

Transformer Oil Containment Risk Assessment

A Team Approach

SWPA / SPRA / USACE

Marshall Boyken

Blake Elliott

Rod Shank



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Project Timeline

- Team Formed - June 2006
- Mission Statement & Questionnaire
- First Meeting Eufaula - Sept 2006
- Second Meeting Table Rock - Dec 2006
- Final SPCC Rule - Dec 2006
- Question Weighting - Jan 2007
- Matrix Development
- Preliminary Results - April 2007



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Mission Statement

A joint working group of Southwestern Power Resources Association, the United States Department of Energy's Southwestern Power Administration (Southwestern) and the United States Army Corps of Engineers (Corps) tasked to develop a system wide response to the issue of secondary containment of oil for transformers in service at Corps powerhouses and dam switchyards within Southwestern's marketing area. The work group will prioritize secondary containment based on environmental risk and operational assessment then identify containment solutions based on best practices at a reasonable cost. This effort will also serve as a pilot activity for future system wide asset management upgrade/replacement decisions.



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Scope

- 397,000 Gallons of Oil
- 69 Transformers
- 26 Locations
- 24 Hydro Power Facilities
- 6 USACE Districts



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Questionnaire – 64 Questions

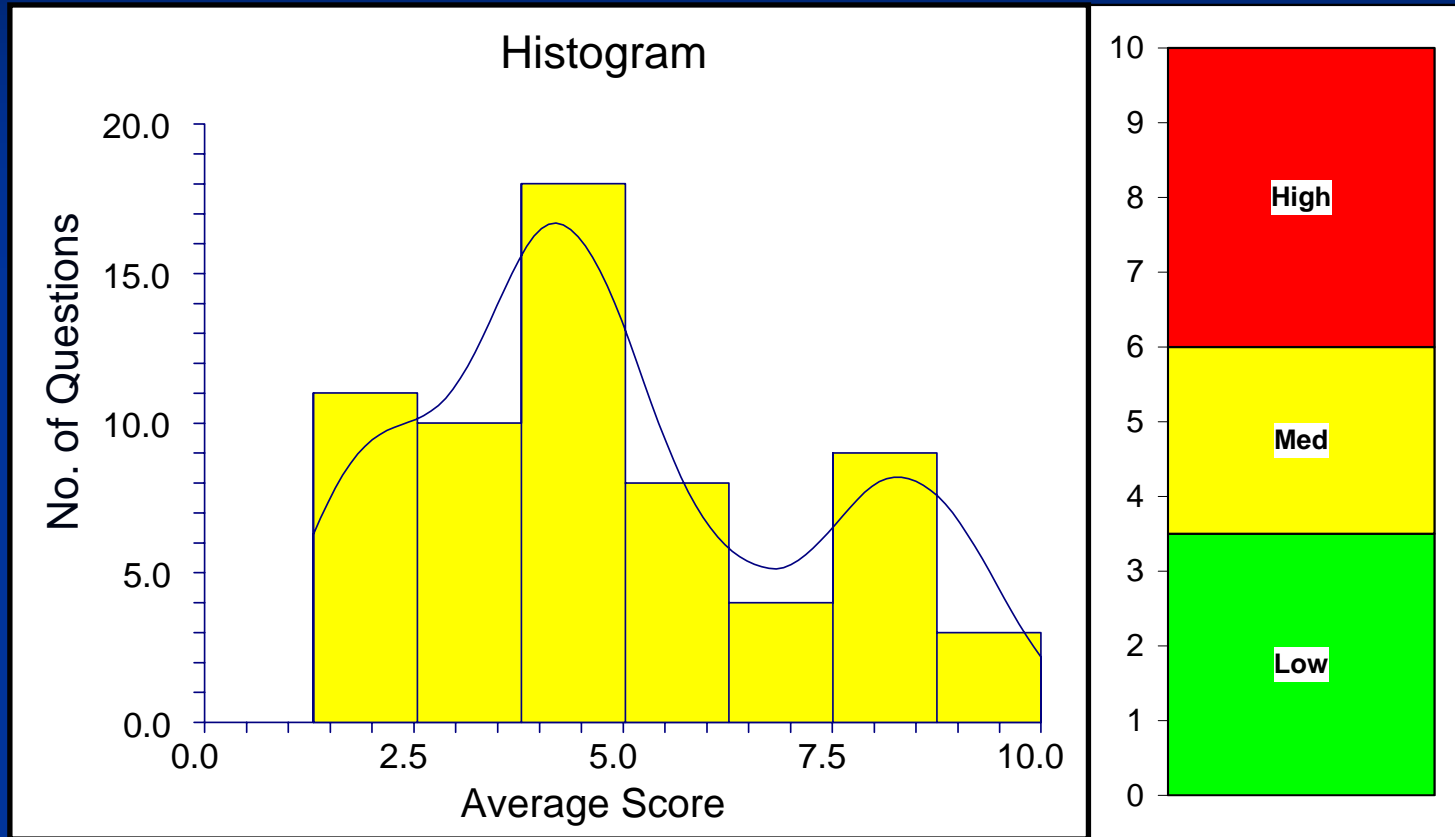
- Five Categories
 - Site Information
 - Utilization/Load Information
 - Transformer Information
 - Oil information
 - Site Topography & Environmental Information



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Question Weighting



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Score	Meaning
10	Very Important
5	Somewhat Important
1	Not Very Important
0.1	Unimportant
0	Remove the Question

Site Information

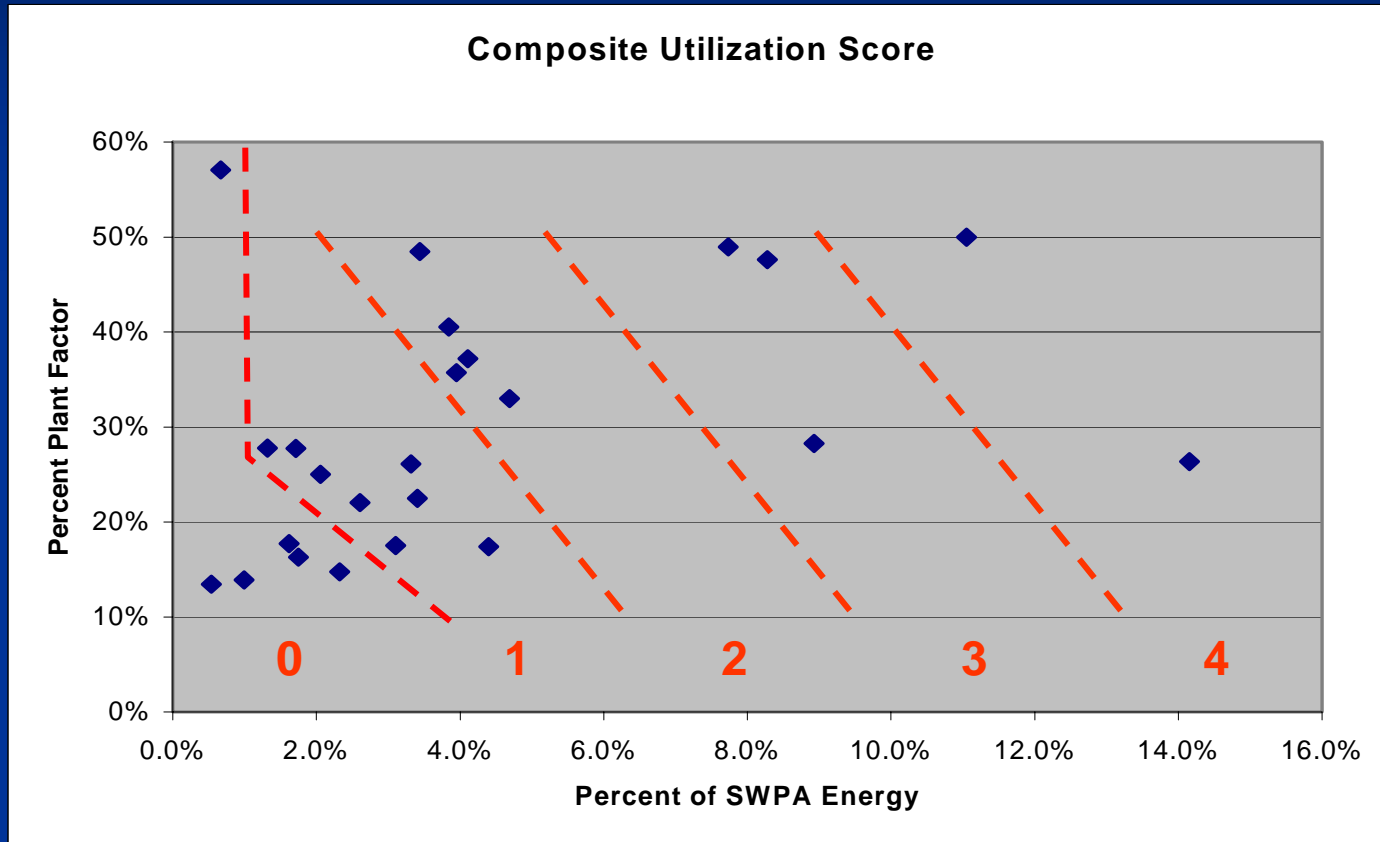
- Current SPCC plan signed by P.E.
- Spill history if any
- Aggregated transformer oil total
- Current & potential containment
- Deluge fire suppression system & Fire response time
- Level alarms, staff level &/or surveillance cameras present



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Utilization/Load Information



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Transformer Information

- Transformer age
- Number of phases, voltage and current ratings
- Application
- Type of cooling (contact with water)
- Transformer condition



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Oil Information

- Type of oil
- PCB history if any and current PCB test results
- Dielectric oil test results



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Environmental Information

- Transformer site sloped towards which water body or stream
- Distance to water body
- Drinking water supply
- Endangered species
- Trout Fishery



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Results by Rank & Risk Score

Rank	Site	Risk Score		Rank	Site	Risk Score
1	Bull Shoals	28.6		14	Keystone	12.0
2	Denison	18.9		15	Ozark	11.9
3	Eufaula DT Deck	17.1		16	Harry S. Truman	11.8
4	Beaver	15.7		17	Dardanelle	11.4
5	Norfolk	15.3		18	Eufaula SwtchYd	11.0
6	Robert S. Kerr	14.2		19	Webbers Falls	10.0
7	Narrows	14.0		20	Clarence Cannon Deck	9.5
8	Blakely Mountain	13.8		21	DeGray	9.5
9	Greers Ferry	13.7		22	Sam Rayburn	9.2
10	Broken Bow	13.2		23	Stockton	9.0
11	Tenkiller	13.0		24	Clarence Cannon SwYd	5.5
12	Fort Gibson	12.9		25	Whitney	5.5
13	Table Rock	12.8		26	Robert D. Willis	4.0



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Preliminary Results by Need

Rank	Site	Risk Score	Rank	Site	Risk Score
7	Narrows	14.0	18	Eufaula SwYd	11.0
8	Blakely Mountain	13.8	19	Webbers Falls	10.0
16	Harry S. Truman	11.8	1	Bull Shoals	28.6
20	Clarence Cannon Deck	9.5	4	Beaver	15.7
21	DeGray	9.5	5	Norfolk	15.3
23	Stockton	9.0	9	Greers Ferry	13.7
2	Denison	18.9	13	Table Rock	12.8
3	Eufaula DT Deck	17.1	15	Ozark	11.9
6	Robert S. Kerr	14.2	17	Dardanelle	11.4
10	Broken Bow	13.2	24	Clarence Cannon SwYd	5.5
11	Tenkiller	13.0	22	Sam Rayburn	9.2
12	Fort Gibson	12.9	25	Whitney	5.5
14	Keystone	12.0	26	Robert D. Willis	4.0
SPCC & Containment		Containment	SPCC		Good

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SPCC Amendments Dec-2006

- Streamlined, alternative methods for compliance with oil spill prevention requirements for qualified oil-filled operational equipment
- Regulatory relief and cost savings for qualified facilities
- New compliance date - July 1, 2009



Oil Slick Mississippi River after Hurricane Katrina
Louisiana DEQ

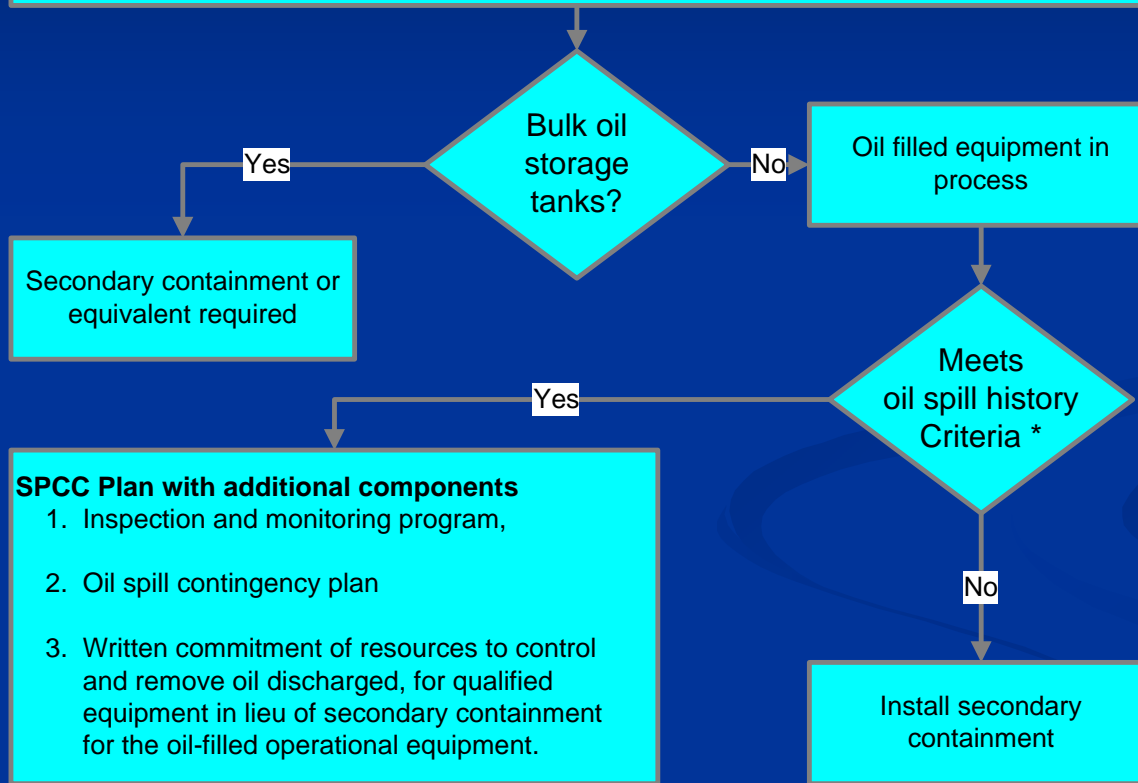


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SPCC Options

Facility Oil spill discharge may reach navigable waters & capacity of aggregated containers is greater than 1,320 gallons. SPCC Plan needed.



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Oil Spill History Criteria

***Equipment is eligible if the facility did not discharge from any oil-filled equipment**

- 1 more than 1,000 U.S. gallons of oil in a single discharge to navigable waters or,
2. two discharges of oil to navigable waters each exceeding 42 U.S. gallons within any twelve-month period, in the three years prior to the SPCC Plan certification date.

Eligibility for the oil-filled operational equipment alternative is determined by the discharge history from the equipment, not the entire facility.



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Oil-filled Operational Equipment

- Examples: Transformers, Circuit Breakers, Electrical Switches, Hydraulic Systems, Gear Boxes, etc.
- Systems containing oil solely to enable the operation of a device
- Alternative secondary containment options (PE must attest alternative is acceptable)
- Not considered a bulk storage container



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Secondary Containment Alternative

- *In lieu of secondary containment you must have up to-date written SPPC Plan with:*
 - Oil spill contingency plan
 - A written commitment of manpower
 - Equipment/Materials available for spill cleanup
 - Inspection or monitoring program



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Oil Spill Contingency Plan

- Detailed oil spill response and removal plan to control, contain, and recover an oil discharge in quantities that may be harmful to navigable waters/adjoining shorelines
- Authorities, responsibilities of all agencies involved in oil removal
- Notification procedures for detection and notification of oil discharge
- Provisions for known resource capability and their commitment during oil discharge



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Written Commitment

- Written commitment that facilities are able to implement the contingency plan
- Owner/operator must provide a written commitment of manpower, equipment, and materials to expeditiously control and remove any quantity of oil discharge that may be harmful



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Preliminary Results by Need

Rank	Site	Risk Score	Rank	Site	Risk Score
7	Narrows	14.0	18	Eufaula SwYd	11.0
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16	Harry S. Truman	11.8	1	Bull Shoals	28.6
20	Clarence Cannon Deck	9.5	4	Beaver	15.7
21	DeGray	9.5	5	Norfolk	15.3
23	Stockton	9.0	9	Greers Ferry	13.7
2	Denison	18.9	13	Table Rock	12.8
3	Eufaula DT Deck	17.1	15	Ozark	11.9
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SPCC & Containment		Containment	SPCC		Good

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Recommendations

- Update all site SPCC plans to include signature by P.E. ASAP in accordance to the current SPCC Regulations without written commitment and Spill Contingency Plan.
 - Six purples turn blue and eight yellows turn green



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Visual of Recommendations

Rank	Site	Risk Score	Rank	Site	Risk Score
2	Denison	18.9	8	Blakely Mountain	13.8
3	Eufaula DT Deck	17.1	21	DeGray	9.5
6	Robert S. Kerr	14.2	1	Bull Shoals	28.6
7	Narrows	14.0	4	Beaver	15.7
10	Broken Bow	13.2	5	Norfolk	15.3
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23	Stockton	9.0	26	Robert D. Willis	4.0
Containment			Good		

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Recommendations

- Complete Customer funded containment on Blakely Mountain and DeGray.
 - Two blues turn green



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Visual of Recommendations

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Containment			Good		

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Recommendations

- Estimate containment costs at remaining sites.
- Develop 5 year plan using criteria i.e. cost, transformer age, water cooled oil, utilization factor, environmental risk etc.
- Add containment according to plan and use written commitment where secondary containment is not feasible.



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Questions ?????



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