

REFERENCES

ABB Environmental Services. 1999. Unpublished Article, "Influence of NH₃ in Fly Ash and Gypsum", September 1999.

Buchanan, G. L. 1975. TVA Memo - From G. L. Buchanan, Chief, Civil Engineering and Design Branch, To Gene Farmer, Chief, Construction Services Branch, July 24, 1975, On Allen Steam Plant - Ash Disposal Areas Dikes Raising - Construction Information.

Copeland, Henry C. 2001. Personal Communication; E-mail and Conversation, February 2001.

Danzig, Andrew J. 1999. "Allen Fossil Plant Groundwater Update - 1999", Tennessee Valley Authority River System Operations and Environment Environmental Research & Services Environmental Engineering Services- East, Chattanooga, Tennessee, April 1999.

Danzig, A. J., and C. E. Bohac. 1992. Groundwater Quality at Allen Fossil Plant. Tennessee Valley Authority, Resource Development, Water Resources, TVA/WR/WQ-91/12, Chattanooga, Tennessee, June 1992.

Division of Water Pollution Control, Tennessee Department of Environment and Conservation. NPDES Permit No. TN0005355.

Division of Water Pollution Control. 1998. Tennessee Department of Environment and Conservation. "The Status of Water Quality in Tennessee", 1998 305 (b) Report.

Division of Water Pollution Control Planning and Standards Section. 1998. Tennessee Department of Environment and Conservation. 1998 303 (d) List.

Elder, Susan. 2000. Personal Communication, e-mail, March 2000.

Geolytics. 1998. Geolytics, Inc. Third World Research Group, Ltd., www.censuscd.com.

Giles, Joe. 2000. Personal Communication, e-mail, March 2000.

Harkins, John E. 1998. Memphis. In *The Tennessee Encyclopedia of History and Culture*, edited by Carroll Van West, pp.604-606. Tennessee Historical Society, Rutledge Hill Press, Nashville.

International Conference of Building Officials (ICBO). 1997. Uniform Building Code. Vol. 1 - 3.

REFERENCES (Continued)

- Johnston, A. C., K. J. Coppersmith, L. R. Kanter, C. A. Cornell. 1994. The Earthquakes of Stable Continental Regions, vol. 1: Assessment of Large Earthquake Potential, Electric Power Research Institute TR-102261-V1, Electric Power Research Institute, Palo Alto, Ca.
- LAWGIBB. 1999. Report of Subsurface Exploration, Proposed SCR Addition, Allen Fossil Plant.
- NRC: 1986. Tornado Climatology of the Contiguous United States, NUREG/CR-4461, May 1986
- Parks, W. S. 1990. "Hydrogeology and Preliminary Assessment of the Potential for Contamination of the Memphis Aquifer in the Memphis Area, Tennessee," U.S. Geological Survey Water-Resources Investigations Report 90-4092, Memphis, Tennessee, 1990.
- Parks, William S, Mirecki, June E., Kingsbury, James A. 1995. "Hydrogeology, Groundwater Quality, and Source of Groundwater Causing Water-Quality Changes in the Davis Well Field at Memphis, Tennessee", U.S. Geological Survey, Water Resources Investigations Report 94-4212, Memphis, Tennessee, 1995.
- Smith, D. R. 2000. Personal Communication from Draft Allen Fossil SCR Ammonia Tank Civil/Structural Phase I Scope of Work. Parsons Energy and Chemical Group, Inc.
- Tennessee Department of Transportation, 1998. 1998 Traffic Flow Maps Tennessee Roads and Streets. TDOT Report.
- Tennessee Valley Authority. 1981. The Impact of Fish Impingement at Allen Steam-Electric Plant on Fish Populations in McKellar Lake. Office of Natural Resources, Knoxville, Tennessee.
- Thom: Thom, H. C. S. 1963. "Tornado Probabilities." Monthly Weather Review, 91:730-736.
- Thornton, E. A. 2000. Personal Communication, E-mail, January 2000.
- U.S. DOE. 1981. "Final Environmental Impact Statement, Memphis Light, Gas and Water Division, Industrial Fuel Gas Project", May 1981.
- U.S. EPA. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA-822-R-99-014, Environmental Protection Agency, Office of Water. December 1999.
- US Environmental Protection Agency. 1999a. Identification and Listing of Hazardous Waste. Report 40CFR261, US Government Printing Office, Washington, DC

REFERENCES (Continued)

Walker, Chet P., and Guy G. Weaver. 1999. Phase I Archaeological Reconnaissance Survey for Biomass Pipe and Project Near the Allen Generating Plant, City of Memphis, Shelby County, Tennessee. Draft report submitted to Tennessee Valley Authority, Cultural Resources Program, Norris.

Wastrack, Kenneth G. 2000. Personal Communication by E-mail, April 2000.

Williams, Edward F., III 1998. Shelby County. In *The Tennessee Encyclopedia of History and Culture*, edited by Carroll Van West, pp. 844-845. Tennessee Historical Society, Rutledge Hill Press, Nashville.

Wilson, Bobby. 2000. TWRA. Personal Communication by E-mail, January 2000.

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Cassandra Wylie	Ammonia Release Risk Assessment
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LIST OF AGENCIES AND PERSONS CONSULTED

Tennessee Department of Environment and Conservation
Tennessee State Historic Preservation Officer
U. S. Fish and Wildlife Service

**APPENDIX A—MATERIAL SAFETY DATA SHEETS FOR ANHYDROUS
AMMONIA AND VANADIUM PENTOXIDE**

		KYNOCHEM (PTY) LTD MATERIAL SAFETY DATA SHEET		No. 004 Issued: Feb. 1993 Page 1 of 4	
AMMONIA ANHYDROUS					
1. Identification:					
Substance Identification:		Ammonia Anhydrous, Liquid Ammonia			
Company Address:		KYNOCHEM (Pty) Limited Modderfontein, Gauteng, 1645.			
Emergency Telephone Number:		(011)608-3300			
2. Composition and Ingredients:					
COMPONENT	CONCENTRATION	S-Phase	R-Phase		
Ammonia	Ca. 100%	S 7/9	R 10		
		S 16	R 23		
Risk and Safety Phases according to EC Directive 67/548/ECC					
3. Hazards:					
Toxic by inhalation. Vapour is irritant to the respiratory tract. Both the vapour and the liquid cause irritation to the skin and eyes. Flammable but not readily ignited.					
4. First Aid:					
Specific Immediate Treatment					
Inhalation:	Remove patient from exposure, keep warm and at rest. Apply artificial respiration if breathing has ceased or shows signs of failing. OBTAIN IMMEDIATE MEDICAL ATTENTION.				
Skin Contact:	Remove contaminated clothing. Wash with copious amounts of water for 20 minutes. Use safety shower if available. OBTAIN IMMEDIATE MEDICAL ATTENTION.				
Eye Contact:	Immediately irrigate with clean water, holding the eyelids apart, for at least 20 minutes. OBTAIN IMMEDIATE MEDICAL ATTENTION. Continue irrigation until medical attention can be obtained.				
Ingestion:	Do not induce vomiting. Wash out mouth with water and give 200-300 ml (half a pint) of water to drink. OBTAIN IMMEDIATE MEDICAL ATTENTION.				
Further professional Medical Assistance					
Symptomatic treatment and supportive therapy as indicated. Administer oxygen if necessary. Cold wet compresses should be applied to the affected areas to relieve pain. Following severe exposure the patient should be kept under medical review for at least 48 hours as delayed pulmonary oedema may develop.					

		KYNOCHEM (PTY) LTD MATERIAL SAFETY DATA SHEET		No. 004 Issued: Feb. 1993 Page 2 of 4	
AMMONIA ANHYDROUS					
5. Fire Fighting:					

FLASH POINT:-	AUTOIGNITION TEMP.:650°C	LEL:16%(v/v)	UEL:27%(v/v)
Flammable. Mixtures are difficult to ignite.			
Requirements for fighting a fire caused by the substance			
Extinguishing media:	In case of fire use water spray. Water spray should be used to cool containers.		
Exposure hazards from combustion:	Combustion evolves toxic and irritant vapours (NH ₃ and NO _x).		
Special protective equipment:	A self-contained breathing apparatus and full protective clothing must be worn in fire conditions.		
6. Accidental Release:			
Personal protection:	Evacuate the area.		
Environmental precautions:	Use water curtains downwind to reduce vapour emissions.		
Methods for cleaning up:	For small spillages: drench with water and wash to drain (dilute at least 100 times.) For large spillages: contain and cover with foam.		
7. Handling and Storage:			
Handling			
Avoid contact with skin and eyes. Do not breathe vapour. Use only in well-ventilated areas.			
Storage			
Liquid Ammonia should not be confined without adequate vapour space or a pressure relief valve with discharge piped to a safe place.			
8. Exposure and Personal Protection:			
TLV-TWA: 17mg/m ³	TLV-STEL: 24 mg/m ³	(ACGIH 92 to 93)	
Where exposure to levels above the occupational exposure limit is likely, and engineering controls are either not fitted or are not totally effective, wear suitable respiratory protective equipment. Wear suitable protective clothing, gloves and eye/face protection.			

	KYNOCHEM (PTY) LTD	No. 004
	MATERIAL SAFETY DATA SHEET	Issued: Feb. 1993 Page 3 of 4
AMMONIA ANHYDROUS		
9. Physical and Chemical Properties:		
Appearance:	Colourless liquified gas.	
Odour:	Characteristically pungent	
Boiling Point (°C):	-33.5	
Melting Point (°C):	-78	
Density (g/cm ³) at 20°C:	0.61	
Vapour Pressure (mm Hg):	7600 at 25°C	
Vapour Density (Air=1):	0.6	
Odour Threshold (ppm):	5-53	
Solubility (water):	ca. 33% at ambient	
10. Stability and Reactivity:		
Hazardous reactions and decomposition products: Will react with halogens, hypochlorites, mercury, silver, lead and the oxide of nitrogen to form unstable compounds which are liable to explode.		

Keep away from copper, zinc, tin, cadmium and their alloys.	
11. Toxicology:	
Inhalation:	Vapour may cause irritation to the respiratory tract. High atmospheric concentrations in excess of the occupational exposure limit may cause injury to the mucous membranes. Fluid build up on the lung (pulmonary oedema) may occur up to 48 hours after exposure to extremely high levels and could prove fatal. The onset of the respiratory symptoms may be delayed for several hours after exposure.
Skin Contact:	High concentrations of vapour may cause irritation. By rapid evaporation the liquid may cause frostbite.
Eye Contact:	The vapour is an irritant but the liquid is a severe irritant. Liquid splashes or spray may cause freeze burns. May cause severe damage if eye is not immediately irrigated. The full effect may occur after several days
Ingestion:	Will cause corrosion of and damage to the gastrointestinal tract.
Long Term Exposure:	This material has been in use for many years with no evidence of adverse effects.
12. Ecology:	
Users should ensure that they comply with local, provincial and national environmental legislation. Environmental fate and mobility: No information available. Persistence, degradation and bioaccumulation: No information available Effect on effluent treatment: Toxic to aquatic organisms.	

	KYNOCHEM (PTY) LTD MATERIAL SAFETY DATA SHEET	No. 004 Issued: Feb. 1993 Page 4 of 4
	AMMONIA ANHYDROUS	
13. Disposal: Disposal should be in accordance with local, state or national legislation. Recover, reclaim or recycle if practicable.		
14. Transport:		
Hazchem Code:	2PE	
UN No.:	1005	
IMDG Class:	2 (2.3)	
Proper shipping name:	Ammonia, Anhydrous, Liquefied	
15. Regulations: The material is classified as a Group II hazardous substance according to the Hazardous Substances Act, Act 15 of 1973, as amended.		
16. Other: All information is given in good faith but without guarantee in respect of accuracy, and no responsibility is accepted for errors or omissions or the consequences thereof. It is the user's obligation to determine the conditions of safe use of the material.		

MATERIAL SAFETY DATA SHEET

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ACC24780FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN, NJ 07410

(201) 796-7100

EMERGENCY CONTACT:
GASTON L. FILLORI
(201) 796-7100

SUBSTANCE IDENTIFICATION

CAS-NUMBER 1314-62-1
RTEC-NUMBER YW2450000

SUBSTANCE: **VANADIUM PENTOXIDE**

TRADE NAMES/SYNONYMS:

VANADIC ANHYDRIDE: VANADIUM OXIDE: VANADIC ACID ANHYDRIDE: VANADIUM
PENTAOXIDE: C.I. 77938: VANADIUM(V) OXIDE: DIVANADIUM PENTAOXIDE:
DIVANADIUM PENTOXIDE: VANADIC OXIDE: VANADIUM OXIDE (V2O5): RCRA
P120: STCC 4963385: V-7: O5V2: ACC24780

CHEMICAL FAMILY:

INORGANIC SALT

MOLECULAR FORMULA: V2-O5

MOLECULAR WEIGHT: 181.88

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: VANADIUM PENTOXIDE

PERCENT: >98

EXPOSURE LIMIT:

VANADIUM PENTOXIDE:

0.05 MG(V2O5)/M3 OSHA TWA (RESPIRABLE DUST AND FUME)

0.05 MG(V2O5)/M3 ACGIH TWA (RESPIRABLE DUST AND FUME)

0.05 MG(V)/M3 NIOSH RECOMMENDED 15 MINUTE CEILING

100/10,000 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY

1000 POUNDS SARA SECTION 304 REPORTABLE QUANTITY

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

PHYSICAL DATA

DESCRIPTION: ODORLESS, YELLOW TO RUST-BROWN CRYSTALLINE POWDER.

BOILING POINT: 3182 F (1750 C)

DECOMPOSES

MELTING POINT: 1274 F (690 C)

SPECIFIC GRAVITY: 3.357 @ 18 C

SOLUBILITY IN WATER: 0.8%

OTHER SOLVENTS (SOLVENT - SOLUBILITY):

SOLUBLE IN ACIDS, ALKALIES, ACETIC ANHYDRIDE, ETHYL

ACETATE, ACETONE; INSOLUBLE IN ALCOHOL

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FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD
NEGLECTIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

OXIDIZER: OXIDIZERS DECOMPOSE, ESPECIALLY WHEN HEATED, TO YIELD OXYGEN OR OTHER GASES WHICH WILL INCREASE THE BURNING RATE OF COMBUSTIBLE MATTER. CONTACT WITH EASILY OXIDIZABLE, ORGANIC, OR OTHER COMBUSTIBLE MATERIALS MAY RESULT IN IGNITION, VIOLENT COMBUSTION OR EXPLOSION.

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. FIGHT FIRE FROM MAXIMUM DISTANCE. STAY AWAY FROM STORAGE TANK ENDS. DIKE FIRE CONTROL WATER FOR LATER DISPOSAL. DO NOT SCATTER MATERIAL (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 55).

EXTINGUISH USING AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING VAPORS OR DUSTS, KEEP UPWIND.

TRANSPORTATION

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
POISON B

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND SUBPART E:
POISON

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.365
EXCEPTIONS: 49CFR173.364

TOXICITY

VANADIUM PENTOXIDE:
TOXICITY DATA: 346 MG/M3 INHALATION-HUMAN TCLD; 1 MG/M3/8 HOURS
INHALATION-HUMAN TCLD; 70 MG/M3/2 HOURS INHALATION-RAT LCLD;
500 MG/M3/23 MINUTES INHALATION-CAT LCLD; 10 MG/KG ORAL-RAT LD50;
23 MG/KG ORAL-MOUSE LD50; 12 MG/KG INTRAPERITONEAL-RAT LD50; 25 MG/KG
INTRATRACHEAL-RAT LDLD; 10 MG/KG INTRAVENOUS-RABBIT LDLD; 14 MG/KG
SUBCUTANEOUS-RAT LD50; 10 MG/KG SUBCUTANEOUS-MOUSE LD50; 20 MG/KG
SUBCUTANEOUS-RABBIT LDLD; 20 MG/KG SUBCUTANEOUS-GUINEA PIG LDLD;
MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- EYE, SKIN, MUCOUS MEMBRANES.
ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INGESTION.

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TARGET EFFECTS: LACRIMATOR. POISONING MAY ALSO AFFECT THE RESPIRATORY AND GASTROINTESTINAL TRACTS, LIVER, AND KIDNEYS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

VANADIUM PENTOXIDE:

IRRITANT. 70 MG/M³ IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE-- INHALATION OF DUST CONCENTRATIONS OF >0.1 MG/M³ MAY RESULT IN RESPIRATORY TRACT IRRITATION, DELAYED SEROUS OR HEMORRHAGIC RHINITIS AND SORE THROAT AND CHEST, OFTEN WITH A LATENT PERIOD OF A HALF TO ONE HOUR, NASOPHARYNGITIS, SNEEZING, DELAYED DRY, PAROXSYMAL COUGH, WHEEZING, AND DYSPNEA ON EXERTION, WITH A LATENT PERIOD OF 6-24 HOURS, TRACHEITIS, EXPECTORATION, BRONCHITIS, BRONCHOSPASMS, RALES AND RHONCHI, PNEUMONITIS, HEMOPTYSIS, AND POSSIBLE PULMONARY SENSITIZATION RESULTING IN ASTHMA. OTHER SYMPTOMS MAY INCLUDE FALLOR, ALTERED TASTE, GREENISH-BLACK DISCOLORATION OF THE TONGUE, HEADACHE, NAUSEA, VOMITING, ABDOMINAL PAIN, INCREASED TEMPERATURE, INSOMNIA, ANOREXIA, WEIGHT LOSS, NERVOUSNESS, DIZZINESS, ANEMIA, TINNITUS, KIDNEY MALFUNCTION, ALBUMINURIA, HEMATURIA, PSYCHIC DISTURBANCES, CARDIAC PALPITATIONS, AND DAMAGE TO THE LIVER AND ADRENALS. OTHER SYMPTOMS OF VANADIUM COMPOUNDS MAY INCLUDE TREMORS OF DISTAL EXTREMITIES, BLINDNESS, AND DAMAGE TO THE BONE MARROW. MORE SEVERE EXPOSURES TO VANADIUM PENTOXIDE MAY RESULT IN PULMONARY EDEMA, PATCHY BRONCHOPNEUMONIA, AND LOBAR PNEUMONIA, WHICH MAY BE FATAL. IF THE VICTIM SURVIVES, THERE MAY BE PERSISTENT ASTHMA-TYPE BRONCHITIS, BOUTS OF DYSPNEA, AND FATIGUE. ONCE REMOVED FROM EXPOSURE, COMPLETE RECOVERY USUALLY OCCURS WITHIN 1-2 WEEKS.

CHRONIC EXPOSURE-- REPEATED OR PROLONGED EXPOSURE MAY RESULT IN CHRONIC BRONCHITIS WITH OR WITHOUT EMPHYSEMA, HIGH BLOOD PRESSURE, AND OTHER EFFECTS AS IN ACUTE EXPOSURE. THERE MAY ALSO BE BLOOD CHANGES, LIVER AND KIDNEY DAMAGE, AND AN INCREASED SUSCEPTIBILITY TO RESPIRATORY CHANGES.

FIRST AID-- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

VANADIUM PENTOXIDE:

IRRITANT.

ACUTE EXPOSURE-- DIRECT CONTACT WITH AIR CONCENTRATIONS OF GREATER THAN OR EQUAL TO 0.03 MG V/M³ MAY RESULT IN IRRITATION, A SEBORRHEA-LIKE ECZEMA WITH INTENSE ITCHING, GENERALIZED URTICARIA, AND POSSIBLE SENSITIZATION RESULTING IN CONTACT DERMATITIS.

CHRONIC EXPOSURE-- REPEATED OR PROLONGED CONTACT MAY RESULT IN ALLERGIC ECZEMA, SENSITIZATION, AND DERMATITIS.

FIRST AID-- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

VANADIUM PENTOXIDE:

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IRRITANT/LACRIMATOR.

ACUTE EXPOSURE- DIRECT CONTACT WITH AIR CONCENTRATIONS OF GREATER THAN OR EQUAL TO 0.018 MG V/M3 MAY RESULT IN IRRITATION, PROFUSE LACRIMATION, BLURRED VISION, AND A BURNING SENSATION OF THE CONJUNCTIVA.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

VANADIUM PENTOXIDE:
HIGHLY TOXIC.

ACUTE EXPOSURE- INGESTION MAY CAUSE A METALLIC TASTE, NAUSEA, VOMITING, ABDOMINAL PAIN AND SPASMS, DIARRHEA, AND GREENISH-BLACK DISCOLORATION OF THE TONGUE. INGESTION OF VANADIUM BY RATS RESULTED IN IMMEDIATE DISTRESS, HEMORRHAGIC RHINITIS, MARKED DIARRHEA, HINDLIMB PARALYSIS, DYSPNEA, CONVULSIONS, AND DEATH. PATHOLOGICAL FINDINGS IN ANIMALS MAY INCLUDE DAMAGE TO THE LIVER, KIDNEYS, LUNGS, GASTROINTESTINAL TRACT, ADRENAL CORTEX, BRAIN, SPINAL CORD, AND BONE MARROW.
CHRONIC EXPOSURE- REPEATED OR PROLONGED INGESTION MAY RESULT IN THE SAME EFFECTS AS IN ACUTE EXPOSURE.

FIRST AID- GIVE ONE GRAM PER DAY ORALLY OF ASCORBIC ACID. CALCIUM EDETATE MAY BE USEFUL (DREISBACH, HANDBOOK OF POISONING, 11TH ED.). GET MEDICAL ATTENTION.

ANTIDOTE:

THE FOLLOWING ANTIDOTE HAS BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

POISONING FROM VANADIUM COMPOUNDS:

GIVE ASCORBIC ACID, 1 GRAM/DAY. CALCIUM DISODIUM EDETATE MAY BE USEFUL. IT IS AVAILABLE AS 5 ML AMPULES OF A 20% SOLUTION. GIVE 15-25 MG/KG (0.08-0.125 ML OF 20% SOLUTION PER KILOGRAM OF BODY WEIGHT) IN 250-500 ML OF 5% DEXTROSE INTRAVENOUSLY OVER A 1 TO 2 HOUR PERIOD TWICE DAILY. THE MAXIMUM DOSE SHOULD NOT EXCEED 50 MG/KG/DAY. THE DRUG SHOULD BE GIVEN IN 5-DAY COURSES. AFTER THE FIRST COURSE, SUBSEQUENT COURSES SHOULD NOT EXCEED 50 MG/KG/DAY. DAILY URINALYSES SHOULD BE DONE DURING THE TREATMENT PERIOD. THE DOSAGE SHOULD BE REDUCED IF ANY UNUSUAL URINARY FINDINGS APPEAR. INTRAVENOUS ADMINISTRATION IS CONTRAINDICATED IN THE PRESENCE OF ELEVATED CEREBROSPINAL FLUID PRESSURE.
FOR INTRAMUSCULAR ADMINISTRATION, GIVE 20% SOLUTION (200 MG/ML), 12.5 MG/KG BODY WEIGHT EVERY 4-6 HOURS. DILUTE EACH DOSE WITH AN EQUAL VOLUME OF 1% PROCAINE. DOSE LIMITATION IS THE SAME AS THAT GIVEN ABOVE (DREISBACH, HANDBOOK OF POISONING, 11TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY SECTION

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
VANADIUM PENTOXIDE:
CALCIUM, SULFUR, WATER: FORMATION OF AN EXPLOSIVE COMPOUND.

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CHLORINE TRIFLUORIDE: VIOLENT REACTION.
LITHIUM: INTENSE EXOTHERMIC REACTION.
ORGANIC MATERIALS: POSSIBLE FIRE AND EXPLOSION HAZARD.
PEROXYFORMIC ACID: VIOLENT DECOMPOSITION.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY RELEASE ACRID SMOKE AND TOXIC FUMES OF VANADIUM OXIDES.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE-DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

THRESHOLD PLANNING QUANTITY (TPQ):
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPO ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER P120.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. CONTAINERS MAY EXPLODE IN HEAT OF FIRE.

SPILLS AND LEAKS

SOIL-RELEASE:
DIG A HOLDING AREA SUCH AS PIT, POND OR LAGOON TO CONTAIN SPILLED MATERIAL. USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT DISSOLVING IN FIREFIGHTING WATER OR RAIN.

WATER-SPILL:
NEUTRALIZE WITH AGRICULTURAL LIME, SLAKED LIME, CRUSHED LIMESTONE OR SODIUM BICARBONATE.

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ALLOW SPILLED MATERIAL TO AERATE.

USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

OCCUPATIONAL-SPILL:

DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH A CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINERS AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1000 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT SECTION

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

VANADIUM, AS VANADIUM PENTOXIDE (V2O5):

DUST OR FUME:

0.5 MG/M3- ANY AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.

1.25 MG/M3- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.
ANY POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

2.5 MG/M3- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING

005576

FACEPIECE AND A HIGH-EFFICIENCY PARTICULATE FILTER.

70 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY: FISHER SCIENTIFIC

THE ABOVE INFORMATION IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES.

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REVISION DATE: 10/13/89

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**APPENDIX B - CORRESPONDENCE WITH STATE, FEDERAL,
LOCAL AND TRIBAL AGENCIES**



TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2841 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 833-1850

January 24, 2000

Mr. J. Bennett Graham
Cultural Resources Program
Div. Land & Economic Res.
Norris, Tennessee 37828

RE: TVA. SCR SYSTEMS/THREE PLANTS, UNINCORPORATED, MULTI COUNTY

Dear Mr. Graham:

Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking received Tuesday, January 18, 2000. This is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (64 FR 27044, May 18, 1999).

After considering the documentation submitted, it is our opinion that THERE ARE NO NATIONAL REGISTER OF HISTORIC PLACES LISTED OR ELIGIBLE PROPERTIES AFFECTED BY THIS UNDERTAKING. This determination is made either because of the location, scope and/or nature of the undertaking, and/or because of the size of the area of potential effect; or because no listed or eligible properties exist in the area of potential effect; or because the undertaking will not alter any characteristics of an identified eligible or listed property that qualify the property for listing in the National Register or meet such property's location, integrity, etc. Therefore, this office has no objections to your proceeding with the project.

If you are applying for federal funds, license or permit, you should submit this letter as evidence of consultation under Section 106 to the appropriate federal agency, which, in turn, should contact this office as required by 36 CFR 800. If you represent a federal agency, you should submit a formal determination of eligibility and effect to this office for comment. You may direct questions or comments to Joe Garrison (615) 833-1599. This office appreciates your cooperation.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jjs

**APPENDIX C - GEOLOGIC AND SEISMIC CONDITIONS
AT ALLEN FOSSIL PLANT**

GEOLOGIC AND TECTONIC SETTING

Allen Fossil Plant is located in the Gulf Coastal Plain physiographic province and lies within the Mississippi Embayment. The surface geologic formation is Quaternary alluvial deposits composed of gravels, sand, silt and clay (Hart 1979). The site of the proposed SCR is underlain by fill material that rest on top of the alluvial sediments (LAWGIBB 1999).

The Mississippi Embayment is located within the North American crustal plate, far removed from any tectonic activity occurring at boundaries of the Earth's crustal plates. Most of eastern North America is characterized by a maximum compressive stress that lies near horizontal and is oriented generally east-northeast to west-southwest (Zoback and Zoback 1991). This type of stress regime results in strike-slip and thrust faulting on fault planes that are favorably oriented to the direction of the maximum compressive stress.

REGIONAL EARTHQUAKE HISTORY

Figure C-1 (CERI 1999) shows the earthquake activity within 300 km of Allen fossil plant from July 1974 through 1998. These earthquake epicenters and their associated magnitudes were determined using regional seismograph networks. Most of the earthquakes shown in Figure C-1 are considered to be part of the New Madrid Seismic Zone.

The New Madrid Seismic Zone (NMSZ) is located in the central Mississippi Valley mostly within the Reelfoot Rift (Figure C-2 -- after Luzietti 1992). The main segments of the NMSZ are outlined by concentrations of earthquakes along the Blytheville Arch in northeastern Arkansas, and by a heavy concentration of seismicity in northwestern Tennessee and southeastern Missouri (Figure C-2). The NMSZ has produced damaging earthquakes in historical time including at least three earthquakes estimated to have had moment magnitudes, M , of 8.0 or greater in the 1811-12 sequence (Johnston 1994).

Earthquakes originating at points within or near the Reelfoot Rift, but not on the main segments of the NMSZ are also important contributors to the seismic hazard at the Allen Fossil Plant. However, assuming that present rates of seismic activity continue throughout the area, the seismic hazard at the project site will be dominated by earthquakes occurring along the main branches of the NMSZ.

GROUND DEFORMATION POTENTIAL AND EFFECTS OF SOILS

The 1811-12 sequence of earthquakes in the New Madrid Seismic Zone formed a fault scarp immediately west of Reelfoot Lake in extreme northwestern Tennessee. The Reelfoot fault scarp and the relative motion of blocks on either side of the fault during the 1811-12 sequence of earthquakes resulted in the formation of Reelfoot Lake. Earthquake faulting associated with the 1811-12 earthquakes was clearly expressed at the surface although actual ground rupture may not have occurred. Surface faulting may have occurred in conjunction with the 1811-12 New Madrid earthquakes well to the north of Allen Fossil Plant, but Hart (1979) did not map or describe any faulting at or near the plant.

The strength and thickness of soils strongly influence the amount and type of shaking a structure is subjected to during earthquakes. Generally, sites founded on soft rocks and soils experience much stronger shaking than sites founded on competent, hard rock. Foundation materials at the proposed Allen Fossil plant SCR site are unconsolidated alluvial sediments and fill and consist of clays, silts, sands and occasionally gravels. Within the plant area, the thickness of the fill material ranges from 20 to 40 feet, and the underlying Quaternary alluvial deposits are about 120 feet thick (LAWGIBB 1999). Results of Standard Penetration Tests (SPT's) performed in six boreholes at the location of the proposed SCR (LAWGIBB 1999) show that individual layers have blow count (N) values that range from 4 to over 50. The average blow count values in the top 100 feet of these six boreholes ranges from 19 to 36. Based on the SPT results, the soils at this site would be classified as category D of the Uniform Building Code (ICBO 1997).

All six of the boreholes completed by LAWGIBB (1999) encountered zones of water saturated clays, silts or sands with SPT values of less than 10. Therefore, it appears to be common for the soils beneath the proposed SCR site to have some liquefaction susceptibility. The depth of the potentially liquefiable layers ranges from 15 to 75 feet and is concentrated from 20 and 40 feet deep. The soil profiles in boreholes 2, 4 and 6 seem to be the most susceptible to liquefaction. Broughton, et al., (1999) have recently found evidence of liquefaction in Shelby County, Tennessee along the Wolf and Loosahatchie rivers. Presumably, these liquefaction features are associated with the sequence of great New Madrid earthquakes that occurred in 1811-12.

SEISMIC HAZARD ASSESSMENT

The earthquake hazard at a site can be modeled probabilistically by considering all seismic source zones around a site, and the probability that these source zones will produce earthquakes of various sizes. The U.S. Geological Survey (USGS) performed probabilistic seismic hazard analyses throughout the United States to prepare the 1996 national seismic hazard maps (United States Geological Survey 1996). The USGS's analysis assumes that foundation conditions correspond to NEHRP B-C site conditions. The hardest rock conditions are category A and the softest soils fall in category F on this scale. As described above, the soil profile information collected at the Allen Fossil Plant places the soils there in soil category D.

Table C-1 presents the USGS's seismic hazard values for a point (35.10 deg N, 90.10 deg W) that is very near the Allen Fossil Plant (35.07 deg N, 90.14 deg W) location. The seismic hazard is expressed as the probability of exceeding ground motion accelerations at four different periods for three probability levels.

Table C-1 Probabilistic Ground Motion Values			
Ground Motion Period	Ground Accelerations in %g		
	10% Prob Exceed in 50 yr (475 year return period)	5% Prob Exceed in 50 yr (950 year return period)	2% Prob Exceed in 50 yr (2375 year return period)
Peak Ground Acceleration	13.9	30.2	69.0
0.2 sec	27.5	58.7	130.0
0.3 sec	20.4	43.4	110.6
1.0 sec	6.5	15.5	40.7

Source: USGS 1996

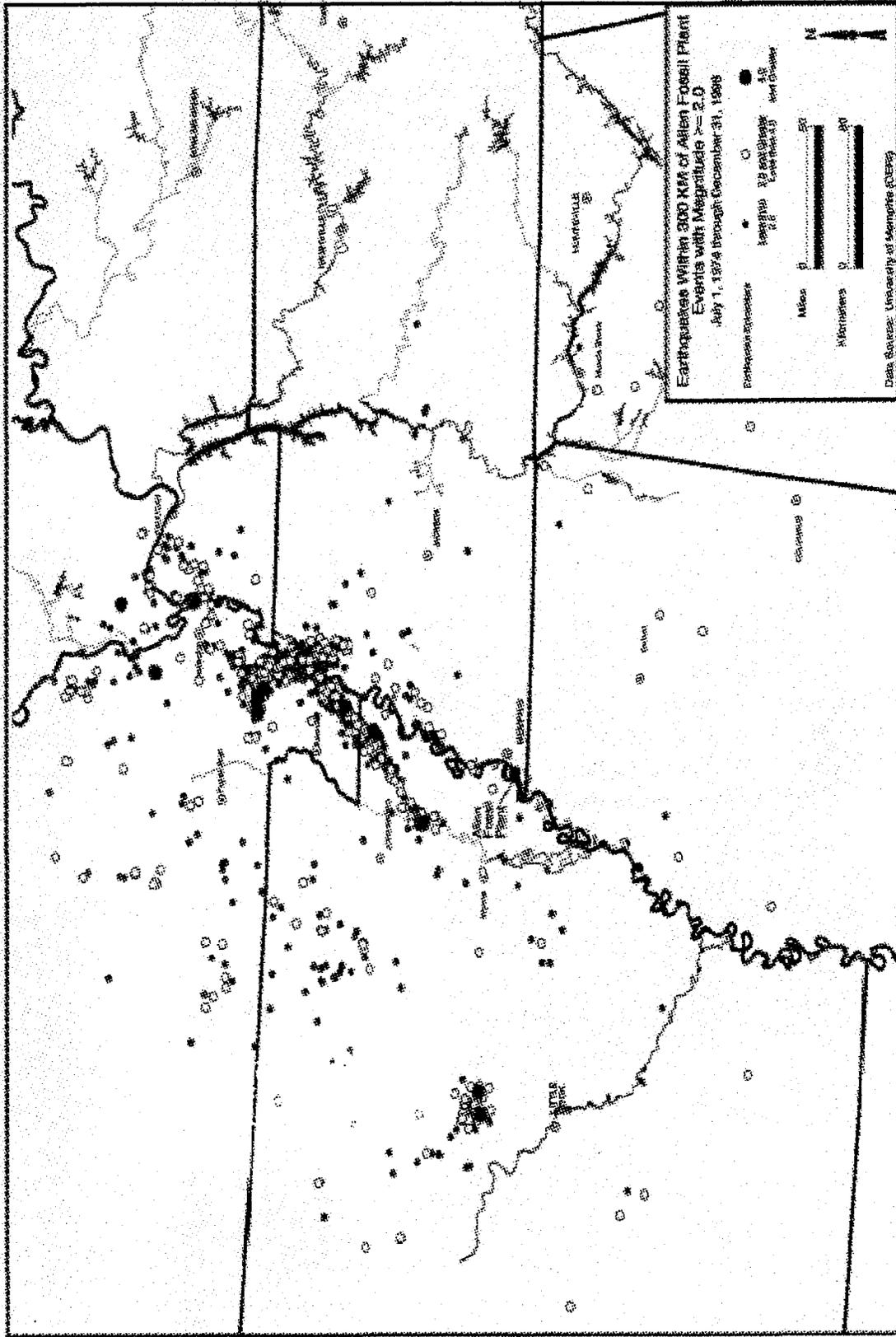


Figure C-1. Earthquakes within 300 kilometers of Allen Fossil Plant

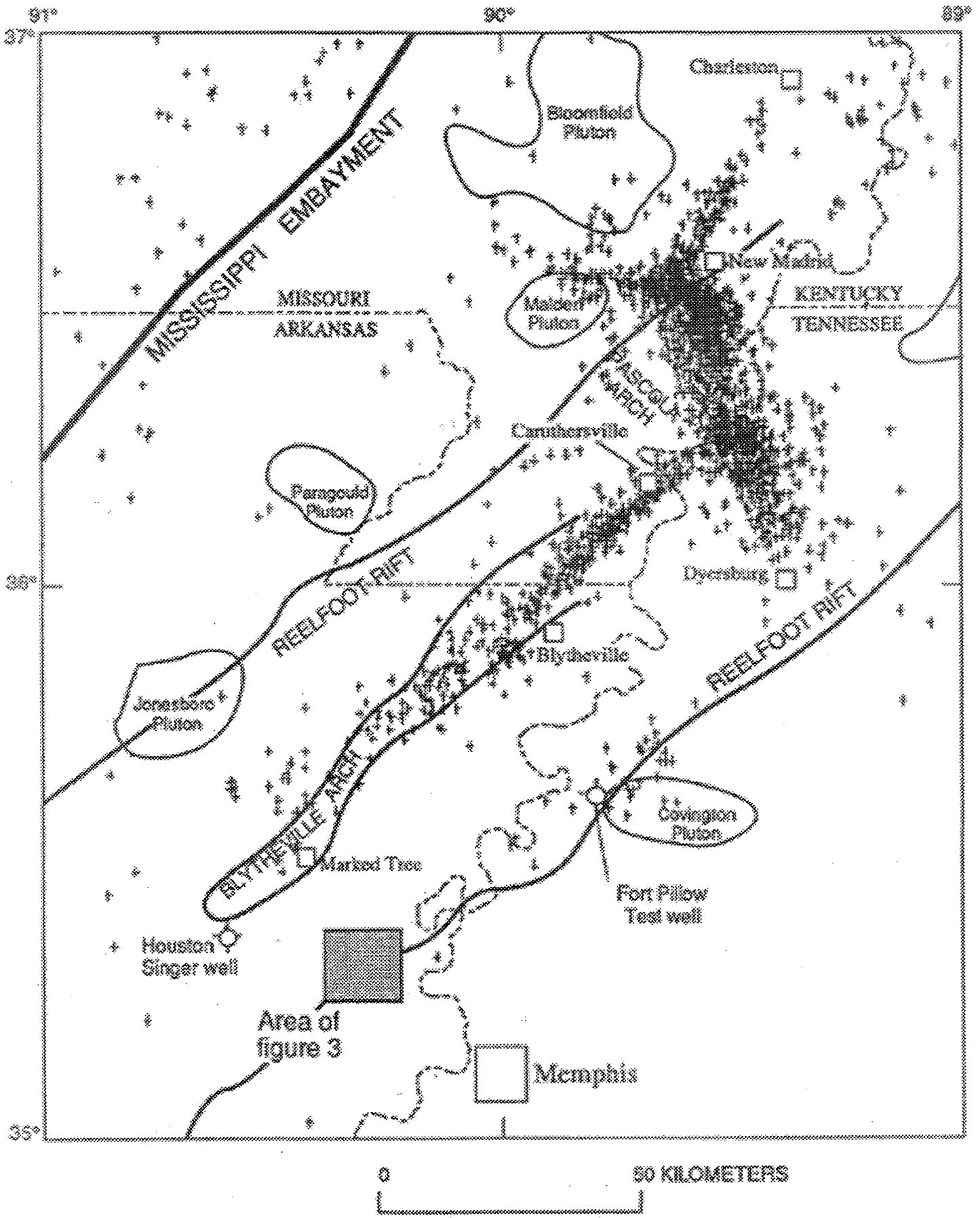


Figure C-2. Concentration of earthquakes along the Reelfoot Rift of the New Madrid Seismic Zone.

REFERENCES

- Broughton, A. T., J. H. Broughton and R. B. Van Arsdale. 1999. Memphis and Shelby County, Tennessee Liquefaction Susceptibility Mapping. Abstract in Proceedings of the 71st annual meeting of the Eastern Section of the Seismological Society of America, p. 11.
- Center for Earthquake Research and Information (CERI). 1999. New Madrid and Surrounding Regions Earthquake Catalog 1974-1998. University of Memphis, Memphis, Tennessee. http://elwe.ceri.memphis.edu/%7Eseisadm/cat_nm.html.
- Hart, T. A. 1979. Geologic Map and Mineral Resources Summary of the Fletcher Lake Quadrangle, Tennessee (GM 404-SW and MRS 404-SW). State of Tennessee, Department of Conversation, Division of Geology.
- International Conference of Building Officials (ICBO). 1997. Uniform Building Code. Vol. 1 - 3.
- Johnston, A. C., K. J. Coppersmith, L. R. Kanter, C. A. Cornell. 1994. The Earthquakes of Stable Continental Regions, vol. 1: Assessment of Large Earthquake Potential, Electric Power Research Institute TR-102261-V1, Electric Power Research Institute, Palo Alto, Ca.
- LAWGIBB. 1999. Report of Subsurface Exploration, Proposed SCR Addition, Allen Fossil Plant.
- Luziatti, E. A., L. R. Kanter, E. S. Schweig, K. M. Shedlock and R. B. Van Arsdale. 1992. Shallow Deformation along the Crittenden County Fault Zone near the Southeastern Boundary of the Reelfoot Rift, Northeast Arkansas, Seismological Research Letters, Volume 63, No. 3, p. 263-275.
- Tennessee Valley Authority. 1981. The Impact of Fish Impingement at Allen Steam-Electric Plant on Fish Populations in McKellar Lake. Office of Natural Resources, Knoxville, Tennessee.
- United States Geological Survey (USGS). 1996. National Seismic Hazard Mapping Project. World Wide Web site -- <http://gldage.cr.usgs.gov/eq/>.
- Zoback, M. D. and M. L. Zoback. 1991. "Tectonic Stress Field of North America and Relative Plate Motions," in Neotectonics of North America, Slemmons, D. B.; Engdahl, E. R.; Zoback, M. D. and Blackwell, D. D. Eds. GSA Decade Map v. 1, pp. 339-366.

APPENDIX D - AQUATIC ECOLOGICAL DATA

Table D-1. Fish Species Collected in 1979 and 1980 TVA Rotenone Surveys of McKellar Lake in the Vicinity of ALF (TVA 1981).

Common Name	Scientific Name
Spotted gar	<i>Lepisosteus oculatus</i>
Bowfin ψ	<i>Amia calva</i>
Skipjack herring	<i>Alosa chrysochloris</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Threadfin shad	<i>Dorosoma petenense</i>
Goldfish ψ	<i>Carassius auratus</i>
Grass carp ψ	<i>Ctenopharyngodon idella</i>
Spotfin shiner ψ	<i>Cyprinella spiloptera</i>
Steelcolor shiner	<i>Cyprinella whipplei</i>
Common carp	<i>Cyprinus carpio</i>
Silvery minnow ψ	<i>Hybognathus nuchalis</i>
Silver chub	<i>Macrhybopsis storeriana</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Emerald shiner ψ	<i>Notropis atherinoides</i>
Silverband shiner ψ	<i>Notropis shumardi</i>
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Fathead minnow*	<i>Pimephales promelas</i>
Bullhead minnow	<i>Pimephales vigilax</i>
River carpsucker	<i>Carpionodes carpio</i>
Quillback ψ	<i>Carpionodes cyprinus</i>
Smallmouth buffalo	<i>Ictiobus bubalus</i>
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>
Black bullhead	<i>Ameiurus melas</i>
Yellow bullhead ψ	<i>Ameiurus natalis</i>
Channel catfish	<i>Ictalurus punctatus</i>
Tadpole madtom	<i>Noturus gyrinus</i>
Flathead catfish	<i>Pygodictis olivaris</i>
Pirate perch ψ	<i>Aphredoderus sayanus</i>
Blackstripe topminnow*	<i>Fundulus notatus</i>
Western mosquitofish*	<i>Gambusia affinis</i>
Brook silverside	<i>Labidesthes sicculus</i>
White bass	<i>Morone chrysops</i>
Yellow bass	<i>Morone mississippiensis</i>
Striped bass*	<i>Morone saxatilis</i>
Green sunfish	<i>Lepomis cyanellus</i>
Warmouth	<i>Lepomis gulosus</i>
Orangespotted sunfish	<i>Lepomis humilis</i>
Bluegill	<i>Lepomis macrochirus</i>
Longear sunfish	<i>Lepomis megalotis</i>
Spotted bass*	<i>Micropterus punctulatus</i>
Largemouth bass	<i>Micropterus salmoides</i>
White crappie	<i>Pomoxis annularis</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Sauger	<i>Stizostedion canadense</i>
Freshwater drum	<i>Aplodinotus grunniens</i>

* Species collected only in 1980 survey.

ψ Species collected only in 1979 survey.

Table D-2. Fish Species Collected in the Mississippi River by the Tennessee Wildlife Resources Agency With Electrofishing and Trawling Gear, Shelby County, Tennessee, October, 1999.

Common Name	Scientific Name
Chestnut lamprey	<i>Ichthyomyzon castaneus</i>
Shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>
Paddlefish	<i>Polyodon spathula</i>
Longnose gar	<i>Lepisosteus osseus</i>
Shortnose gar	<i>Lepisosteus platostomus</i>
Goldeye	<i>Hiodon alosoides</i>
Mooneye	<i>Hiodon tergisus</i>
American eel	<i>Anguilla rostrata</i>
Skipjack herring	<i>Alosa chrysochloris</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Threadfin shad	<i>Dorosoma petenense</i>
Grass carp	<i>Ctenopharyngodon idella</i>
Blacktail shiner	<i>Cyprinella venusta</i>
Common carp	<i>Cyprinus carpio</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Emerald shiner	<i>Notropis atherinoides</i>
Quillback	<i>Carpoides cyprinus</i>
Highfin carpsucker	<i>Carpoides velifer</i>
Blue sucker	<i>Cycleptus elongatus</i>
Smallmouth buffalo	<i>Ictiobus bubalus</i>
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>
Black buffalo	<i>Ictiobus niger</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Blue catfish	<i>Ictalurus furcatus</i>
Channel catfish	<i>Ictalurus punctatus</i>
Flathead catfish	<i>Pylodictis olivaris</i>
Striped mullet	<i>Mugil cephalus</i>
White bass	<i>Morone chrysops</i>
Yellow bass	<i>Morone mississippiensis</i>
Striped bass	<i>Morone saxatilis</i>
Green sunfish	<i>Lepomis cyanellus</i>
Bluegill	<i>Lepomis Macrochirus</i>
Longear sunfish	<i>Lepomis megalotis</i>
Spotted bass	<i>Micropterus punctulatus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Sauger	<i>Stizostedion canadense</i>
Freshwater drum	<i>Aplodinotus grunniens</i>