# WATER QUALITY STANDARDS REVIEW SHEET

FACILITY NAME: UE-Labadie Power Plant NPDES #: Mo0004812

DESIGN FLOW: #001: Once-through cooling water---1,428 MGD
#002: Ash pond, pH neutralization---57.8 MGD

RECEIVING STREAM: Missouri River STREAM CLASS: P

BENEFICIAL USES: Aquatic-life protection (general warm-water fishery); livestock, wildlife watering; drinking-water supply; irrigation; industrial; boating.

RECEIVING-STREAM LOW FLOW: 20,000 cfs

The maximum allowable heat discharge was reviewed in light of the current mixing-zone regulations: a maximum of $5.5 \times 10^9$ btu/hr would assure that the ambient temperature was not raised more than 5°F at the edge of the mixing zone (mixing zones may be up to 25% of the stream volume) at low flow:

$20{,}000 \text{ cfs} \times 25\% \times 60 \times 60 \times 62 \text{ lbs/ft}^3 \times 5^\circ\text{F} = 5.5 \times 10^9 \text{ btus}$

The current limit is 11.16 billion btus\hr. Output of 5-10 billion btus\hr have been reported in recent years; this suggests compliance with current limits, but theoretical exceedence of the 5.5 billion btus\hr at low stream flow. However, the "5 above ambient" requirement is an older criterion without a strong correlation with biological impact, and the Standards allow 316(a) studies to be used to establish alternative criteria. Since Labadie's large heat output could significantly increase the temperature in a large portion of a major river, a review of 316(a) studies was requested to re-confirm that aquatic life in the outfall area are adequately protected. These studies had not been reviewed for some time. The summary of studies appear to be adequate and persuasive that aquatic life is being protected.

The ~10% increase to 11.16 billion btus/hour requested by the company is allegedly a reporting adjustment and represents no additional heat output. The increase is acceptable, based on the permittee's assertion that actual heat output has been within 3% for the past 17 years and will not significantly increase in the future.

A daily computation of the theoretical mixing-zone size (expressed as percent of stream flow) exceeding the 5-degree-above-ambient temperature will be required. This will be based on daily heat output and concurrent river flow, and will document the extent of 5-degree exceedences (if any), and show any trends in thermal output. This data will be especially useful, with the possibility of decreased upstream release flows in the future.

NFR and oil-and-grease limits are satisfactory.

Sulfate data from the #002 discharge show an average of 250 mg/l for the past two years; with a high value of 348 mg/l. The Missouri River

averages 125-150 mg/l; therefore:
89 cfs / 5,000 cfs (in a mixing zone) = ~1/55
250 - 125 = 125 mg/l difference
125 mg/l x (1/55) = 2-3 mg/l; that is, only about 2-3 mg/l sulfate increase above ambient at the edge of the mixing zone, which does not violate criteria. Because of the overall trend of increasing sulfates in the Missouri River, however, monitoring should be continued.

WET tests:

Outfall #001---Annual whole-effluent toxicity (WET) testing at the beginning of the next permit period should be required to confirm non-toxicity. WET testing may be waived if no biocides are used. The acceptable effluent concentration (AEC) is:
1428 MGD = 2210 cfs
2210 cfs / (500 cfs + 2210 cfs) = 0.81
81% = AEC

Outfall #002---Annual testing is required. The AEC is:
57.8 mgd = 89 cfs
20,000 x 25% x 10% = 500 cfs = ZID
89 / (500 cfs + 89 cfs) = 1/7
1/7 = 15% = AEC

Reviewer: RG UPDATE: 2-7-94 Section Chief: JH