GRAEF ANHALT SCHLOEMER & ASSOCIATES INC. CONSULTING ENGINEERS

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April 5, 1990

Mr. Eddie Young
Safety-Kleen Corporation
2720 Westminster Suite A
Post Office Box 50716
Denton, Texas 76206

Dear Mr. Young:

Graef, Anhalt, Schloemer & Associates, Inc., Consulting Engineers (GAS), has been requested by Safety-Kleen Corporation to certify that the design and installation plan of Safety-Kleen Corporation's proposed underground hazardous waste storage tank system at the Albuquerque, New Mexico, service center is in compliance with Federal Regulation 40 CFR 264.192, 40 CFR 264.193 and the state of New Mexico Underground Storage Tank Regulations. Local codes concerning underground hazardous waste storage were also considered.

This letter will present those aspects of the design and installation plan of the tank system which are necessary to determine compliance with 40 CFR 264.192, 40 CFR 264.193 and with New Mexico Underground Storage Tank Regulations.

The City of Albuquerque was contacted and GAS was verbally informed that there are no local zoning requirements. The State of New Mexico was also contacted to confirm that the New Mexico Underground Storage Tank Regulations conform with the Federal Regulations

Safety-Kleen Corporation's Albuquerque, New Mexico, facility will contain two (2) 10,000-gallon underground storage tanks, one for product and one for waste mineral spirits. This preconstruction assessment addresses the waste mineral spirits tank only; the product tank, however, will be identical to the waste mineral spirits tank.

The following is a discussion of each item as it occurs in the regulation:

40 CFR 264.192 (a)

An assessment that the foundation, structural support, seams, and connections are adequately designed and that the tank system will have sufficient structural strength, compatibility with the wastes to be stored, and corrosion protection to prevent collapse, rupture or failure.

(1) According to Safety-Kleen specifications, the tank will be designed and constructed in accordance with Underwriters Laboratories, Inc., "Standard for Steel Underground Tanks for Flammable and Combustible Liquids," UL 58(1987). GAS has not evaluated the tank design or the specifications of UL 58, and does not take responsibility for them. The UL 58 standard is intended to prevent the collapse or rupture of tanks designed to that standard. The tank system at the Albuquerque, New Mexico, service center will be a doubled-wall steel underground storage tank with fiberglass coating. The inner tank shell thickness is specified as 1/4-inch hot-rolled carbon steel (H.R.C.S.) the outer wall is specified as 10-guage carbon steel with a 7-guage fiberglass coating. The tank operating pressure is atmospheric and the operating temperature is ambient. The specific gravity of mineral spirits ranges between .775 and .795. The maximum height of liquid in the tank will be at 95 percent capacity and will be monitored by a high level alarm.

(2)

i. The three hazardous characteristics of the used mineral spirits waste, as defined by 40 CFR 261, are the following:

A. Ignitability (D001) - A waste is considered ignitable, and therefore hazardous, if its flash point is below 140°F.

The used mineral spirits to be stored in this tank has a typical flash point in the range of 100°F to 110°F, and therefore is ignitable (D001).

B. EP Toxicity due to Cadmium Content (D006) - A waste is considered to be EP toxic due to cadmium content if its concentration exceeds 1.0 ppm (parts per million).

A typical value for cadmium concentration in used mineral spirits is 0.93 ppm. Since this value is close to 1.0 ppm, it may be considered to be EP toxic due to cadmium content.

C. EP Toxicity due to Lead Content (D008) - A waste is considered to be EP toxic due to lead content if concentration exceeds 5.0 ppm.

A typical value for lead concentration in used mineral spirits is 5.0 ppm. Therefore, the used mineral spirits is considered to be EP toxic due to lead content.

Of those three hazardous waste characteristics, none would affect the compatibility of the mineral spirits waste with the inner carbon steel tank material. In fact, mineral spirits is often used as a light hydrocarbon coating to prevent rusting of metal parts, and therefore acts to preserve the carbon steel.

ii. The National Fire Protection Agency identifies three types of fire hazards by degree. The ratings for the spent mineral spirits are as follows:

A. Health Hazards - 0. Includes "materials which on exposure under fire conditions would offer no hazard beyond that of normal combustible material."

B. Flammability Hazards - 2. Includes "materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur... (and) should include liquids having a flash point above 100°F, but not exceeding 200°F." It can be pointed out that, although the flash point falls in this category, the vapor pressure, which reflects the amount of ignitable gases given off by the liquid, of mineral spirits is very low (2mm). Ignitability is therefore not nearly as great as that of other liquids with similar flash points.

C. Reactivity (Instability) Hazards - 0. Includes "materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water".

iii. Finally, the Material Safety Data Sheet for fresh mineral spirits, which has mostly the same characteristics as spent mineral spirits, describes the material as stable and combustible, and incompatible only with strong oxidizing agents. Warnings include avoiding heat, sparks and flame. Oxidizers are not handled at the Albuquerque, New Mexico, service center, and operating procedures are such that they minimize the possibility of ignition sources near the tank farm.

It, therefore, can be concluded that there is no apparent incompatibility of the tank with the hazardous waste contents.

(3) This section of the regulations applies to tank systems for which the external shell of a metal tank or any external system will be in contact with soil or water. The tank system at the Albuquerque, New Mexico, service center will be a double walled steel underground storage tank with fiberglass coating and interstitial monitoring and piping with secondary containment. All piping is specified to be 2-inch diameter primary, with 4" secondary piping. Primary piping is to be Schedule 40 SCRD Carbon Steel and secondary piping is to of Polyethylene constructed by Total Containment, Inc. Thus, no external metal component of the tank system will exist.

(4) The underground tank system components are not likely to be adversely affected by vehicular traffic. The depth of cover of compacted backfill, and 6 inches of reinforced concrete with number 4 RB 18 inches O.C.eachway, overlapping the tanks by 1 foot on all sides will dissipate traffic loads.

(5) Designs have been analyzed for the following:

i. Tank foundation of granular compacted bedding and backfill will maintain the load of the full tank.

ii. The tank system is to be installed with an adequate overburden and anchored using deadmen anchors to prevent flotation (see attached calculations).

iii. The facility location is listed in Appendix VI of part 264. Therefore, the EPA requires compliance with seismic standards. 40 CFR 264.18(a) requires that areas of new facilities where hazardous wastes are to be stored must not be located within 200 feet of a fault which has had displacement in Holocene [illegible] Albuquerque, New Mexico, service center are located beyond the 200 foot requirement (refer to enclosed geologic maps).

iv. Frost is not considered to be a problem due to the geographical location of Albuquerque, New Mexico.

40 CFR 264.192 (b)

Safety-Kleen Corporation is to ensure proper handling procedures during installation, with continuous inspection by the installers and experienced Safety-Kleen personnel, and final inspection by an independent, qualified tank inspector, with specific attention paid to:

1. Weld breaks
2. Punctures
3. Scrapes of protective coatings
4. Cracks
5. Corrosion
6. Other structural damage or inadequate construction/installation

All discrepancies are to be remedied before the tank is placed in use.

40 CFR 264.192 (c)

The underground tank system is to be backfilled with a material that is non-corrosive, porous, and homogeneous. The backfill material is to be installed so that it is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.

40 CFR 264.192 (d)

The tank and ancillary equipment are to be tested for tightness by a qualified tank tester prior to being placed in use. All repairs necessary to remedy any leaks discovered are to be performed prior to placing the tank in use.

40 CFR 264.192 (e)

Ancillary equipment is specified to be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction. Lengths of piping aboveground are to be supported no less than every eight running feet.

40 CFR 264.192 (f)

Based on the information provided under paragraph (a)(3) above, the degree of corrosion protection necessary is the double-walled tank with corrosion-resistant, fiberglass coating and interstitial monitoring, and piping with secondary containment.

40 CFR 264.192 (g)

This report has been prepared to fulfill the requirements of Section 40 CFR 264.192(g) and will be kept on file in accordance with this regulation.

40 CFR 264.193 Containment and Detection of Releases

This part of the Code of Federal Regulations addresses the compliance dates, applicability, design characteristics, and structural integrity of secondary containment for hazardous waste storage tank systems.

The following is a discussion of each item as it occurs in the Regulations.

40 CFR 264.193(a)

This paragraph of the regulation establishes the compliance dates for secondary containment.

- For the Albuquerque, New Mexico, facility, compliance is required at the time of construction.

40 CFR 264.193(b)

The secondary containment system must be:

1. Designed, installed, and operated to prevent migration of wastes or accumulated liquids out of the system to the soil, groundwater, or surface water at any time during the use of the tank system.

2. Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

    - The secondary containment structure at the Albuquerque, New Mexico, facility, in regards to the requirements of 40 CFR 265.193(b), are discussed in the following paragraphs (c) and (e).

40 CFR 264.193(c)

To meet the requirements of paragraph (b), secondary containment systems must be at a minimum:

3. Constructed of materials which are compatible with the wastes, have sufficient strength and thickness to prevent failure owing to pressure gradients, climatic conditions, physical contact with the stored waste, and daily operational stresses.

    - The secondary containment walls will be 7 gauge carbon steel with a 1/8 inch of chopped fiberglass and a resin coating. The tank and secondary containment will be designed and constructed in accordance with Underwriter Laboratories, Inc., UL 58 (1987). GAS has not evaluated the tank design or

the specifications of UL 58, and does not take responsibility for them. The UL 58 standard is intended to prevent the collapse or rupture of tanks designed to that standard.

- The secondary containment shell is constructed of carbon steel. None of the hazardous waste characteristics are incompatible with the secondary containment shell. In fact, mineral spirits is often used as a light hydrocarbon coating to prevent rusting of metal parts and therefore acts to preserve the carbon steel.

- Frost is not considered to be a problem due to the low regional frost depth (9 inches) of Albuquerque, New Mexico, and the burial depth of the tank system.

- The tank system is overlain by 3.5 feet of compacted backfill and 8 inches of concrete reinforced with No. 4 RB, 18 inches on center each way, overlapping the tanks by 1 foot on all sides this pad will dissipate traffic loads (see attached calculations).

4. Placed on a base capable of supporting the secondary containment system.

   - Safety-Kleen specifications require a tank foundation of granular compacted bedding which will support and maintain loads generated by a full tank (see attached stress calculations).

5. Provided with a leak detection system that will detect failure in either the primary or secondary containment structure or detect the presence of a hazardous waste released or accumulated liquid in the secondary containment system within 24 hours.

   - A liquid sensing probe will be installed in the interstitial space between the primary and secondary ends of the tanks. This probe will detect the presence of product released from the primary tank or groundwater entering through the secondary shell which will collect in the interstice. An audio-visual alarm will sound when liquid is detected between the primary and secondary walls of the tank.

6. Sloped or otherwise designed to drain and remove liquids resulting from leaks, spills, or precipitation within 24 hours of occurrence.

   - If liquid is detected in the interstice of the tank, the system will be removed from use within 24 hours of detection, or in as timely manner as possible.

40 CFR 264.193(d)

The secondary containment for tanks must be one or more of the following:

1. A liner (external to the tank)
2. A vault
3. A double-walled tank
4. An equivalent device as approved by the Regional Administrator

- The secondary containment at the Albuquerque, New Mexico, facility is a double-walled tank.

40 CFR 264.193(e)

This paragraph deals with the specific design requirements of the secondary containment structures mentioned in paragraph (d).

i. Designed as an integral structure so that any release from the inner tank is contained by the outer shell.

- The tank system at the Albuquerque, New Mexico, service center will be a Glassteel Type 1, 360° wrap double-walled steel with fiberglass coating underground storage tank. The tank is to be designed and constructed in accordance with Underwriters Laboratories UL 58. The 360° wrap of the outer tank shell completely encases the inner tank shell. The outer shell is capable of containing 100 percent of the inner tank volume.

ii. Protected from both corrosion of the primary tank interior and of the external surface of the outer shell.

- The outer shell of the tank will be coated with a minimum of 100 mils of chopped fiberglass and resin and be sealed by a final resin coating. No external metal parts will exist.

  In addition, the tanks are electrically isolated to prevent stray current which may cause corrosion.

iii Provided with a built-in continuous leak detection system capable of detecting a release within 24 hours.

- A liquid sensing probe is to be installed between the two walls of the tank which is capable of detecting a release of product from the primary tank or entrance of groundwater through the secondary wall. With detection of a release, an audio-visual alarm will sound.

40 CFR 264.193(f)

This paragraph states that all ancillary equipment must be provided with secondary containment that meets the requirements of paragraphs (b) and (c) of this Section except for:

1. Aboveground piping (exclusive of flanges, joints, valves, and connections) that are visually inspected for leaks on a daily basis.

   - All underground piping is to be provided with secondary containment constructed of polyethylene manufactured by Total Containment, Inc., and is EPA approved.

   - Aboveground portions of piping will have welded connections, be accessible for daily inspection and have secondary containment in the form of containment pans under the return and fill dumpsters.

New Mexico UST Rules Part 4, Sections 401,403

These sections of the New Mexico UST Rules call for a description of the design specifications of the tank system, and piping. These design specifications are addressed in 40 CFR 264.192 (a), and 40 CFR 264.193 (c)-(d). These regulations are previously cited in this letter.

CONCLUSION

In view of all of the topics discussed above, it is concluded that the installation plan of Safety-Kleen Corporation's proposed underground hazardous waste storage tank system at the Albuquerque, New Mexico, service center are in compliance with Chapter 40 of the Code of Federal Regulations, Section 264.192, and New Mexico Underground Storage Tank Regulations Part 4, Sections 401, 403.

Respectfully submitted,

GRAEF, ANHALT, SCHLOEMER
& ASSOCIATES INC.

John C. Schwabe
Environmental Specialist

JCS:fls
enclosures

CC: E Jurczak
R. Wacsmuth
R. Omiecinski

CERTIFICATION STATEMENT

I, Jerome S. Chudzik, have reviewed a portion of the design of a proposed underground hazardous waste storage system located at 2720 Girard Ave., Albuquerque, New Mexico, which is owned and operated by Safety-Kleen Corporation. My duty was a pre-construction evaluation of the tank system as required by the Resource Conservation and Recovery Act (RCRA) regulations, namely 40 CFR 264.192, Paragraphs a) and e).

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Jerome S. Chudzik, P.E.
Illinois Professional Engineer
License Number 062-041587

I, Harold J. Farchmin, certify under penalty of law that I have personally examined the information submitted in this document for the proposed underground hazardous waste storage system located at 2720 Girard Ave., Albuquerque New Mexico, which is owned and operated by Safety-Kleen Corporation. Based on my inquiry of Jerome S. Chudzik, my associate who is immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

HAROLD J. FARCHMIN
NEW MEXICO
9520
REGISTERED PROFESSIONAL ENGINEER

Harold J. Farchmin, P.E.
New Mexico Professional Engineer
License Number 9520

4/9/90

12000 GALLON UNDERGROUND STORAGE TANK

4' BURY BELOW TOP OF SLAB

TANK OD = 8'-0" WEIGHT = 17000# PER MFGR
L = 32'-0"
V = 1608.5 CFT

RISER $V = [(2.67^2\pi/4)\,2] + [(3.5^2\pi/4)\,2.25] = 32.85$ CFT / RISER

$V_T = 1608.5 + 3(32.85) = 1707.03$ CFT

98.55 = M

REFLECTED TANK AREA = 8 x 32 = 256 □'

REINFORCED CONCRETE SLAB

(8 + 2)(32 + 4) = 360 □' (343.2 □' NET)

SUBMERGED WEIGHT 343.2 (15)(87.5) = 15015#

VOLUME & WEIGHT OF OVER BURDEN

DEPTH BURY BELOW SLAB = 3.5' (d) $h = D/2 + d = 7.5'$
TANK DIAMETER = 8' (D)
VOL RISERS BELOW SLAB = 81.75 CFT (M)
TANK DISPLACEMENT = 1608.5 CFT (V)
AREA CONCRETE SLAB = 360 □' (B_1)
REFLECTED TANK AREA = 256 □' (B_2)

VOLUME OF OVERBURDEN $= [(h/3)(B_1 + B_2 + \sqrt{B_1 \times B_2}] - (V/2 + M)$

$\left[\left(\frac{7.5}{3}\right)(360 + 256 + \sqrt{360 \times 256})\right] - \frac{1608.5}{2} - 81.75 = 1412.45$ CF

WEIGHT OF OVERBURDEN

1412.45 (60) = 84776.8 #

TOTAL RESTRAINING FORCE

17000 + 84776.8 + 15015 = 116791.8#

TOTAL BUOYANT FORCE

62.4 (1707.03) = 106518.7# FS = 1.1

FOR FS 1.5 REQUIRED RESTRAINING FORCE

106518.7 (1.5) = 159778# NET TO DEADMAN 43[illegible]#

WT OF DEMOMEN

$2(22)(1)(1.67)(87.5) = 9352^{\#}$

8 - 1"ϕ GALVANIZED ANCHOR BOLTS $A_s = .79 in^2$

$42986.25/8 = 5373.3^{\#}/BOLT$ $f_t = 6800 psi < 22000 psi$ OK

TENSION IN STRAP

$5373.3/.75(?) = 7164.4 psi < 22000 psi$ OK

CHECK EMBEDMENT IN DEMOMEN $l_e = 6"$ $f'_c = 3000 psi$

$\phi P_c = 10.7(6^2)(3000^{1/2}) = 20900^{\#}$ $F_s = 3.9$ OK

$5373.3/6^{\#} = 285 psi$

RECOMMEND 8" EMBEDMENT & REPLACE HOOKED END W/NUT & WASHER

LOAD ON DEMOMEN

$42986.25/64 = 671.66^{\#}/ft$ @ 10' SPACING

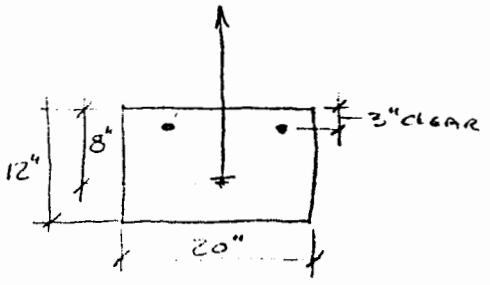
$M_u = 1.7(.672)(10^2)/10 = 11.42^{IK}$ A_s req'd $= .43 in^2$ 2-#5 $A_s = .62 in^2$

$M_{SUC} = 6.72^{IK}$ $S = 20(12^2)/6 = 480 in^3$

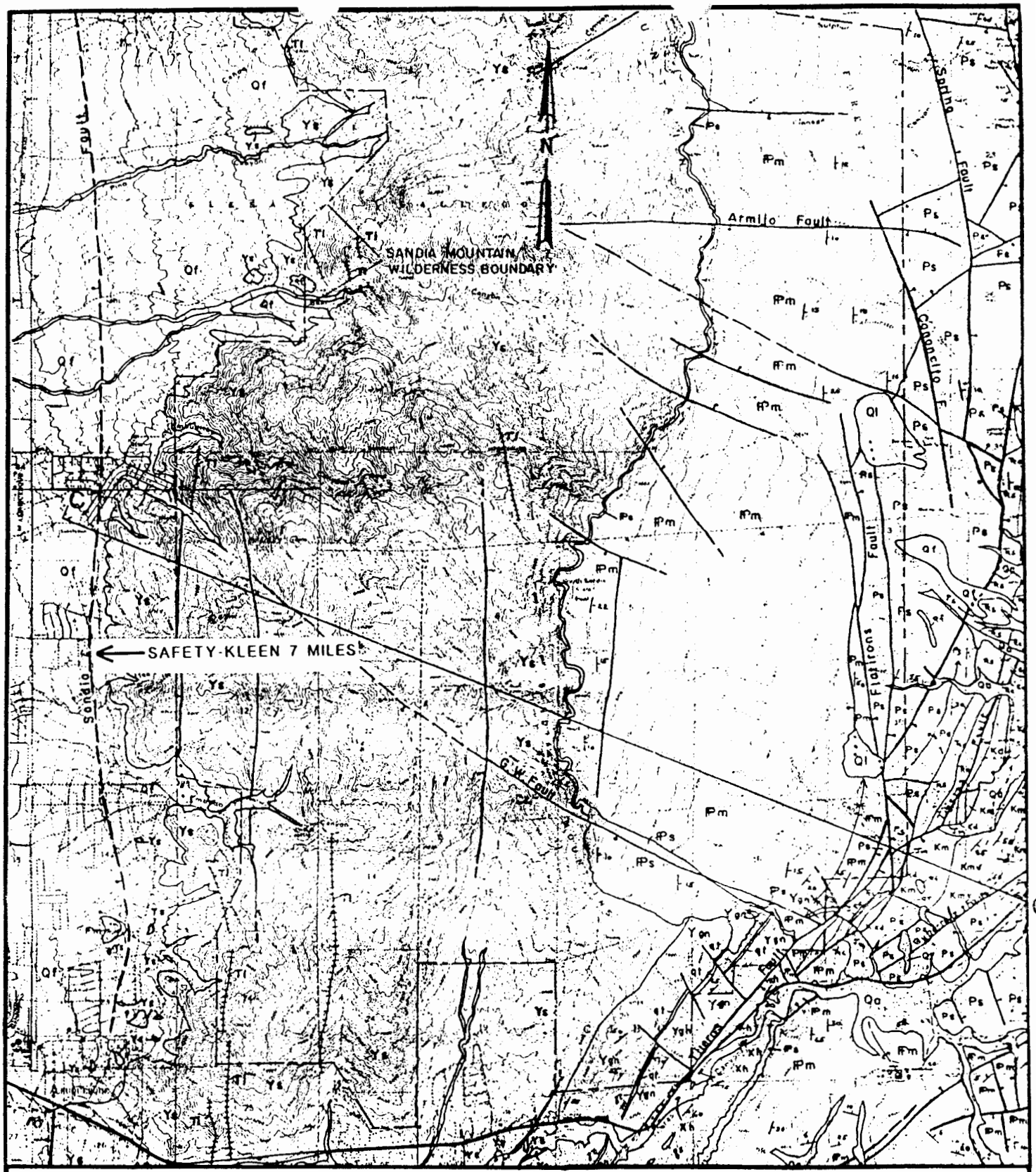
$f_b = 6.72(12000)/480 = 168 psi$ (T) $\leq 2\sqrt{f'_c}$

105 psi (C) OK

RECOMMEND REINFORCING W/ 2 - #5 BARS TOP



SANDIA MOUNTAIN GEOLOGIC MAP



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

SCALE 1 : 57500
FIGURE 5

MISCELLANEOUS FIELD STUDIES
MAP MF-1631-B

GEOLOGIC MAP OF THE SANDIA MOUNTAIN WILDERNESS, BERNALILLO AND SANDOVAL COUNTIES, NEW MEXICO

By D.C. Helund
1985

FAULT--Showing dip where known. Dashed where approximately located or inferred; dotted where concealed. Bar and ball on downthrown side

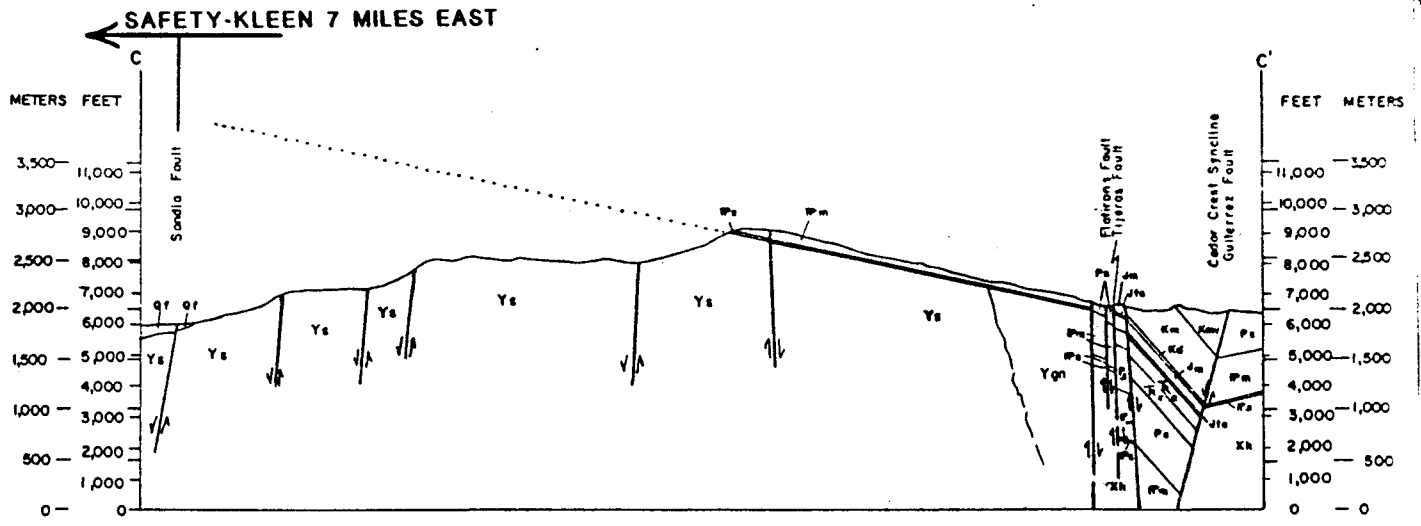
ANTICLINE--Showing plunge. Dashed where approximately located or inferred

SYNCLINE--Showing plunge. Dashed where approximately located or inferred

CROSS SECTION OF SANDIA MOUNTAINS

CORRELATION OF MAP UNITS

ALLUVIUM	Qa		Holocene	QUATERNARY
FAN, TALUS, LANDSLIDES	Qf	Qt / Ql	Holocene and Pleistocene	
SANTA FE FORMATION	QTsf		Pleistocene, Pliocene and Miocene	
LAMPROPHYRE DIKES	Tl		Oligocene(?)	TERTIARY
GALLISTEO FORMATION	Tg		Eocene	
MESAVERDE FORMATION	Kmv		Upper Cretaceous	CRETACEOUS
MANCOS SHALE	Km			
DAKOTA SANDSTONE	Kd			
MORRISON FORMATION	Jm		Upper Jurassic	JURASSIC
TODILTO AND ENTRADA	Jte		Middle Jurassic	
CHINLE FORMATION	Rc		Upper Triassic	TRIASSIC
SANTA ROSA FORMATION	Rs			
SAN ANDRES FORMATION	Ps		Lower Permian	PERMIAN
MADERA GROUP	Pm		Upper Pennsylvanian	PENNSYLVANIAN
SANDIA FORMATION	Ps		Middle Pennsylvanian	
ARROYO PENASCO GROUP	Ma		Upper and Lower Mississippian	MISSISSIPPIAN
SANDIA GRANITE	Ys	Pg		MIDDLE PROTEROZOIC
GNEISS AND SCHIST	Yr			MIDDLE(?) PROTEROZOIC
CIBOLA GNEISS	Ygn	qt		EARLY PROTEROZOIC
TIJERAS GREENSTONE	Xh	qs		



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

FIGURE 6

MISCELLANEOUS FIELD STUDIES
MAP MF-1631-B

GEOLOGIC MAP OF THE SANDIA MOUNTAIN WILDERNESS, BERNALILLO AND SANDOVAL COUNTIES, NEW MEXICO

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