySolutions
- Perform an independent/confirmatory walk over survey



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ADH Performing Independent Walk-Over Survey – Mar 26th



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Soil Samples Staged for Weighing and Separating – Mar 26th



Separating and Weighing FSS Soil Samples – Mar 26th



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Throughout the project 10 community meetings were conducted with the last on April 11, 2019.





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NWA Democrat-Gazette/CHARLIE KAIJO Dale Quinton of Strickler reacts Thursday as he's acknowledged during a public meeting at the Strickler Fire Department community center in Fayetteville. Quinton helped with digging at the Southwest Experimental Fast Oxide Reactor site.



SEFOR Decommissioning Summary

- Phase 1 – 2009 to 2011 ~\$1.5M
 - HSA, Characterization, D-Plan, minor Demo
- Phase 2 – 11/21/2016 to 9/11/2017 ~\$10.5M
 - Secondary Structure Demo and Cleanup
- Phase 3a – 10/4/2017 to 3/30/2018 ~\$3.5M
 - Containment Cleanout and Prep for Rx Removal
- Phase 3b – 5/25/18 to 5/23/19 ~\$10.3M
 - Rx Removal, LLRW Disposal and FSS

TOTAL ~\$25.8M



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The Arkansas Department of Health,
Radiation Control Program, Released the site
for unrestricted use on June 3, 2019



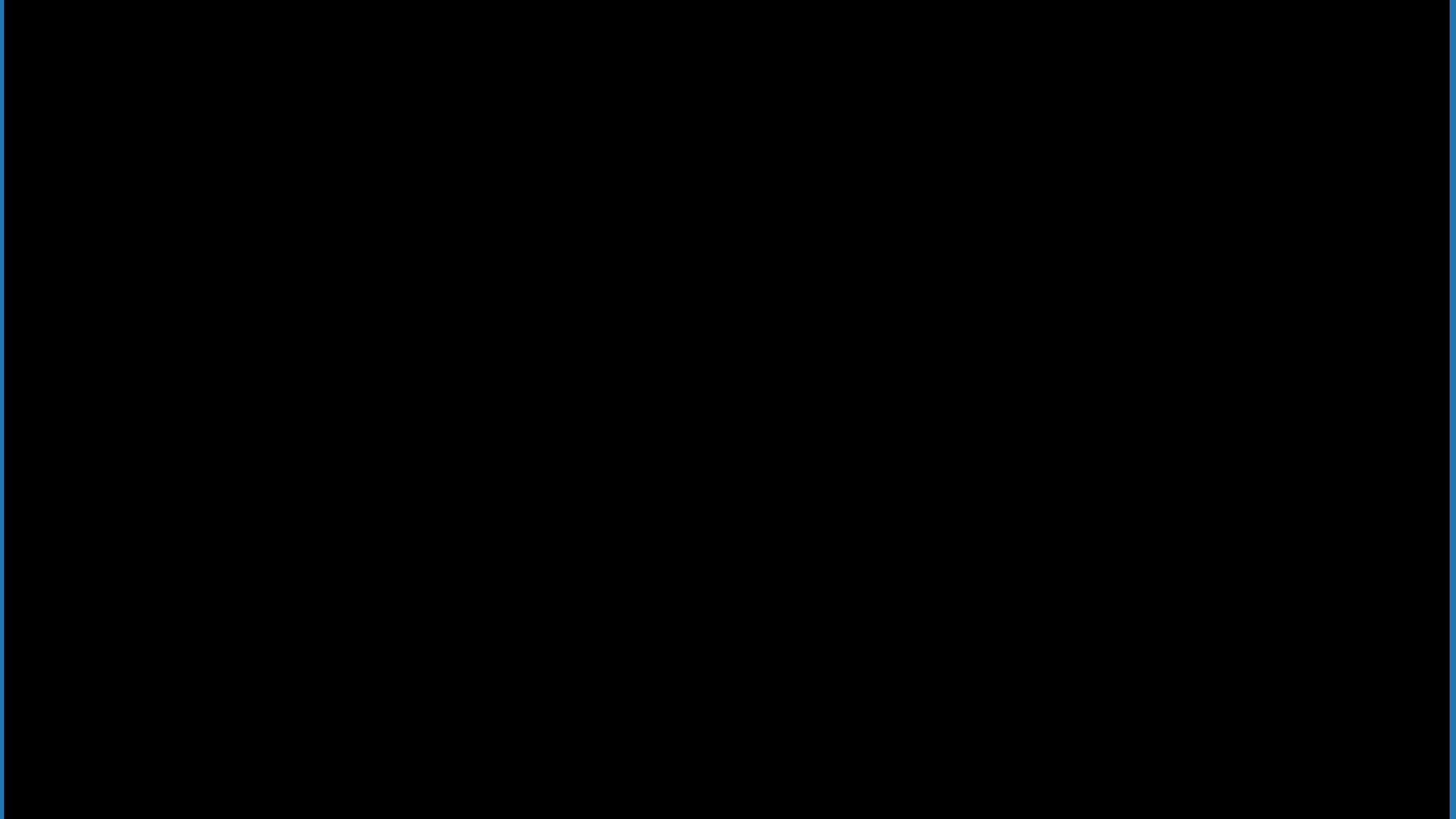
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SEFOR Today





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Contact information:

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because licensees will
drive you crazy!!

