APPENDIX D

FAULT HAZARD INVESTIGATION OF THE STORAGE FACILITY (2233) AND HYDROLYSIS TREATMENT FACILITY (0503)

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Prepared for:

United Technologies Corporation
Chemical Systems
P.O. Box 49028
San Jose, CA 95161-9028

JANUARY 1997

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EXECUTIVE SUMMARY

The California Code of Regulations (CCR) Title 22, Section 66270.14 requires that if an active fault (known displacement within the past 11,000 years) is present within 3,000 feet of a facility where treatment, storage, or disposal of hazardous waste occurs, a comprehensive geologic analysis must be performed near the facility to determine if any other faults pass within 200 feet of the structure. At the request of the California Department of Toxic Substance Control (DTSC), a fault hazard investigation was conducted at the Storage Facility (Station 2233) and Hydrolysis Treatment Facility (Station 0503) at the United Technologies Corporation, Chemical Systems (CSD) site in Santa Clara County, California. This investigation was requested due to the close proximity of Stations 2233 and 0503 to the Calaveras fault zone.

Suggested guidelines for earthquake and/or fault hazard investigations were used to conduct this work. The scope of the investigation was to review published and unpublished geologic/fault hazard data and literature pertinent to the region surrounding the CSD site; review data from numerous geologic, groundwater, soils, fault hazard and other investigations/reports conducted at the CSD site; conduct a detailed site reconnaissance and geologic inspection; review aerial photographs; conduct a geophysical investigation in the vicinity of Stations 2233 and 0503 to assess if subsurface conditions exist that may be related to faulting; and prepare a geologic report describing the results and interpretations of all investigations.

The investigation found that the Storage Facility (Station 2233) is located approximately 2,500 feet from the Calaveras fault, an active fault, and about 2,500 feet from the Animas and Quimby faults which are inactive. The investigation found that the Hydrolysis Treatment Facility (Station 0503) is more than 3,000 feet from the active Calaveras fault and 2,500 feet from the inactive Animas and Quimby faults. Field reconnaissance, stereoscopic examination of aerial photographs, and review of geologic and groundwater data found no evidence of active or potentially active faults, splays, or any other lineations within more than 200 feet of either of the facility structures. Results of the seismic refraction investigation at both stations indicated no evidence of subsurface conditions that can be attributed to faulting or fracturing. On the basis of all the data, the potential for faulting at Stations 2233 and 0503 is extremely low.

1.0 INTRODUCTION

This report presents data requested by the California Department of Toxic Substance Control (DTSC) on possible fault hazards near the Storage Facility (Station 2233) and Hydrolysis Treatment Facility (Station 0503) at the United Technologies Corporation, Chemical Systems (CSD) site in Santa Clara County, California.

Due to the close proximity of the Calaveras fault zone, a fault hazard investigation of Stations 2233 and 0503 is required by the California Code of Regulations (CCR) Title 22, Section 66270.14. It requires that if a fault which has had known displacement within Holocene time (past 11,000 years) is present within 3,000 feet of a facility where treatment, storage, or disposal of hazardous waste occurs, a comprehensive geologic analysis of the facility must be performed to determine if any faults pass within 200 feet of the structure.

Suggested guidelines for earthquake and/or fault hazard investigations were used for this investigation and report. These guidelines are listed in Special Publication 42 from the California Division of Mines and Geology [CDMG, 1994a] along with the Alquist-Priolo Earthquake Zoning Act. In general, the following scope of work was performed to achieve the objective of the investigation:

- Review of published and unpublished geologic/fault hazard data and literature pertinent to the region surrounding the CSD site,
- Review of data from numerous geologic, groundwater, soils, fault hazard and other investigations/reports conducted at the CSD site by several different consultants,
- Detailed site reconnaissance and geologic inspection,
- Stereoscopic inspection of aerial photographs taken of the CSD site in 1994,
- Geophysical investigation in the vicinity of Stations 2233 and 0503 to assess if subsurface conditions exist that may be related to faulting,
- Preparation of a geologic report describing the results and interpretations of all investigations.

Most of the local geologic data reviewed in this study is from previous CSD investigations conducted by various consultants. In addition, for regional geology and fault information, the most recent information and data were researched and reviewed at the California Division of Mines and Geology Library in Sacramento, California.

1.1 CSD Site Description

The CSD site is located at 600 Metcalf Road in the eastern foothills in an unincorporated area of southern Santa Clara County, California. CSD is approximately five miles south of San Jose and four miles east of Highway 101 (Figure 1). The site occupies 5,200 acres which is divided into three geographic areas: Shingle Valley, Mixer Valley, and the Panhandle (Figure 2 - Map Pocket) . Approximately 3,000 acres of the CSD site have been developed since 1959. Prior to CSD's occupancy, the site consisted of open range land.

Over the 37 years the site has been owned by CSD, primary operations have consisted of the development, manufacturing, and testing of solid propellant propulsion systems. Currently there are approximately 200 active stations at the site. The stations include laboratory, research, testing, manufacturing, storage, administration, and maintenance facilities. Stations 2233 and 0503 are located within Mixer Valley in the north central portion of the site.

1.2 Storage Facility (Station 2233)

The CSD Storage Facility is located in lower Mixer Valley at the intersection of Manufacturing Road and Los Animas Road. The Storage Facility consists of an 80-foot by 100-foot reinforced concrete slab covered by a pre-fabricated steel weather cover (Butler Building). Self-contained storage sheds are also used for the storage of smaller individual quantities of hazardous waste and are located adjacent to the slab. The Storage Facility (2233) receives wastes generated on-site from research and development and testing activities. The facility only receives wastes from CSD operations.

1.3 Hydrolysis Treatment Facility (Station 0503)

The Hydrolysis Treatment Facility (0503) is currently being constructed and will be used as an alternative to open burning for disposal of propellant wastes. The hydrolysis of the propellant active ingredients into less reactive materials has been demonstrated to be a safe and reliable alternative to open burning of propellant waste generated at the CSD Facility. The key units at the facility are a reaction tumbler, a caustic storage tank, a digester tank, and a brine holding tank.

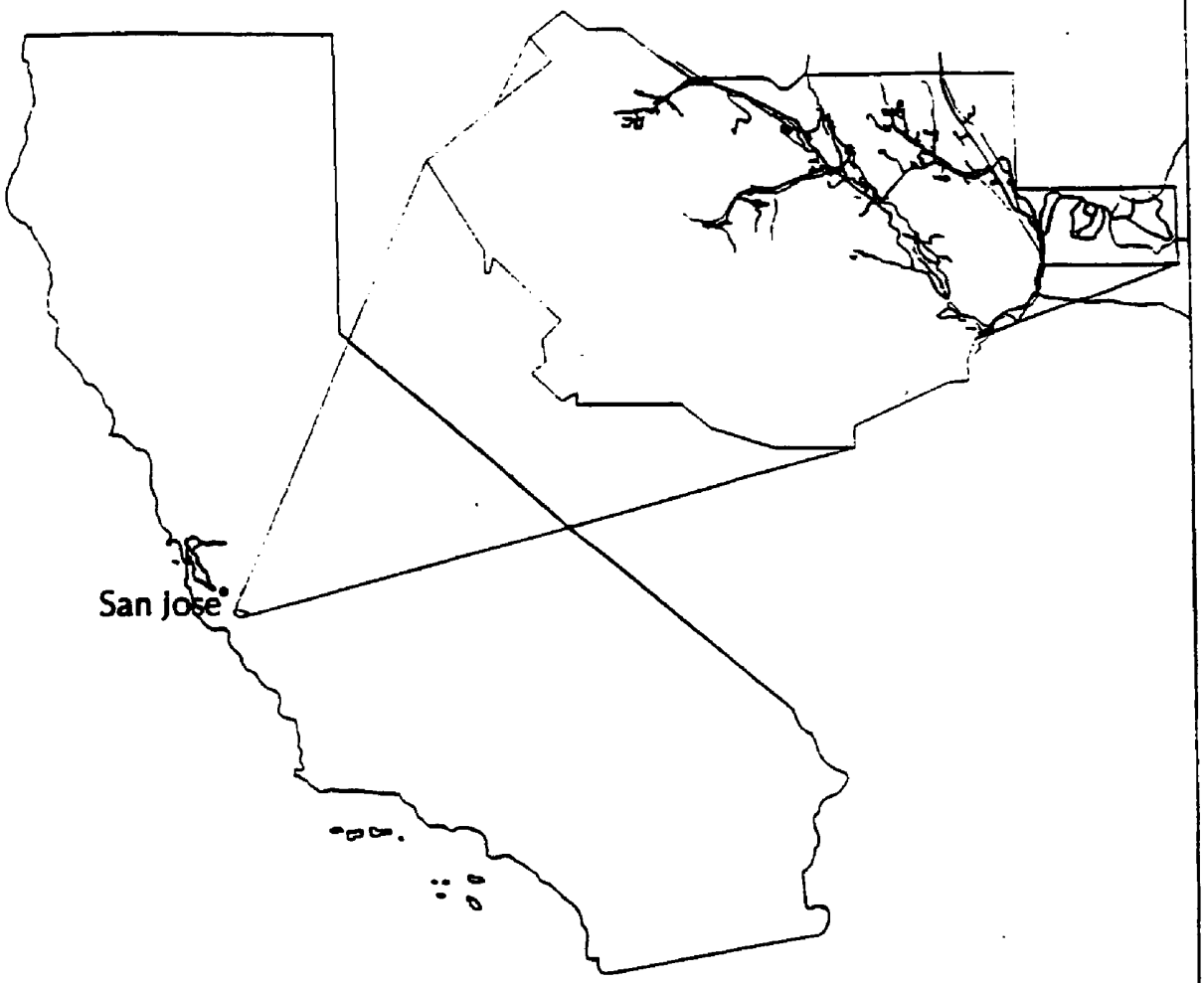

Figure 1
Location Map of
CSD Complex

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CHEMICAL SYSTEMS DIVISION
SAN JOSE, CA

N

Fault Hazard Investigation of the Storage Facility (2233)
and Hydrolysis Treatment Facility (0503)

2.0 GEOLOGIC CONDITIONS

2.1 General Geology

The CSD site is located in the southwest portion of the Diablo Range, within the coast ranges geomorphic province. The Diablo Range is characterized by a series of northwest trending ridges which separate the Santa Clara Valley and San Francisco Bay from the San Joaquin Valley. The northwest alignments parallel numerous active faults. Tectonic activity associated with the faulting provided the deformation and uplift that formed these regional features. The geology was originally mapped by Dibblee [Dibblee, 1973]. A geologic map of the region surrounding the CSD site is shown in Figure 3.

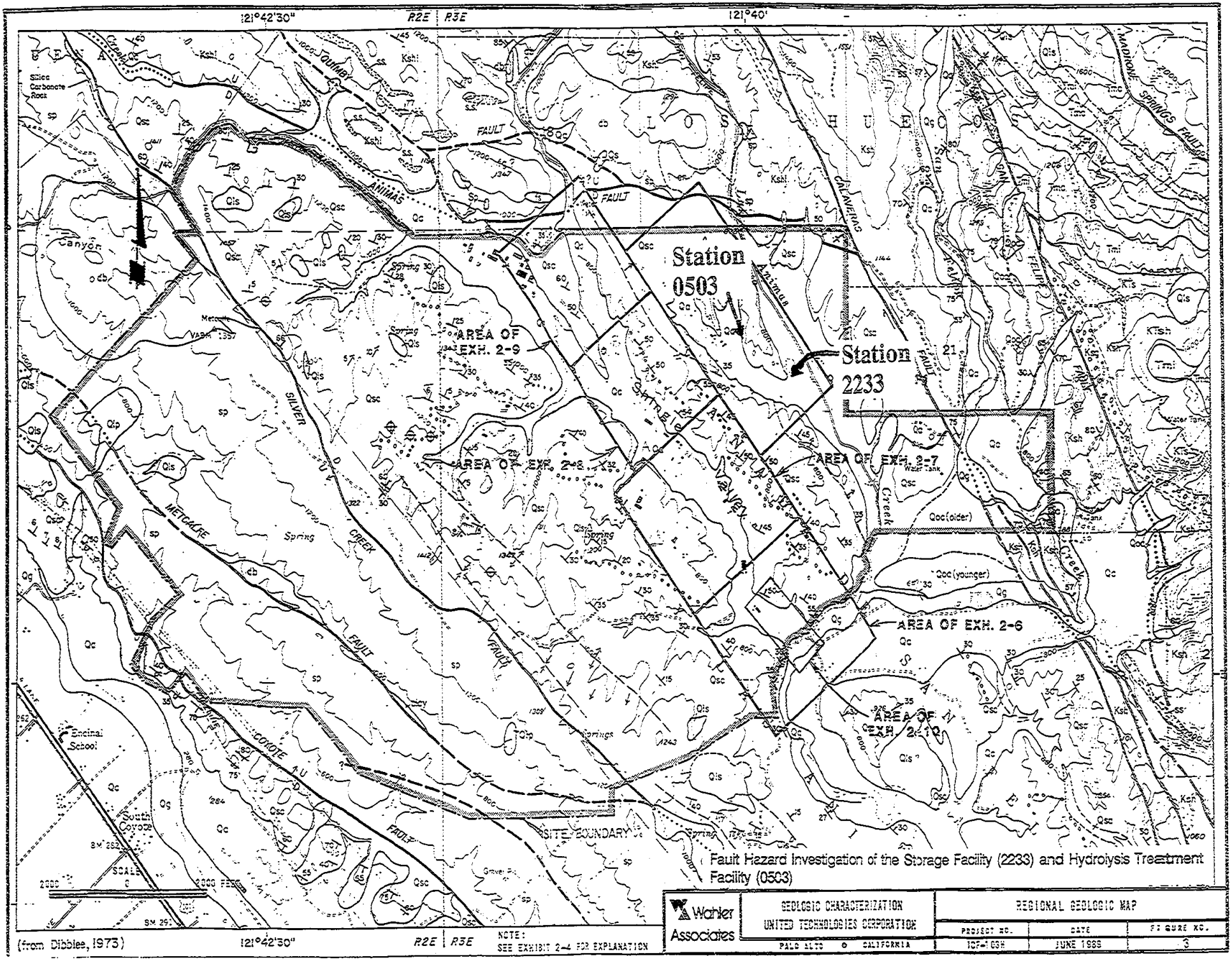
The CSD site can be divided into three general sections or provinces. The western section is bounded by a northwest trending ridge which has a maximum elevation of approximately 1,400 feet. The ridge separates the operations portion of the site from Santa Clara Valley to the west. It is characterized by a moderate southwest slope and meets the valley at an elevation of approximately 300 feet.

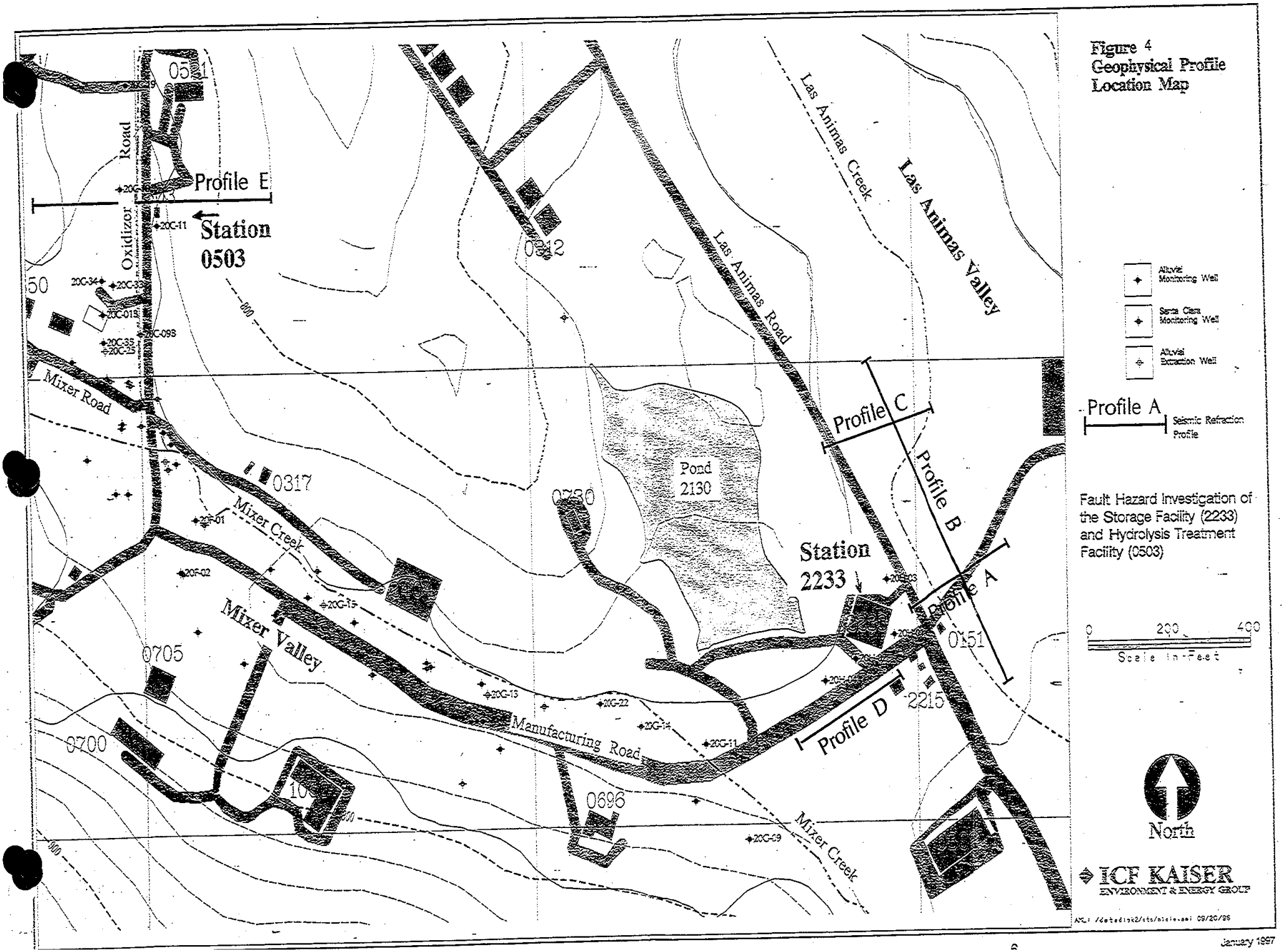
The central section is characterized by rolling hills and relatively broad valleys. Shingle Valley and Las Animas Valley are the two main valleys. The minimum elevation within either valley is approximately 640 feet along Las Animas Creek. Mixer Valley is a smaller valley which merges with Las Animas Valley. The Storage Facility (Station 2233) is located where the valleys merge and the Hydrolysis Treatment Facility (Station 0503) is located in the central portion of Mixer Valley (Figure 4).

A small portion of the CSD site lies in the eastern section. The area is characterized by steeper slopes and canyons. The Calaveras fault trends northwest through the area. Elevations range from approximately 800 feet at the Calaveras fault to 2,000 feet at Henderson Ridge two miles east of the fault.

The regional geologic formations consist of Quaternary Alluvium deposits (Qal), Santa Clara Formation, Berryessa Formation, and Franciscan Formation. The valleys are covered with alluvium that has a maximum thickness of approximately 30 to 40 feet [Wahler, 1989 and 1991]. The alluvium generally consists of interfingering deposits of poorly sorted sand, silt, clay, and gravel. The alluvium overlies the Plio-Pleistocene Santa Clara Formation which consists of semi-consolidated, heterogeneous deposits of interbedded clays, silts, sands, and gravels approximately 1,800 feet thick. The Santa Clara Formation comprises the bedrock ridges around Shingle and Mixer Valleys and is frequently exposed in creek banks. Most of the ridge slopes are blanketed by thin colluvial deposits. The formation was folded into northwest trending anticlines and synclines which parallel the major faults in the area.

The Santa Clara Formation lies unconformably on the older Franciscan Formation (late Jurassic to Cretaceous). The Franciscan Formation consists of folded and faulted marine sedimentary rocks and oceanic volcanic rocks. The formation is 50,000 feet thick and the most abundant rocks are graywacke sandstone with smaller amounts of shaly limestone, chert, glaucophane schist, and greenstone.


121°42'30"
R2E
R3E
121°40'
Station 0503
Station 2233
AREA OF EXH. 2-9
AREA OF EXH. 2-8
AREA OF EXH. 2-7
AREA OF EXH. 2-6
AREA OF EXH. 2-10
SITE BOUNDARY
SILVER CREEK FAULT
METCALFE FAULT
COYOTE FAULT
ANIMAS FAULT
YOUTHBY FAULT
CALAVERAS FAULT
MADRONE SPRINGS FAULT
FELIPE FAULT
Encinal School
South Coyote
Qoc(older)
Qoc(younger)
Fault Hazard Investigation of the Storage Facility (2233) and Hydrolysis Treatment Facility (0503)
Wahler Associates
GEOLOGIC CHARACTERIZATION
UNITED TECHNOLOGIES CORPORATION
PALO ALTO • CALIFORNIA
REGIONAL GEOLOGIC MAP
PROJECT NO. 10F-1638
DATE JUNE 1988
FIGURE NO. 3
NOTE: SEE EXHIBIT 2-4 FOR EXPLANATION
(from Dibblee, 1973)



January 1997

The Berryessa Formation is Cretaceous and consists chiefly of shaly claystones and siltstones with lenses of thickly bedded sandstone. An unknown amount of the Berryessa Formation has been faulted and eroded away. The Berryessa Formation is primarily seen in fault contact with the Santa Clara Formation along the Calaveras fault.

A number of landslides are located in the Santa Clara Formation at the CSD site. Most of the landslides are located in the northern and western portions of the site and are generally associated with dip slopes [Weiss, 1984]. Most of the slides are less than 50 feet thick.

Groundwater occurs at various elevations at the CSD site. In Shingle Valley and Mixer Valley, groundwater elevations generally range from less than 630 to greater than 900 feet msl. Groundwater elevations are strongly controlled by the stratigraphy and occurrence of clay bedding/lenses underlying the site. In general, a significant contrast in permeability exists between the alluvium in the valleys and the underlying Santa Clara Formation. Permeabilities in the alluvium are relatively high (10^{-2} to 10^{-3} cm/sec) while permeabilities in the Santa Clara Formation are much lower (10^{-5} to 10^{-8} cm/sec) [ICF, 1989 and 1996].

2.2 Active Faults

An active fault is defined by the California Division of Mines and Geology (CDMG) and the Alquist-Priolo Earthquake Fault Zoning Act as a fault that has generated surface displacement in Holocene time, the last 11,000 years [CDMG, 1982 and 1994b]. The Calaveras fault, which passes within 2,500 feet of Station 2233 (Figure 5) is the major active regional fault at the CSD site. It is a right lateral strike-slip fault with a secondary or subordinate dip-slip component [Bailey et al, 1964]. The relative dip-slip displacement is downward to the west. The fault zone is characterized by a nearly vertical dip or steep dip toward the northeast. The fault zone consists of a main fault trace and in some areas a number of branches and smaller faults exist.

The northern portion of the Calaveras fault, north of Calaveras Reservoir and south of Danville, is considered a significant seismic hazard [Oppenheimer and Lindh, 1992]. Since 1969, virtually no seismicity has occurred along this section. It is believed to be locked and accumulating elastic energy possibly for a future rupture. The CSD site is located along the southern section of the Calaveras fault (south of Calaveras Reservoir). Since 1979, three earthquakes greater than M5 (Richter Magnitude 5) have occurred in the region near the CSD site between Calaveras Reservoir and Coyote Reservoir (6 miles southeast of Morgan Hill). These are the 1979 Coyote Lake (M5.9), 1984 Morgan Hill (M6.2), and Alum Rock (M5.1) earthquakes [Du and Aydin, 1992]. The locations of these there earthquakes in relationship to the CSD site are shown on Figure 6. Aftershock-defined fault segment from the Morgan Hill earthquake indicates that the Calaveras fault in the area dips 85° NE, strikes N 30° W, and has a depth of approximately 12 km. A right lateral displacement of 20 cm was observed.

Two miles southeast of the Storage Facility (Station 2233), drainage channels in Packwood Valley and lower San Felipe Valley were offset by the Calaveras fault by 4 km from the late-Pleistocene to Holocene [Harden and Gallego, 1992].

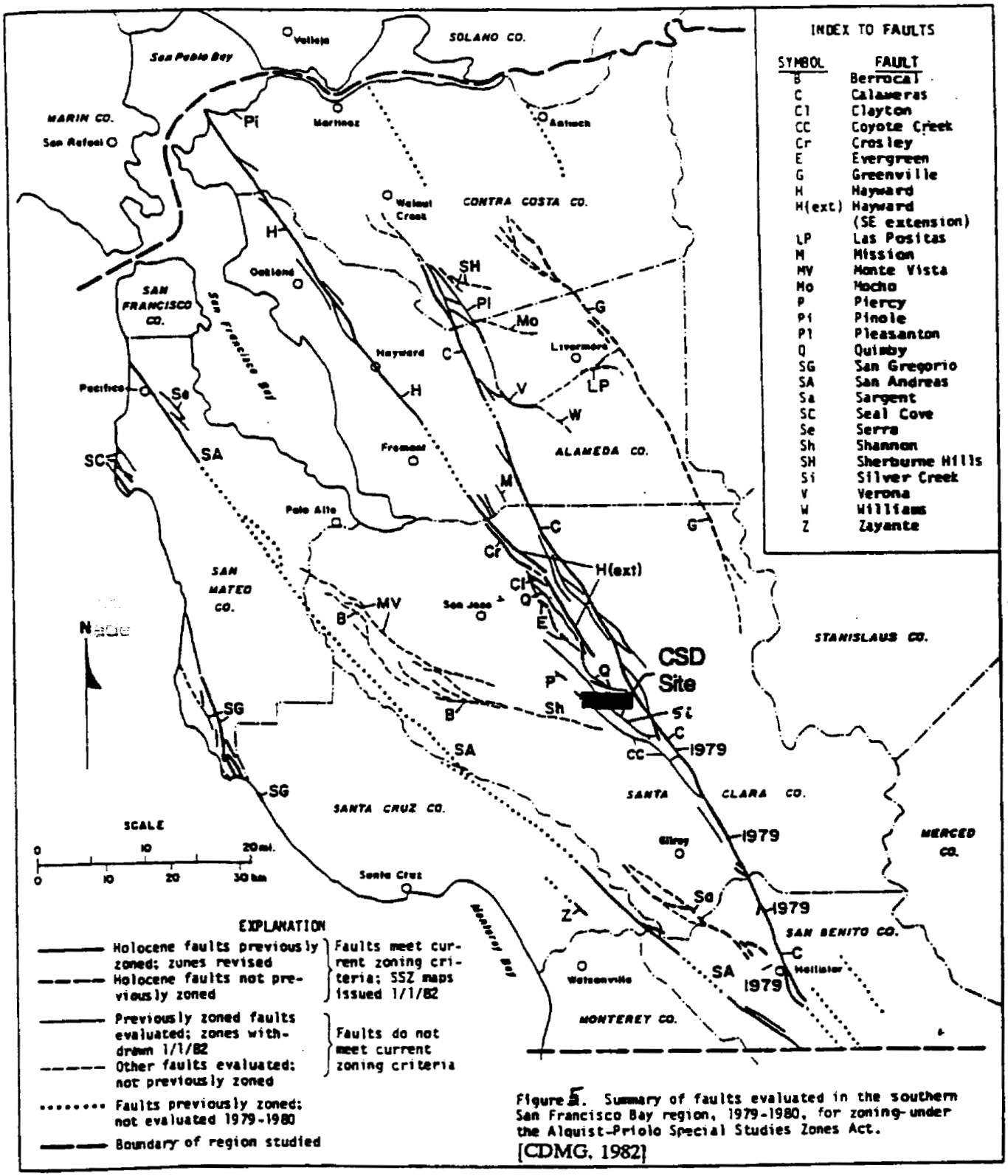


Figure 5. Summary of faults evaluated in the southern San Francisco Bay region, 1979-1980, for zoning under the Alquist-Priolo Special Studies Zones Act. [CDMG, 1982]

Fault Hazard Investigation of the Storage Facility (2233) and Hydrolysis Treatment Facility (0503)

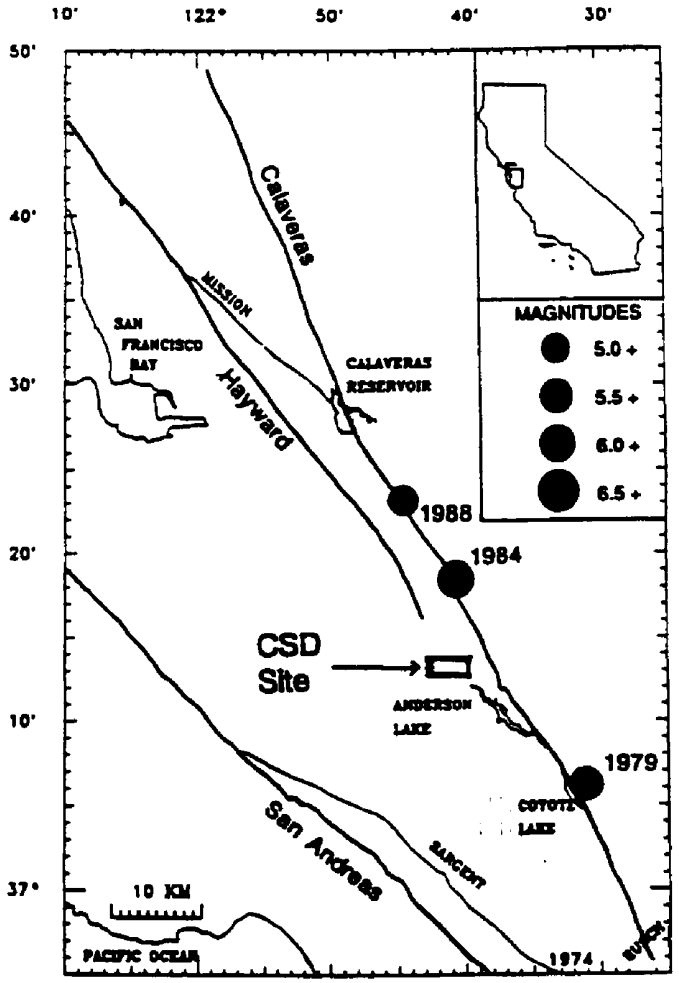


Figure 6. Map of major faults in south San Francisco Bay region and locations of the 1979 Coyote, 1984 Morgan Hill, 1988 Alum Rock earthquakes. Symbol sizes are proportional to magnitude. Modified from Oppenheimer, Bakun and Lindh (1990).
[Du and Aydin, 1992]

The Hayward fault is classified as an active fault which is subparallel to the Calaveras fault in the vicinity of Santa Clara County (Figures 5 and 6). However, no traces of the Hayward fault are indicated on geologic and fault maps near the CSD site. Andrews et. al. suggest that the Mission fault is a possible link between the Hayward and Calaveras faults near Calaveras Reservoir 15 to 20 miles northeast of the CSD site [Andrews et. al., 1992].

Coyle and Anderson cite evidence for a potentially active fault along the base of the Diablo Range adjacent to Santa Clara Valley [Coyle and Anderson, 1992].

2.3 Inactive Faults

Numerous other faults are located in the vicinity of the CSD site, most of which trend sub-parallel to the Calaveras (Figure 5). The Calaveras fault is the only one that is presently zoned under the Alquist-Priolo Earthquake Zoning Act and is considered active [CDMG, 1982 and 1994b].

The faults discussed in this section are not zoned under the Alquist-Priolo Earthquake Fault Zoning Act, and therefore, are considered to be inactive by the California Division of Mines and Geology. CDMG defines an active fault as one which has had surface displacement within Holocene time. The absence of an Alquist-Priolo classification or and inactive classification by CDMG does not mean the fault is incapable of generating future earthquakes. Since they have not generated displacement in Holocene time, the potential for significant rupture along these "inactive" faults is considered to be low.

The Silver Creek fault trends northwest in the western portion of the CSD site (Figures 3 and 5). It is a reverse fault with the downthrown block on the east [Dibblee, 1973]. At one location, a large serpentine block (west of the fault) was thrust over quaternary sediments east of the fault [Weiss, 1984]. The Silver Creek fault was originally considered an active fault in 1972. However, it is not presently considered active [CDMG, 1994a] due to lack of evidence for Holocene displacement. Wiegers and Tryhorn indicate that evidence of Holocene movement is inconclusive [Wiegers and Tryhorn, 1992]. CDMG considers the Silver Creek fault as a Quaternary fault.

The Coyote Creek fault is a reverse fault with the downthrown block to the west. It also trends northwest and is located west of the CSD site near the base of the foothills (Figures 3 and 5). The fault dips approximately 52 degrees to the northeast [Ortalda, 1950]. Movement along the Coyote Creek fault is estimated as Pleistocene, therefore, it is not presently zoned as an active fault. It is considered a Quaternary fault by the California Division of Mines and Geology [CDMG, 1994a)].

The Metcalfe fault trends through a body of serpentine located between the Silver Creek and Coyote faults (Figure 3). Little is known about movement along the Metcalfe fault. It is not presently zoned under the Alquist-Priolo Earthquake Fault Zoning Act and is not considered active. The last movement is thought to be older than Pliocene time [Brown and Caldwell, 1988].

The Animas and Quimby faults are smaller transverse faults that are branches of the Calaveras fault (Figures 3 and 5). They are located in the northern section of the site greater than 3,000 feet north of the Hydrolysis Treatment Facility and trend approximately east-west. Both faults are mapped as normal or reverse faults with the downthrown block on the south. They are described as Pleistocene faults [Weiss, 1984]. These faults are not zoned under the Alquist-Priolo Earthquake Fault Zoning Act and are considered inactive.

3.0 STOR FACILITY INVESTIGATION (Station 2233)

Once all of the pertinent literature regarding faults and the geologic setting at the CSD site and in the vicinity of Station 2233 were reviewed, the next step was to conduct field reconnaissance, inspect and interpret aerial photographs, conduct a geophysical investigation of the area, and assess the impact of previous earthquakes. Section 3.1 provides a more detailed discussion of the local geologic setting near Station 2233 which is based on the finding of field reconnaissance and the literature and data review. Section 3.2 provides a discussion of the review and interpretation of aerial photographs of the area around the station. Section 3.3 provides a discussion of the geophysical investigation performed at the Storage Facility and the results of the investigation. Section 3.4 provides an assessment of the impact of previous earthquakes.

3.1 Local Geologic Setting and Site Reconnaissance

The Storage Facility is located at the northwest corner of the intersection of Las Animas and Manufacturing Road (Figure 4). The facility is situated near the mouth of Mixer Valley where it merges with Las Animas Valley. Las Animas Creek is located east of the intersection and trends along the approximate axis of the Las Animas Valley.

The Storage Facility is built on the Las Animas Valley alluvial sediments. Four r itoring wells were previously installed in the vicinity of the structure on the north, south d east side. Their boring logs indicate that the alluvium ranges from 14 to 20 feet in thickness and consists of a heterogeneous mixture of sand, silt, and clay. The logs indicate a depositional transitional sequence between wells rather than well-defined continuous beds or horizons that can be used for the assessment of faulting.

The alluvium overlies the Santa Clara Formation which is considered to be bedrock (Figure 3). The Santa Clara Formation is described in the boring logs as a stiff silty sandy clay to a sandy, silty gravel at this location. The boring logs indicate a significant increase in blow counts (greater than doubled) when the Santa Clara Formation is encountered.

The alluvium becomes thinner west of the facility (behind the facility) where elevations increase and the Santa Clara Formation comprises the hill at that location. Pond 2130 was constructed in the Santa Clara Formation on the hill behind the facility.

In 1996, groundwater elevations were measured at an avarage of about 740 feet msl in the four wells (20H-01, 20H-02, 20H-03, and 20H-04) surrounding the facility [UTC, 1996b]. The lack of variation in groundwater elevations indicates that there are no faults nearby. No other wells occur in the local vicinity of Station 2233. The next closest wells are located in Mixer Valley approximately 500 feet west of the facility.

A field reconnaissance of the area surrounding Station 2233 found no evidence of potentially active or inactive faults. Station 2233 is approximately equidistant (2,500 feet) from both the Calaveras active fault and the Animas and Quimby inactive faults (Figure

3). Except for the Calaveras and Animas/Quimby faults, no visible lineations that may be related to faulting are present within 3,000 feet of the facility. No features such as offset drainages, vegetation patterns, sag ponds, small scarps, offset bedding, offset fences or drainage structures occur in the area.

The Calaveras fault zone is a right-lateral strike slip fault with a dip slip component. The Animas and Quimby faults are all normal or reverse faults. The sense of movement on all of the above faults would likely create bedrock offsets or preferred fracture or gouge zones in the Santa Clara Formation below the alluvium in the vicinity of Station 2233. The Calaveras fault trends northwest-southeast and the Animas and Quimby faults trend east-west (Figure 3). These two orientations and possible lineations that merge with the faults (splays) were especially considered during site reconnaissance and design of the subsequent geophysical investigations.

3.2 Aerial Photograph Inspection and Interpretation

Stereoscopic examination of aerial photographs found no evidence of potential faults traversing Station 2233. The aerial photographs were flown in 1994 and are scaled at a 1 inch equals 400 feet. Numerous small detailed features (cattle trails, subtle vegetation patterns, old access roads and walkways, subtle elevation changes, etc.) are observable on the photos, however, no lineations or any other indications of possible faulting occur.

3.3 Geophysical Investigation

The purpose of the geophysical investigation was to assess the presence of subsurface geologic features that may indicate faults in the alluvium and/or Santa Clara Formation in the vicinity of Station 2233. Subsurface geologic features would consist of preferred zones of low seismic velocity (gouge zones) and/or bedrock offsets typical of faulting in the area. The seismic refraction method is typically utilized in fault investigations. The large amount of data obtained, subsurface physical properties measured, and depth of investigation make it very practical and accommodating for fault investigations of this type.

Seismic refraction data were obtained along four profiles in the vicinity of Station 2233 (Figure 4 - Profiles A through D). For the most part, profiles were located over valley alluvium in accessible areas on the eastern portion of the site. The western section of the site consists of Pond 2130 and a hillside consisting of the Santa Clara Formation where faulting is unlikely. If faulting occurred on the western side it would likely be observable on the surface. The profiles are positioned approximately parallel and perpendicular to the Calaveras fault to assess the possible presence of subparallel or high angle splay faults related to the Calaveras and other faults near the CSD site.

Profiles A, C and D are all 250 feet long and consist of one geophone spread. Profile B is 750 feet long and consists of three collinear spreads positioned end to end. Each spread consisted of 24 geophones positioned at 10-foot intervals. Shot points were located off both ends of each spread and in the middle of each spread. Seismic energy (shotpoint) was provided by striking a metal plate located on the ground surface with a 15-pound sledge hammer. Each of the shots were struck several times and added together (stacked). The data were recorded on a 24-channel Geometrics Strataview

seismograph using digital grade geophones. The data were stored on computer disk and hard copy printouts of the data were viewed in the field for quality control and used to assess if instrument adjustments were necessary. Each geophone spread was 250 feet in length which corresponded to an investigation depth of 70 to 80 feet under the existing field conditions.

The raw seismic refraction data display the amount of time it takes for a compressional (P) wave to travel from a shotpoint to each geophone in the spread (arrival time). The arrival times for each of the shotpoints to each of the geophones are plotted versus their respective distances from each shotpoint (time-distance graph). The arrivals were then assigned to various seismic layers. These parameters served as input to inversion modeling programs which use a combination of algorithms (ray-tracing, delay times, reciprocal methods) to invert the seismic data. The output consisted of the seismic velocity, depth, and configuration of each seismic layer beneath the shotpoints and geophones. Seismic velocity cross-sections were generated and used for interpretation.

The results of the seismic refraction survey are illustrated on Figures 7 through 10 which are the seismic cross-sections for Profiles A through D, respectively. The cross-sections depict the position of the ground surface and the underlying seismic velocity interfaces beneath the length of each profile. The location of each geophone and some shotpoints are also shown (offset shotpoints not shown). The velocity of each seismic layer along each profile is indicated in feet per second (fps).

The data identified three seismic layers along Profiles A through D. The velocity range and general geologic interpretation of each layer is summarized below. Reference should be made to the figures regarding specific elevations of the various layers or the configuration of the layers along a particular profile. To enhance the configuration of subsurface layers, the vertical exaggeration on these figures is approximately 2:1.

Layer V1 - The seismic velocity range in Profiles A through D is from 995 to 2,097 feet per second (fps). Layer V1 is a surficial layer and ranges in thickness from zero to approximately 20 feet. This velocity range is typical of unsaturated unconsolidated surface deposits. Layer V1 likely represents the youngest alluvial material in the valley.

Layer V2 - The seismic velocity range in Profiles A through D is from 2,484 to 3,069 fps. Layer V2 ranges in thickness from approximately zero to 22 feet. This velocity range is typical of unsaturated, slightly to semi-consolidated sands, silts and clays. Layer V2 likely represents older alluvium in the valley. It likely also corresponds to colluvium and may also represent highly weathered portions of the Santa Clara Formation where exposed or uncovered.

Layer V3 - The seismic velocity range in Profiles A through D is from 5,616 to 6,158 fps. The thickness of Layer V3 is undetermined. This velocity range is typical of semi-consolidated sediments and is interpreted to represent unweathered portions of the Santa Clara Formation. The interface between Layer V2 and V3 likely represents a significant decrease in permeability based on the seismic velocity contrast.

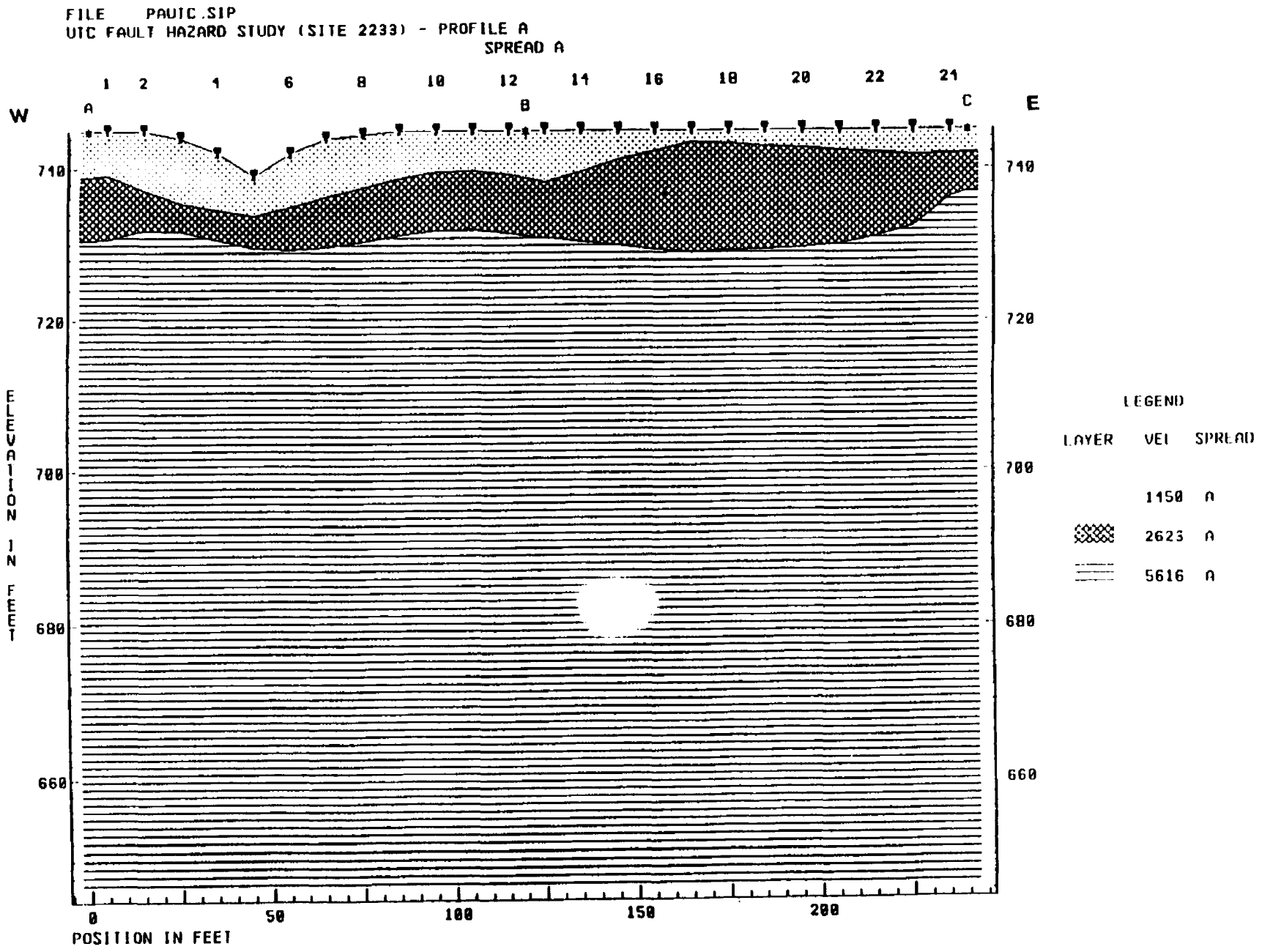


Figure 7 Seismic Refraction Profile A

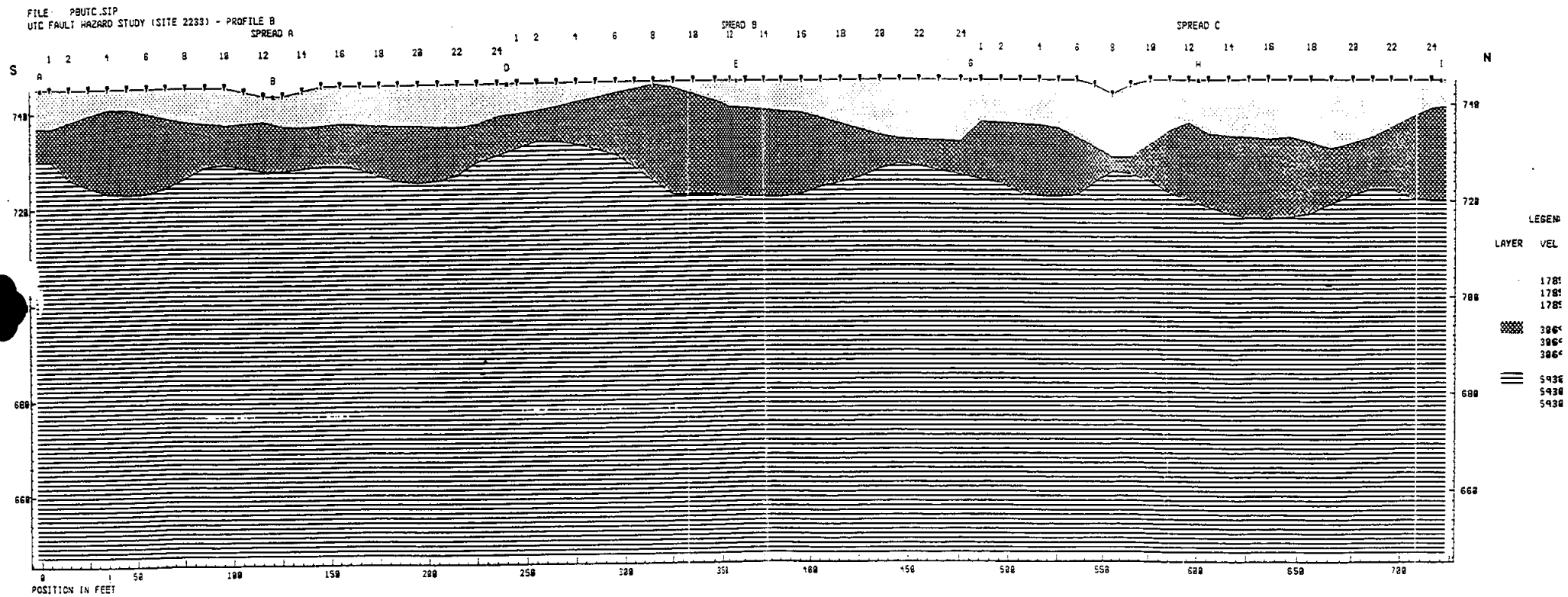


Figure 8

Seismic Refraction Profile B

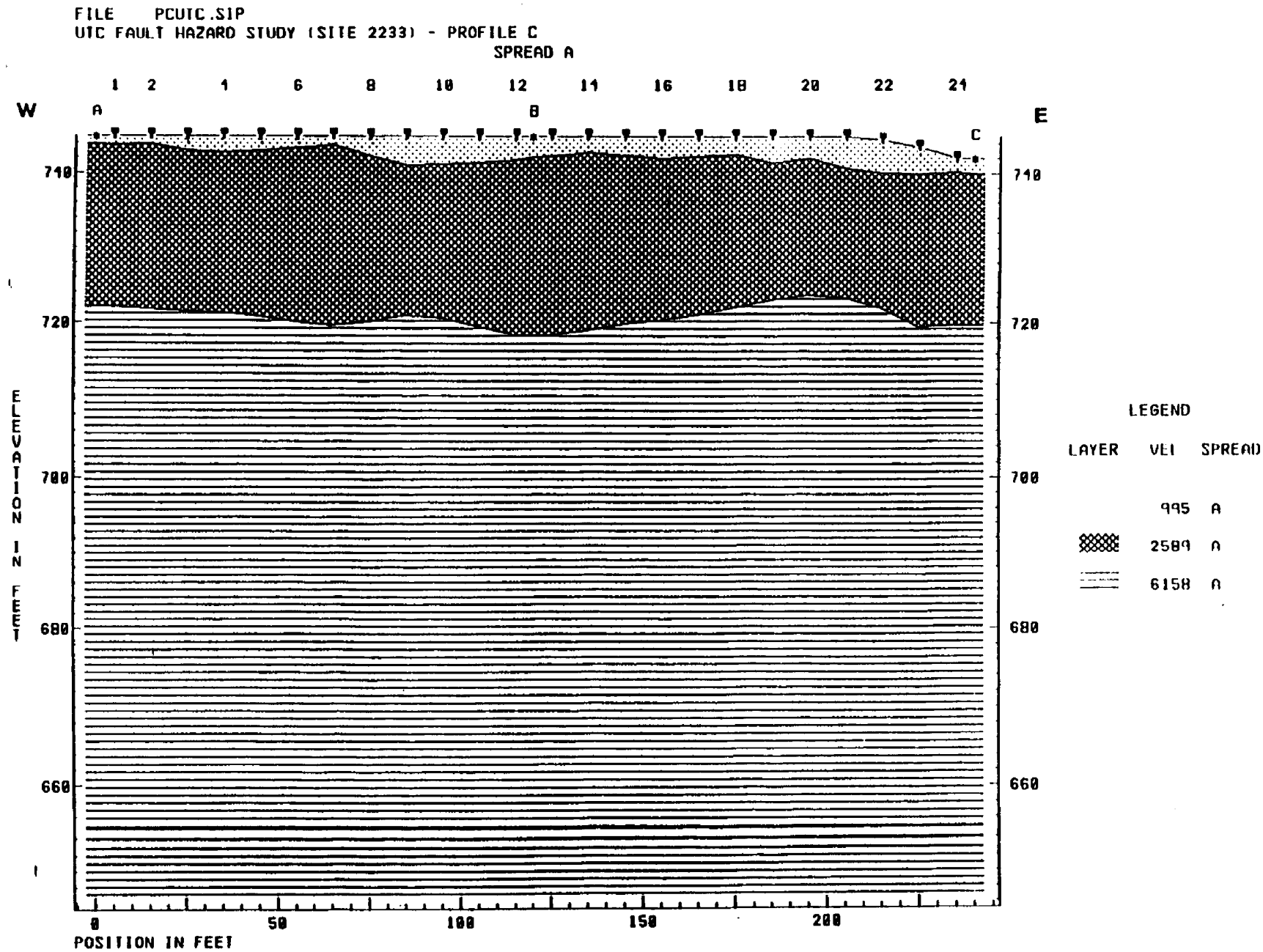


Figure 9 Seismic Refraction Profile C

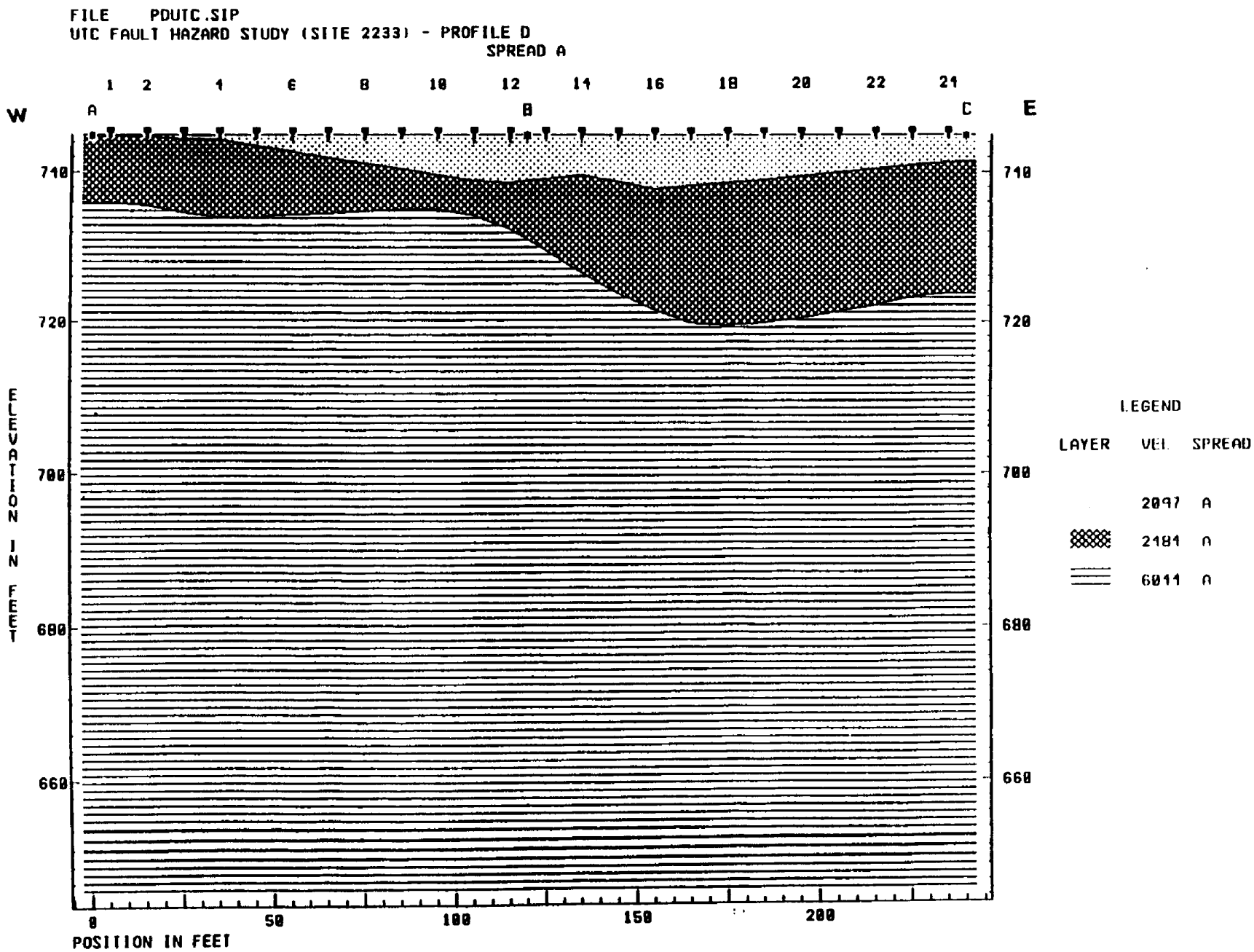


Figure 10 Seismic Refraction Profile D

Station 2233 data indicate generally consistent seismic velocities within each layer and no localized low velocity zones that may represent faults are present in the seismic data. Layer V1 thickens beneath the creeks or drainages which is likely due to the more recent sediment input. Layer V2 varies in thickness across some of the profiles. This is likely due to depositional processes coupled with subsurface physical properties. In some areas, Layer V2 likely represents highly weathered Santa Clara Formation.

The top of Layer V3 is somewhat hummocky. However, the configuration does not indicate offset that is typical of faulting. The configuration of the layer is likely due to normal depositional and weathering processes. The hummocky appearance is partly due to the vertical exaggeration.

3.4 Impact of Previous Earthquakes

The potential for earthquake damage to occur at Station 2233 was also assessed by reviewing records of damage from previous earthquakes. A review of available records indicate that the structural damage caused by the April 24, 1984 Morgan Hill earthquake was generally located in Shingle Valley and that there was no significant damage in Mixer Valley. More specifically, Station 2233 and adjacent structures suffered no structural damage [UTC, 1996a].

4.0 HYDROLYSIS TREATMENT FACILITY INVESTIGATION (Station 0503)

Once all of the pertinent literature regarding faults and the geologic setting at the CSD site and in the vicinity of Station 0503 were reviewed, the next step was to conduct field reconnaissance, inspect and interpret aerial photographs, conduct a geophysical investigation of the area, and assess the impact of previous earthquakes. Section 4.1 provides a more detailed discussion of the local geologic setting near Station 0503 which is based on the finding of field reconnaissance and the literature and data review. Section 4.2 provides a discussion of the review and interpretation of aerial photographs of the area around the station. Section 4.3 provides a discussion of the geophysical investigation performed at the Hydrolysis Treatment Facility and the results of the investigation. Section 4.4 provides an assessment of the impact of previous earthquakes.

4.1 Local Geologic Setting and Station Reconnaissance

The Hydrolysis Treatment Facility is located in central Mixer Valley on Oxidizer Road (Figure 4). The facility is being built adjacent to a hill near the alluvial/Santa Clara Formation boundary (Figure 3). Two monitoring wells were previously installed near the facility (20C-10, and 20C-11). The boring logs indicate that the alluvium is 10 feet (20C-11) and 20 feet (20C-10) in thickness and consists of a heterogeneous mixture of sand, silt, clay, and some gravel. Well 20C-10 was drilled near the center of the valley where alluvium is thicker.

The alluvium overlies the Santa Clara Formation in the center of the valley (Figure 3). The hill behind the facility consists of the Santa Clara Formation and a colluvial cover. The Santa Clara Formation is described in the boring logs as a hard silty, sandy, gravelly clay. The alluvium becomes thinner east of the facility (behind the facility) where elevations increase and the Santa Clara Formation comprises the hill at that location.

Groundwater elevations in Mixer Valley generally ranged between 750 and 780 msl in 1995 [UTC, 1996b]. This variation is typical of groundwater levels across the alluvial valleys at the CSD site.

Field reconnaissance at Station 0503 found no evidence of potentially active or inactive faults within the area or in the hills surrounding the area. Station 0503 is approximately 3,500 feet from the Calaveras active fault and 2,500 feet from the Animas and Quimby inactive faults (Figure 3). No visible lineations that may be related to either of the faults are present within Mixer Valley. No features such as offset drainages, vegetation patterns, sag ponds, small scarps, offset bedding, offset fences, or offset drainage structures occur in the area.

The Calaveras fault trends northwest-southeast and Mixer Valley trends approximately parallel to the fault. Possible faulting in Mixer Valley is expected to be sub-parallel to the active Calaveras fault and parallel to Mixer Valley. East-west faults are not expected due to the local structure of Mixer Valley. However, if they were present they would be readily

observed on the surface of the hills. During site reconnaissance, all directions were considered for lineations that may merge with any of the faults in the facility (splays).

The Calaveras fault zone is a right-lateral strike slip fault with a dip slip component. The sense of movement would likely create bedrock offsets or preferred fracture zones in the Santa Clara Formation or alluvium in the vicinity of Station 0503.

4.2 Aerial Photograph Inspection and Interpretation

Stereoscopic examination of aerial photographs found no evidence of potential faults traversing Station 0503 or Mixer Valley in general. The aerial photographs were flown in 1994 and are scaled at a 1 inch equals 400 feet. Numerous small detailed features (cattle trails, subtle vegetation patterns, old access roads and walkways, subtle elevation changes, etc.) are observable on the photos, however, no lineations or any other indications of possible faulting occur.

4.3 Geophysical Investigation

Station 0503 is more than 3,000 feet from any active fault, however, a geophysical investigation was performed in the vicinity of Station 0503. The purpose of the geophysical investigation was to assess the presence of subsurface geologic features that may indicate faults in the alluvium and/or Santa Clara Formation in the vicinity of Station 0503. Subsurface geologic features would consist of preferred zones of low seismic velocity (gouge zones) and/or bedrock offsets typical of faulting in the area. The seismic refraction method is typically utilized in fault investigations. The large amount of data obtained, subsurface physical properties measured, and depth of investigation make it very practical and accommodating for fault investigations of this type.

Seismic refraction data were obtained along one profile in the vicinity of Station 0503 (Figure 4 - Profile E)). The profile was located over valley alluvium in accessible areas on the western portion of the profile and on the hillside in the eastern portion (Santa Clara Formation). The profile was positioned approximately perpendicular to the Calaveras fault and axis of the valley in order to assess possible faults that are parallel to the valley structure. Faults that are perpendicular to the valley structure are not expected (extremely unlikely), however, if they were present, lineations would easily be observable on the hillsides in the area during site reconnaissance.

Profile E consists of two geophone spreads and is 520 feet long. Each spread consisted of 24 geophones positioned at 10-foot intervals. Shot points were located off both ends of each spread and in the middle of each spread. Seismic energy (shotpoint) was provided by striking a metal plate located on the ground surface with a 15-pound sledge hammer. Each of the shots were struck several times and added together (stacked). The data were recorded on a 24-channel Geometrics Strataview seismograph using digital grade geophones. The data were stored on computer disk and hard copy printouts of the data were viewed in the field for quality control and used to assess if instrument adjustments were necessary. Each geophone spread was 250 feet in length which corresponded to an investigation depth of 70 to 80 feet under the existing field conditions.

The raw seismic refraction data display the amount of time it takes for a compressional (P) wave to travel from a shotpoint to each geophone in the spread (arrival time). The arrival times for each of the shotpoints to each of the geophones are plotted versus their respective distances from each shotpoint (time-distance graph). The arrivals were then assigned to various seismic layers. These parameters served as input to inversion modeling programs which use a combination of algorithms (ray-tracing, delay times, reciprocal methods) to invert the seismic data. The output consisted of the seismic velocity, depth and configuration of each seismic layer beneath the shotpoints and geophones. Seismic velocity cross-sections were generated and used for interpretation.

The results of the seismic refraction survey at Station 0503 are illustrated on Figure 11 which is the seismic cross-section for Profiles E. The cross-section depicts the position of the ground surface and the underlying seismic velocity interfaces beneath the length of the profile. The location of each geophone and some shotpoints are also shown (offset shotpoints not shown). The velocity of each seismic layer along the profile is indicated in feet per second (fps).

The data identified three seismic layers along Profiles E. The velocity range and general geologic interpretation of each layer is summarized below. Reference should be made to the figures regarding specific elevations of the various layers or the configuration of the layers along a particular profile. To enhance the configuration of subsurface layers, the vertical exaggeration on these figures is approximately 2:1.

Layer V1 - The seismic velocity of Layer V1 on Profile E is 1,560 feet per second (fps). Layer V1 is a surficial layer and ranges in thickness from zero to approximately 20 feet. The velocity range of this layer is typical of unsaturated unconsolidated surface deposits. Layer V1 likely represents the youngest alluvial material in the valley.

Layer V2 - The seismic velocity of Layer V2 on Profile E is 2,714 fps. Layer V2 ranges in thickness from approximately zero to 40 feet. The velocity range is typical of unsaturated, slightly to semi-consolidated sands, silts and clays. Layer V2 likely represents older alluvium in the valley. It likely also corresponds to colluvium and may also represent highly weathered portions of the Santa Clara Formation where exposed or uncovered.

Layer V3 - The seismic velocity of Layer V3 on Profile E is 5,885 fps. The thickness of Layer V3 is undetermined. The velocity range is typical of semi-consolidated to consolidated sediments and is interpreted to represent unweathered portions of the Santa Clara Formation. The interface between Layer V2 and V3 likely represents a significant decrease in permeability based on the seismic velocity contrast.

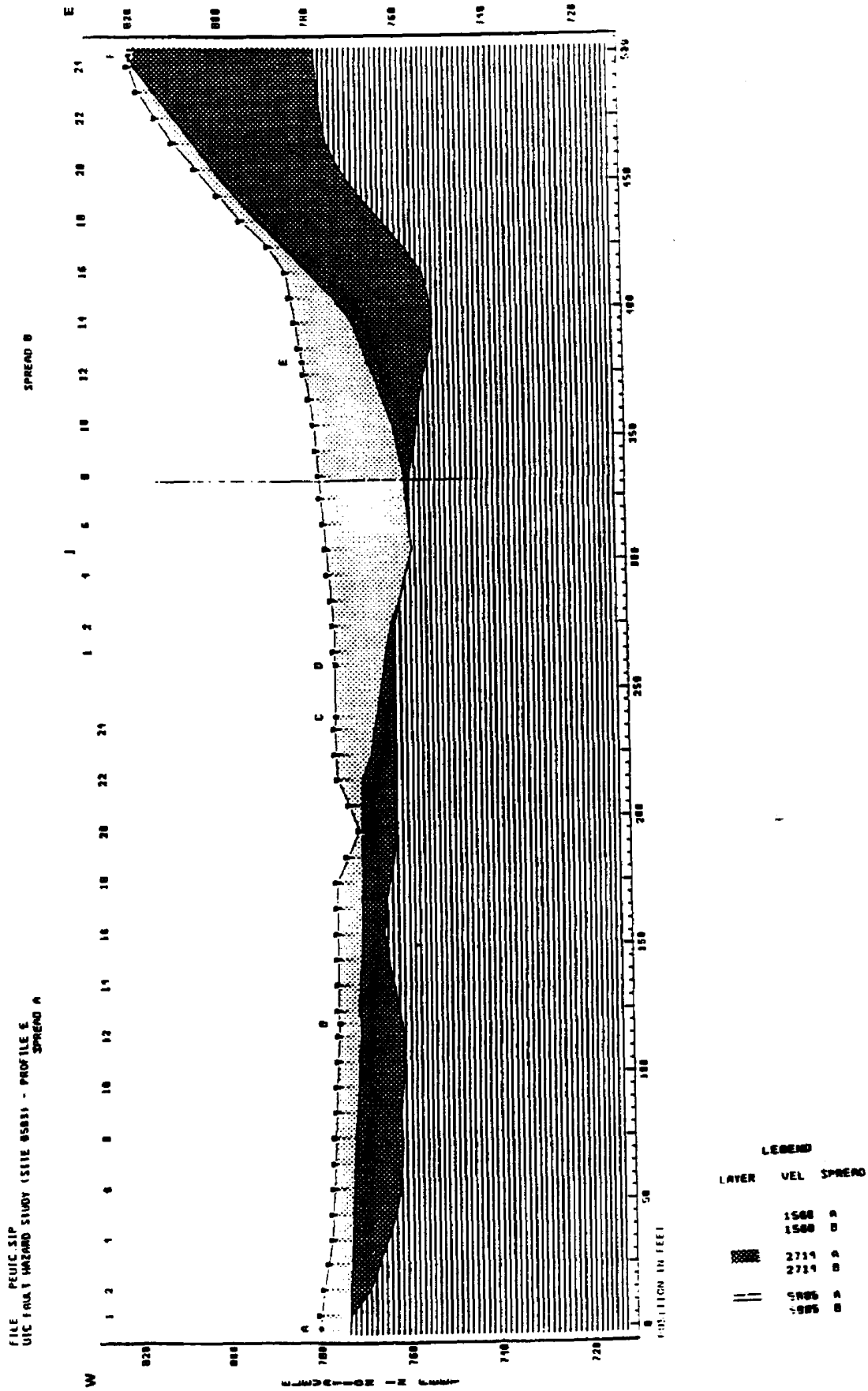


Figure 11 Seismic Refraction Profile E

Station 0503 data indicate generally consistent seismic velocities within each layer and no localized low velocity zones that may represent faults are present in the seismic data. Layer V1 thickens at the foot of the hill which is likely due to the more recent sediment input or construction fill. Layer V2 varies in thickness across the profile. This is likely due to depositional processes coupled with subsurface physical properties. In some areas Layer V2 likely represents highly weathered Santa Clara Formation. Layer V2 thickens dramatically in the hill on the eastern section of the profile which is likely due to more exposure of the Santa Clara Formation to weathering processes.

The top of Layer V3 is somewhat hummocky. However, the configuration does not indicate offset that is typical of faulting. The configuration of the layer is likely due to normal depositional and weathering processes. The hummocky appearance is partly due to the vertical exaggeration.

4.4 Impact of Previous Earthquakes

The potential for earthquake damage to occur at Station 0503 was also assessed by reviewing records of damage from previous earthquakes to structures in the vicinity of Station 0503. A review of available records indicate that the structural damage caused by the April 24, 1984 Morgan Hill earthquake was generally located in Shingle Valley and that there was no significant damage in Mixer Valley. More specifically, there was no significant structural damage to any stations in the vicinity of Station 0503 (Station 0503 was not constructed until 1996) [UTC, 1996a]. A letter from Ruth and Going, Inc. to the County of Santa Clara Building/Inspection Department [Ruth and Going, 1987] stated that Station 0501 (adjacent to Station 0503) survived the 1984 Morgan Hill earthquake with "no visible signs of distress."

5.0 DISCUSSION AND CONCLUSIONS

5.1 Storage Facility (Station 2233)

The Storage Facility is less than 3,000 feet (2,500 feet) from the Calaveras fault. The Calaveras fault is defined by the California Division of Mines and Geology (CDMG) as an active fault and strong ground shaking is likely at least once during its lifetime. The Animas and Quimby faults are also 2, 500 feet from Station 2233, however, these faults are considered not to be active by CDMG.

Field reconnaissance, stereoscopic examination of aerial photographs, and review of geologic and groundwater data found no evidence of active or potentially active faults, splays or any other lineations within more than 200 feet of the facility structure. Review of published and unpublished data indicate that no faults or lineaments have been mapped near the facility.

Results of the seismic refraction investigation indicate no evidence of subsurface conditions that can be attributed to faulting or fracturing. The seismic cross-sections suggest normal alluvial/depositional conditions within at least 200 feet of the facility. No bedrock offsets or preferred low velocity zones that may indicate faulting occur in the data. On the basis of all the data, the potential for faulting at Station 2233 is extremely low. No other investigative techniques are expected to add useful information.

Strong ground-shaking from the Calaveras fault could induce minor settlement in alluvial materials and possibly cracking in the concrete slab at Station 2233. However, due to the type of alluvial materials near Station 2233 (described in borehole logs from the area as being firm (sometime stiff), dry to moist sandy to silty clay), the potential for liquefiable materials and earthquake induced liquification near Station 2233 is low. In addition, the potential for seismically induced landslides is low near Station 2233 as the hill nearby is moderately sloping and no evidence of instability was observed in the field reconnaissance and review of aerial photographs.

A review of available records indicate that the structural damage caused by the April 24, 1984 Morgan Hill earthquake was generally located in Shingle Valley. There was no significant damage in Mixer Valley. More specifically, Station 2233 and adjacent structures suffered no structural damage [UTC, 1996a].

5.2 Hydrolysis Treatment Facility (Station 0503)

The Hydrolysis Treatment Facility is more than 3,000 feet from the active Calaveras fault and 2,500 feet from the inactive Animas and Quimby faults. Field reconnaissance, stereoscopic examination of aerial photographs, and review of geologic and groundwater data found no evidence of active or potentially active faults, splays or any other lineations within more than 200 feet of the facility structure. Review of published and unpublished data indicate that no faults or lineaments have been mapped near the facility.

Results of the seismic refraction investigation indicate no evidence of subsurface conditions that can be attributed to faulting. The seismic cross-sections suggest normal alluvial/depositional conditions within at least 200 feet of the facility. No bedrock offsets or preferred low velocity zones that may indicate faulting occur in the data. On the basis of all the data, the potential for faulting at Station 0503 is extremely low. No other investigative techniques are expected to add useful information.

Ground-shaking from the Calaveras fault could induce minor settlement in alluvial materials and possibly cracking in the concrete slab at Station 0503. However, due to the type of alluvial materials near Station 2233 (described in borehole logs from the area as being firm (sometime stiff), dry to moist sandy to silty clay), the potential for liquefiable materials and earthquake induced liquification near Station 2233 is low. In addition, the potential for seismically induced landslides is low near Station 0503 as no evidence of instability in the nearby hill was observed in the field reconnaissance and review of aerial photographs.

A review of available records indicate that the structural damage caused by the April 24, 1984 Morgan Hill earthquake was generally located in Shingle Valley and that there was no significant damage in Mixer Valley. More specifically, there was no significant structural damage to any stations in the vicinity of Station 0503 (Station 0503 was not constructed until 1996) [UTC, 1996a]. Station 0501 (adjacent to Station 0503) survived the 1984 Morgan Hill earthquake with "no visible signs of distress" [Ruth and Going, 1987].

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APPENDIX E

PART A PERMIT SUMMARY

APPENDIX E
PART A PERMIT SUMMARY

This Part A Permit Summary includes all wastes that may be generated and treated at the site. The following listed EPA source codes and storage area codes are used in this summary.

Key: EPA Source Codes	
Source Code	Description
	Wastes from Ongoing Production and Service Processes (waste from general day to day manufacturing, production, or maintenance activities)
G06	Painting and coating (manufacturing, building, or maintenance)
G08	Removal of spent process liquids or catalysts (bulk removal of wastes from chemical manufacturing or processing)
G09	Other production or service-related processes from which the waste is a direct outflow or result (specify in comments)
	Other Intermittent Events or Processes
G11	Discarding off-specification or out-of-date chemicals (unused chemicals or products – corresponds to P and U hazardous waste codes)
G13	Cleaning out process equipment (periodic sludge or residual removal from enclosed processes including internal scrubbing or cleaning)
G14	Removal of tank sludge, sediments, or slag (periodic sludge or residue removal from storage tanks including internal scrubbing or cleaning)
G15	Process equipment change-out or discontinuation of equipment use (final materials and residuals removal including cleaning)
G16	Oil changes and filter or battery replacement (automotive, machinery)
G19	Other one-time or intermittent processes (specify in comments)
	Pollution Control and Waste Management Process Residuals
G21	Air pollution control devices (bag house dust or ash from stack scrubbers or precipitators; vapor collection)
G22	Laboratory analytical wastes (used chemicals from laboratory operations)
G23	Wastewater treatment (sludge, filter cake including wastes from treatment before discharge by NPDES or POTW or by UIC disposal)
G24	Solvent or production distillation or recovery (sludge, waste solvent, bottoms, from recovery/recycling of used product)
G25	Hazardous waste management – indicate management method (for residuals from regulated hazardous waste treatment processes – enter the related H code)
	Spills and Accidental Releases
G32	Cleanup of spill residues (infrequent, not routine)
G33	Leak collection and floor sweepings (ongoing, routine)
G39	Other cleanup of current contamination (specify in comments)
	Remediation of Past Contamination
G41	Closure of hazardous waste management unit under RCRA
G42	Corrective action at a solid waste management unit under RCRA
G44	State program or voluntary cleanup
G45	Underground storage tank cleanup
G49	Other remediation (specify in comments)

Key: Storage Locations at Storage Facility (2233)*				
Map Location	Primary DOT Hazard Class	Storage Capacity (gallons/ drums)	Secondary Containment Capacity (gallons)	Description (Typical)
A	3, 9	4400/80	1032**	Flammable, combustible, & general storage
B	3, 9	4400/80	1032**	Flammable, combustible, & general storage
C	3, 9	4400/80	1032**	Flammable, combustible, & general storage
D	3, 9	4400/80	1032**	Flammable, combustible, & general storage
E (2 Cabinets)	3, 9	30/Cabinet	30/Cabinet	Flammable, combustible, & general storage
F	3, 4	440/8	205	Flammable solids, reactive, spontaneously combustible storage
G	5	440/8	205	Oxidizing storage
H	6	440/8	205	Poison storage
I	8 (acid)	440/8	205	Corrosive storage (acids) & lead acid batteries
J	8 (base)	440/8	205	Corrosive storage (bases)
K	3, 9	440/8	205	Flammable, combustible, & general storage
L	3, 9	440/8	205	Flammable, combustible, & general storage
M	9	440/8	205	General storage & universal waste storage***
N	9	440/8	205	General storage & universal waste storage***
0	9	440/8	205	General storage & universal waste storage*** or PCB waste storage****
P	9	200 cubic yards		DOT Roll-offs and Bins
Q	3, 9	400/8	205	Flammable, combustible, & general storage
R	3, 9	400/8	205	Flammable, combustible, & general storage
S	3, 4	440/8	205	Flammable solids, reactive, spontaneously combustible storage
T	3, 4	440/8	205	Flammable solids, reactive, spontaneously combustible storage

*Certain times during the year, the designation (hazard class) of a specific shed may have to be changed to insure that adequate storage is provided. For example, if additional acid storage is required, then Shed G or H may be designated for acid storage. Or, if additional flammable solid waste space is needed, then one of the other sheds may be used on a temporary basis. At no time, will incompatibles be stored together.

**Plus additional secondary containment storage capacity from a tank and vault system of 17,234 gallons.

***May include fluorescent tubes/high intensity discharge lamps (HID's)/mercury devices/batteries.

****If PCB wastes are stored, then all other materials are removed from the storage shed.

Key: Storage Locations at Storage Magazine (0312)				
Map Location	Primary DOT Hazard Class	Storage Capacity	Secondary Containment Capacity	Description (Typical)
0312A	1.1/1.3*	1,320 gallons	264 gallons	Explosive, reactive, ignitable**
0312B	1.1/1.3*	1,320 gallons	264 gallons	Explosive, reactive, ignitable**
0312C	1.1/1.3*	1,320 gallons	264 gallons	Explosive, reactive, ignitable**

*Explosive Storage may include DOT Hazard Class 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, or DOT Non-Classified Explosives that meet the storage compatibility requirements.
**Waste in storage magazines is normally dry. May be “wet waste” without free liquids for which secondary containment greater than waste volume is provided by plastic tubs compatible with waste

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
001 Aqueous waste with low solvents	Mfg- G08, G09, G11, G13, G14, G15, G19, G22, G23, G32, G33, G39 Remediation - G42, G44, G49	Water DS-108 Isopropanol Acetone Methyl ethyl ketone Toluene Methanol Xylenes Halogenated & non-halogenated solvents 111-TCA Perchlorates Ammonium perchlorate Perchlorates Carbon tetrachloride Petroleum and hydrocarbon solvents Terpene hydrocarbons glycol ethers Esters Detergents Oil Alcohols Trace organic solvents Trace metals	D001 D019 D022 D029 D035 F001 F002 F003 F005	122 131 134 135 221 331 341	200 Tons	A, B, C, D, K, L, Q, R	
002 Water with high solids	Mfg-G08	Solids Water DS-108 Isopropanol Acetone Methyl ethyl ketone Toluene Methanol Xylenes Halogenated & non-halogenated solvents Perchlorates Ammonium perchlorate Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Trace solvents Trace metals	D004 D005 D006 D007 D008 D009 D010 D011 D035 F002 F003	135 491	100 Tons	A, B, C, D, K, L, Q, R	
003 Acidic aqueous waste with metals	Mfg-G08, G11, G16, G19, G39 Lab-G22	Mixed acids Cadmium Chromium Silver Trace metals	D002 D006 D007 D011	541 551 723	5 Tons	I	Corrosive - Acid
004 Caustic aqueous waste with metals	Mfg-G08 Lab-G22	Mixed bases Cadmium Chromium Silver Trace metals	D002 D006 D007 D011	122 541 551	5 Tons	J	Corrosive - Base

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
005 Aqueous or organic waste with other reactives (e.g., explosives)	Mfg-G08, G25, G39 Lab-G22 Remediation – G41	Water DS-108 Isopropanol Acetone Methyl ethyl ketone Toluene Methanol Xylenes Halogenated & non-halogenated solvents 111-TCA Perchlorates Ammonium perchlorate Nitroglycerin Ammonium nitrate HMX RDX Trace organic solvents	D001 D003 F002 F003	331	100 Tons	A, B, C, D, K, L, Q, R at Storage Facility (2233) if not explosive. Storage Magazine (0312) if explosive.	Reactive Toxic
006 Aqueous waste with high dissolved solids	Mfg-G08, G09, G25, G32, G33, G39 Lab – G22 Remediation – G41, G45	Water Solids Metals Trace organic compounds	D001	131 132 134 561	20 Tons	A, B, C, D, K, L, Q, R	
007 Petroleum hydrocarbons (distillates, naphtha, paraffins, aromatic petroleum solids)	Mfg-G06, G08, G09, G11, G14, G19, G39 Lab-G22	Oil Petroleum distillates	D001	213 214 221 331	5 Ton	A, B, C, D, K, L, M, N, O, Q, R	
008 Halogenated solvents mixtures	Mfg-G08, G09, G11, G13, G24 Lab – G22	Methylene chloride Methyl ethyl ketone 111-TCA CFC 113 CFC's HCFC's Arsenic Barium Cadmium Chromium Lead Mercury Silver Carbon tetrachloride Chlorobenzene Chloroform Acetone Methanol DS-108 Isopropanol Xylenes Alcohols Trace other organic compounds Trace metals	D004 D005 D006 D007 D008 D009 D011 D019 D021 D022 D035 F002 F003 F005 U226	211 214 551 741	10 Tons	A, B, C, D, K, L, Q, R	Poison Toxic High VOC

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
009 Non-Halogenated solvents mixtures	Mfg-G08, G09, G11, G13, G15, G24, G33, G39 Lab – G22	Methyl ethyl ketone Acetone DS-108 Methanol Isopropanol Isobutyl alcohol Petroleum & hydrocarbon solvents Terpene hydrocarbons glycol ethers Esters Detergents Xylenes Toluene Arsenic Barium Cadmium Chromium Lead Mercury Silver Pyridine Trace methylene chloride Trace111-TCA Trace CFC 113 Alcohols Trace organic compounds Trace metals	D001 D004 D005 D006 D007 D008 D009 D010 D011 D035 D038 F002 F003 F005	212 213 214 223 551 741	10 Tons	A, B, C, D, K, L, Q, R	Ignitable High VOC High BTU
010 Non-halogenated and halogenated solvent mixtures	Mfg-G08, G11, G24 Lab – G22	Methyl ethyl ketone Acetone Methanol Isopropanol Isobutyl alcohol Xylenes Toluene Petroleum & hydrocarbon solvents Terpene hydrocarbons glycol ethers Esters Detergents Methylene chloride Nitroglycerine 111-TCA CFC 113 Oil Water Alcohols Trace organic compounds Trace metals	D022 D025 D035 F002 F003 F005 P022	133 211 212 214 223 341 342 551 741	70 Tons	A, B, C, D, K, L, Q, R	Ignitable High VOC High BTU

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
011 Oil-water emulsion or mixtures	Mfg-G08, G09, G11, G13, G14, G15, G16, G19, G23, G32, G33, G39 Lab-G22 Remediation – G45, G49	Oil Coolant Water Acetone Methanol Isopropanol Isobutyl alcohol Xylenes Toluene Antifreeze Glycol ethers Methylene chloride 111-TCA CFC 113 Alcohols Trace organic solvents	F002 F003 F005	134 135 221 341 551	80 Tons	A, B, C, D, K, L, M, N, O, Q, R	
012 Waste Oil	Mfg-G08, G11, G15, G16, G19, G32, G33, G39 Lab – G22	Oil Trace metals Trace organic solvents	Non-RCRA	181 221 223 261 352 551 731	40 Tons	A, B, C, D, K, L, M, N, O, Q, R	
013 Other Organic Mixture	Mfg-G08, G09, G11, G39	Resins Pre-mix Trace organic solvents Chromium Trace metals	D001 D007	132 134 214 272 331 343 551	20 Ton	A, B, C, D, K, L, Q, R	
014 Organic paint, ink, lacquer, or varnish	Mfg-G06, G08, G09, G11, G16, G19, G24, G39 Lab – G22	Methyl ethyl ketone Toluene Xylene 2-Ethoxyethanol Cadmium Chromium Lead Trace organic solvents Trace metals	D001 D006 D007 D008 D035 F005	331 352 461 551	50 Tons	A, B, C, D, K, L, Q, R	Ignitable High VOC
015 Adhesives, epoxies, and resins	Mfg-G06, G08, G09, G11, G16, G19, G39 Lab – G22	Methyl ethyl ketone Toluene 2-Ethoxyethanol Alcohols Terpenes Hydrocarbons Trace organic solvents Trace metals	D001 D035 F005	272 331 551	50 Tons	A, B, C, D, K, L, Q, R	Ignitable High VOC Poison

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
016 Paint thinner or petroleum distillates	Mfg-G06, G08, G09, G11, G13, G16, G19, G33, G39	Petroleum distillates Methyl ethyl ketone Toluene Xylene 2-Ethoxyethanol Methylene chloride 111-TCA Stoddard Solvents Esters Glycol ethers Hydrocarbon solvents Terpenes hydrocarbons Alcohols Cadmium Chromium Lead Trace organic compounds Solvents Trace metals	D001 D006 D007 D008 D035 F002 F003 F005	212 213 214 331 551	20 Tons	A, B, C, D, K, L, Q, R	Ignitable High VOC
017 Reactive or polymerizable organic materials	Mfg-G08, G09, G11, G16, G19, G39 Lab – G22	Isocyanate and diisocyanate compounds	D001 D003 P105	212 214 271 272 331 352 551	10 Tons	A, B, C, D, K, L, Q, R	Poison
018 Inorganic solids	Mfg.-G09, G11, G19	Graphite Silica Aluminum oxide Arsenic compounds Cadmium compounds Chromium compounds Silver Trace organic compounds Trace metals	D001 D004 D006 D007 D011	141 181 331 541 551	10 Tons	A, B, C, D, K, L, P, Q, R	Ignitable Poison
019-A Resin Filters with Silver	Mfg-G19, G39, G49 Lab – G22	Silver Cadmium Trace metals	D006 D011	132 171 331 541 551	5 Tons	A, B, C, D, K, L, Q, R	
019-B Spent Developer, Fixer & Water	Mfg-G08, G09, G11, G19, G39 Lab – G22	Silver Cadmium Trace metals	D002 D006 D011	171 541 551	20 Tons	A, B, C, D, K, L, Q, R	
019-C Steel Wool with Silver	Mfg-G19, G23, G39 Lab – G22	Silver Cadmium Trace metals	D006 D011	171 181 541 551	5 Tons	A, B, C, D, K, L, Q, R	
019-D Silver Flake	Mfg-G39	Silver Cadmium Trace metals	D006 D011	171 541 551	5 Tons	A, B, C, D, K, L, Q, R	
019-E Photographic Film	Mfg-G11, G19, G39 Lab – G22	Silver Trace metals	D011	171 541 551	5 Tons	A, B, C, D, K, L, Q, R	
020 Solid resins or polymerized organic compounds	Mfg-G11, G19, G22	Resins Isocyanate compounds Trace organic Trace metals	D001 D003	271 551	5 Tons	A, B, C, D, K, L, P, Q, R	Poison
021	Mfg-G11,	Acetone	D001	352	25 Tons	A, B, C, D,	Reactive

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
Halogenated organic solids	G33	Methanol Isopropanol Isobutyl alcohol Xylenes Toluene DS-108 Methylene chloride 111-TCA CFC 113 Carbon tetrachloride Chlorobenzene Chloroform Trace organic compounds Methyl ethyl ketone p-Cresol Trace metals	D003 D025 D035 F002 F003 F005	551		K, L, P, Q, R	
022 Non-halogenated organic solids	Mfg-G06, G09, G11, G14, G15, G16, G19, G21, G32, G33, G42, G49, G39 Lab – G22	Solids Aluminum Toluene Esters Glycol ethers Petroleum & hydrocarbon solvents Alcohols Polyglycol powder	D001 D005 D035 F002 F003 F005	331 352 513 551	25 Tons	A, B, C, D, K, L, P, Q, R	Ignitable
023 Empty or crushed metal drums or containers	Mfg-G06, G09, G11, G15, G16, G19, G25, G32, G33, G39 Lab-G19, G22 Remediation – G41, G49	Metals Trace organic compounds Trace residues	Non-RCRA	141 181 512 513	25 Tons	A, B, C, D, K, L, P, Q, R	
024 Gases & Aerosols	Mfg-G06, G09, G11, G16, G19, G33, G39, G49 Lab – G22	Paints Adhesives Mold release compounds Other organic solvents	D001 D002 D003	141 331 512 551	5 Tons	A, B, C, D, K, L, Q, R	Lab pack Ignitable Corrosive
025	Mfg. – G06,	Barium	D001 to	121	45 Tons	A, B, C, D,	Lab packs,

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
Lab packs of off-spec. or out-of-date materials and debris	G09, G11, G16, G19, G32, G33, G39, G49 Lab – G22	Cadmium Chromium Lead Mercury Silver Methyl ethyl ketone Acetone Methanol Isopropanol Isobutyl alcohol Xylenes Toluene Methylene chloride Nitroglycerin Nitrocellulose Ammonium nitrate Petroleum & hydrocarbon solvents Terpene hydrocarbons glycol ethers Esters 111-TCA CFC 113 Alcohols Other acids Other bases Water reactives Air reactives Trace organic compounds Trace metals	D011 D018 D019 D021 D022 D025 D028 D033 D034 D035 D036 D039 D040 D043 F001 to F009 F039 Misc. P-Codes & U-Codes (See Part A)	122 123 131 132 133 134 135 141 151 171 172 181 211 212 213 214 (Other State Codes as Required) (See Part A)		E, F, G, H, I, J, K, L, M, N, O, Q, R, S, T (segregation dependant upon hazard)	Ignitable, Corrosive, Reactive, & Other Water and Air Reactives
026 Spent carbon containing organic compounds	Remediation – G11, G15, G19, G21, G24, G25, G39, G41, G49	Carbon tetrachloride Chlorobenzene Acetone Methanol Isopropanol Isobutyl alcohol Xylenes Toluene Methylene chloride 111-TCA CFC 113 Petroleum & hydrocarbon solvents Terpene hydrocarbons glycol ethers Esters Detergents Alcohols Trace organic compounds Trace metals	D001 D002 D019 D021 D022 F002 F003 F005	351 352 751	30 Tons	A, B, C, D, K, L, P, Q, R	Ignitable Corrosive
027	Remediation	Asphalt	D001	131	5000 Tons	A, B, C, D,	

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
Soil contaminated with organic compounds	– G41, G39, G42, G45, G49	Oil 111-TCA Methylene chloride Acetone Methanol Toluene Benzene Xylenes Perchlorates PCB's Trace organic compounds Trace metals	F002 F003 F004 F005	181 261 352 611		K, L, P, Q, R	
028 PCB Wastes	G11, G39	Oil Metals PCB's	Non-RCRA (TSCA)	261	1 Ton	O (Separate from other materials)	TSCA
029 Universal Wastes (Including: Fluorescent tubes, High Intensity Discharge Lamps (HID's), Mercury devices, and Batteries)	G09, G11, G16, G19, G25, G39, G41, G44 Lab – G22	Mercury Nickel Cadmium Chromium Silver Lithium Lead Trace metals	D002 D003 D006 D007 D008 D009	141 181 551 725 791	25 Tons	M, N, O	
030 Asbestos solids and debris	G08, G09, G11, G14, G19, G39, G41, G45, G49 Lab – G22	Asbestos & debris	F003 & Non-RCRA (TSCA)	135 151 551	50 Tons	A, B, C, D, K, L, P, Q, R	
032 Brine - Liquid Reactive waste after treatment (Stream #31)	HTF – G19, G25, G39, G41	Water Sodium perchlorate Sodium nitrate Sodium nitrite Sodium formate Glycerol Aluminum hydroxide Methanol Perchlorates Trace organic compounds Trace metals	D002	121 123 131 133 134 491	200 Tons	Shed J at the Storage Facility (2233).	Corrosive
033 Ash from thermal destruction of explosive waste	Mfg-G25, G39 Lab-G39 Remediation – G41	Ash Trace Organic compounds Trace metals Lead Chloroform Carbon tetrachloride	D008 D019 D022 F002 F003 F005	571	50 Tons	A, B, C, D, K, L, P, Q, R	

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
034 Non-RCRA and Non-Hazardous Waste Solid	Mfg-G08, G09, G11, G13, G14, G16, G19, G21, G25, G32, G33, G39, G44, G49 Lab-G19, G22 Remediation – G42, G45	Other organic and Inorganic solids Resins Polymers Carbon black Pigments & fillers Film & tape Adhesives Fibers Sodium chloride Pre-preg fibers and materials Grease Iron oxide Debris Metals Trace metals Trace organic compounds	Non-RCRA	134 141 151 181 272 331 351 352 512 513 551	200 Tons	A, B, C, D, K, L, P, Q, R	
035 Treated Medical & Biological Wastes	Medical Facility & Environ. Lab	Medical waste Biological wastes Trace metals Trace organic compounds	Non-RCRA	322	1 Ton	A, B, C, D, K, L, P, Q, R	
036 Mercury Waste	G11, G32, G39, G49	Mercury Metal Glass Plastic Debris Trace metals Trace organic compounds	D009	181 551 725	0.5 Ton	H, M, N, O	
038 RCRA Solids for Macroencapsulation	Mfg-G11, G19, G39 Lab-G19	Resins Wood Trace organic compounds Trace metals	D001 D002 D003 D004 D006 D007 D008	352 551	10 Tons	A, B, C, D, K, L, P, Q, R	
039 High Viscosity, Non Pumpable (Oils, Fuels, Resins)	Mfg-G08, G11, G13, G14, G16, G19, G25, G32, G39, G41 Lab-G19, G22	Oil Fuel Premix Resins Trace organic compounds Trace metals	D001	221 272 331 343 352 551	200 Tons	A, B, C, D, K, L, Q, R	
040 Non-Hazardous Solid Waste for Class I or II Landfill	G06, G09, G11, G19, G25, G39, G41, G45, G49 Lab – G22	Non-hazardous solid waste Debris Sand Blasting grit Trace organic compounds Trace metals	None	None	5000 Tons	A, B, C, D, K, L, P, Q, R , On-site	

Hazardous Wastes : Storage Facility 2233******							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
041 HTF Crumb & Debris Solid - Reactive waste after treatment (Stream #31)	HTF – G19, G22, G25, G39 Remediation – G41	PPE Metal Glass Plastic Ceramic Wood Cardboard Foil Other debris Trace organic compounds Trace metals	D001 D002	181 352 551	10 Tons	Sheds F, G, S, and T at the Storage Facility (2233). Storage Magazine (0312).	Flammable Solid Corrosive
055C Wood (pressure-treated)	Construction Demolition – G39, G41	Arsenic Zinc	Non-RCRA	181	50 Tons	P	Toxic
058 Metal, Metal Turnings, Metal Powder, Metal Fines, or Metals mixed fines mix	Mfg-G11, G19, G33, G39 Lab-G19, G22	Tungsten powder Zinc powder Magnesium powder Magnesium turnings Aluminum powder Other metal powders and turnings Oil Cutting fluids Trace organic compounds	D001 D003 D006 D007 D008	141 172 181 551	20 Tons	F, S	Flammable Solid
059 Desiccant, PPE and other debris contaminated with Trace Ammonium Perchlorate	Mfg-G09, G11, G19, G25, G39, G41 Lab-G19, G22	Desiccant Sodium chlorate Ammonium perchlorate PPE Metal Glass Plastic Ceramic Wood Cardboard Foil Other debris Trace organic compounds Trace metals	D001	141 181 551	20 Tons	G, T	
060 Oxidizer, Sodium Nitrate	Mfg-G11	Sodium nitrate Ammonium perchlorate Other oxidizers	D001	141	1 Ton	G, T	Oxidizer, Flammable Solid
061 Oxidizer, Desiccant Bags with Ammonium Perchlorate	Mfg-G09, G16, G33, G49	Ammonium perchlorate Other oxidizers	D001	181 551	1 Ton	G, T	Flammable
062 Cathode Ray Tubes	Mfg-G15	Lead Phosphorus Trace other metals	D008	181	15 Tons	A, B, C, D	Toxic
069 Oil removed from equipment	G41, G44	Oil PCBs	Non-RCRA	221	50 Tons	Point of Generation	TSCA
071 Debris generated from decontamination	G25, G41, G44	PPE Cleaning Rags	D003	343	100 Tons	Point of Generation	Flammable Toxic Solid

******** These materials may be found onsite in <90 day storage.**

Explosive/Reactive Hazardous Waste : Storage Magazine (0312)							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
005****** Aqueous or organic waste with other reactives (e.g., explosives)	Mfg-G08, G25, G39 Lab-G22 Remediation – G41	Water DS-108 Isopropanol Acetone Methyl ethyl ketone Toluene Methanol Xylenes Halogenated & non-halogenated solvents 111-TCA Perchlorates Nitroglycerin Ammonium nitrate HMX RDX Ammonium perchlorate Trace organic solvents	D001 D003 F002 F003	331	100 Tons	Storage Magazine (0312) if mixture is explosive. A, B, C, D, K, L, Q, R at Storage Facility (2233) if not explosive.	Reactive Toxic
031****** Reactive waste before treatment	Mfg-G08, G09, G11, G19, G25, G33, G39, G49 Lab-G22 Remediation – G41	1.1-1.6 Propellant DOT unclassified propellant Ammonium perchlorate Nitroglycerine AND HMX RDX Ammonium nitrate 111-TCA Methanol Other explosive-constitutes and devices Other high explosives Explosive-contaminated trash and debris Trace organic compounds Trace metals	D001 D003 F002 F003 P081	135 141 181 214 331 352 551	50 Tons	Storage Magazine (0312). No storage at Storage Facility (2233).	Reactive Ignitable
041 Reactive waste after treatment (Stream #31)	HTF – G19, G22, G25, G39 Remediation – G41	PPE Metal Glass Plastic Ceramic Wood Cardboard Foil Trace organic compounds Trace metals	D001 D002	181 352 551	10 Tons	Storage Magazine (0312). Sheds F, G, S, and T at the Storage Facility (2233).	Flammable Solid
063 Debris/Building materials: masonry brick, wall board, concrete and wood	G41, G44	PPE HMX Energetics Nitrocellulose Nitroglycerin	Non-RCRA	351 611	50,000 Tons	Point of Generation	Ignitable Solid
064 Debris/Building materials: wood and wall board	G41, G44	PPE Lead Energetics HMX Nitrocellulose Nitroglycerin Asbestos	D008	351 611	1,000 Tons	Point of Generation	Ignitable Toxic Solid

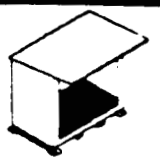
Explosive/Reactive Hazardous Waste : Storage Magazine (0312)							
Number / Description	**Source Code**	**Hazardous Waste Constituents**	**EPA Waste #**	**State Waste #**	**Annual Amount (Tons)**	**Storage Location (Typical)**	**Handling**
065 Debris including hydraulic equipment, reservoir tanks, pipelines and oilers	G41, G44	PPE Energetics Oil HMX RDX	Non-RCRA	223 351 611	1,000 Tons	Point of Generation	Ignitable
066 Treated wood/debris generated by demolition	G41, G44	Energetics Arsenic Chromium	Non-RCRA	181 351	200 Tons	Point of Generation	Ignitable Toxic
067 Building materials including floor tiles and caulking	G41, G44	Asbestos Energetics	Non-RCRA	151 351	300 Tons	Point of Generation	Ignitable Solid Toxic
068 Building materials including painted building siding, caulking and roofing	G41, G44	Asbestos Lead Energetics	D008	151 351 611	100 Tons	Point of Generation	Ignitable Solid Toxic
070 Rinsate generated from decontamination	G41, G44	Asbestos Lead Energetics PCBs	Non-RCRA	343	100 Tons	Point of Generation	Ignitable Solid Toxic

******** These materials may be found onsite in <90 day storage.**

APPENDIX F

TYPICAL STORAGE SHED SPECIFICATIONS

MODEL K



Specifications for Portable
Hazardous Waste Storage Building
Manufactured by Ideal Environmental Products
CHEM-STOR Model K

The portable hazardous materials storage container is designed to bring the client above compliance levels for hazardous material and waste storage. The container provides secondary spill containment, and security for hazardous materials storage in accordance with federal, state and local regulations. The material, design and workmanship are specified in the following outline.

Product Qualification:
The product has a history of production, sales and service for more than nine years.

Design:
A) Dimensions - Exterior dimensions approximately six feet wide by ten feet long by nine feet tall. (6'-0"W x 10'-0"L x 9'-0"H) (This does not include roof overhang.)
The building design will exceeds the recommendations of:

The Uniform Building Code	NFPA 30	Factory Mutual
The Uniform Fire Code	OSHA	

B) Spill Containment - Internal spill containment is a major design feature of the storage container. When filled with 55 gallon drums stored upright and unstacked, the container will contain a minimum of the total leakage from one-quarter (25%) of the drums.
C) Floor - The floor of the container is constructed of 10 gauge steel and incorporates a false floor system to prevent the release of hazardous liquids and solids if they are discharged from a primary container.
D) Walls & Roof - The walls and roof are fabricated using 12 and 14 Gauge HRS.
E) Doors - The container has a total opening of 9'-0" wide by 6'-3" high located on the front of the container. This model is not equipped with doors.
F) Ventilation - The container is equipped with vents which are sized to allow for a minimum of 6 air changes per hour.
G) Grounding - The container is equipped with one exterior static grounding connection.
H) Seismic Tie Down - The container is equipped with provisions for securing the building to the ground per seismic Zone 4 regulations.

Workmanship:
A) Steel Fabrication - The steel used to fabricate the container is free from kinks, and sharp bends. The manufacturing process does not reduce the strength of the steel to a value less than intended by the design. Each manufacturing process is done neatly and accurately, and all bends are made by controlled means to insure uniformity of size and shape.
B) Welding - The welding procedures employed are in accordance with the filler metal specifications of the American Welding Society and in cooperation with the ASTM. All welds are of sufficient size and shape to develop the full design strength of the parts connected by the welds. These welds transmit the imposed stresses without permanent deformation or failure when subject to proof of storage loads.
C) Painting - After a thorough cleaning process the exterior and interior of the container are painted with a self-priming chemical resistant epoxy paint. All exterior surfaces are then painted with a durable polyurethane paint.

Structural Design:

Wind Load	90 MPH
Floor Load	250 PSF
Snow Load	40 PSF

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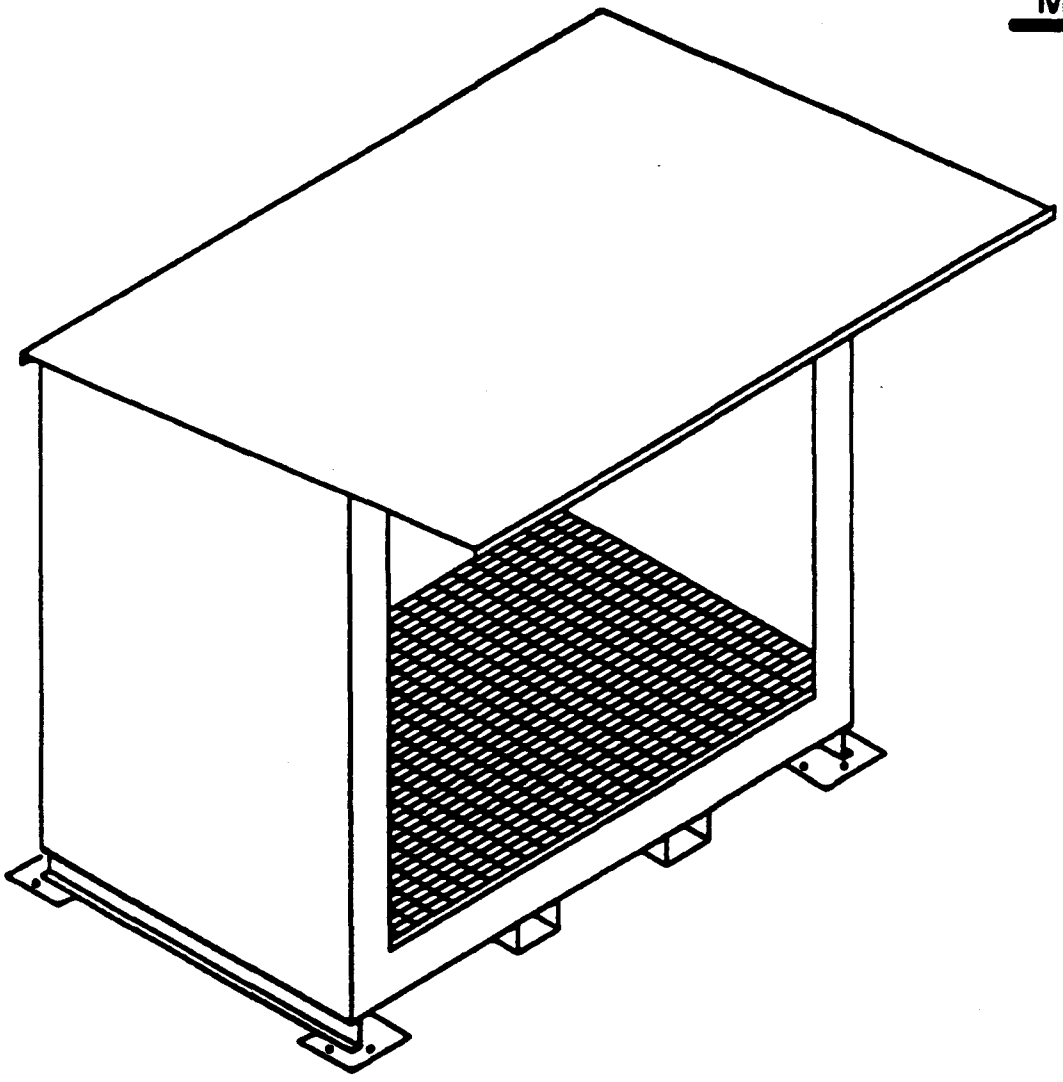
MODEL K



INTERIOR DIMENSION	EXTERIOR DIMENSION	STORAGE CAPACITY	SECONDARY CONTAINMENT	DOOR CONFIGURATION			APPROXIMATE SHIPPING WT
				NO.	RATING	DIMENSION	
10'0" X 6'0" X 7'0"	10'6" X 7'6" X 9'0"	14/55 Gal. Drums	205 Gallons	0	None	9'0" X 6'3" Opening	2500 LBS.

Standard Equipment:

Two Part Chemical Resistant Epoxy Paint Interior and Exterior. Polyurethane Top Coat on Exterior. Six air changes per hour natural ventilation. Exterior Ground Connection. Corrosion Resistant Epoxy Coated Steel Grate Flooring. Forklift Pockets, Seismic Tie Down Pads.

Construction: 10, 12 & 14 Gauge HRS

Exterior & Interior Dimensions Above are Length X Width X Height

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APPENDIX G

ENGINEER'S CERTIFICATION OF CONTAINMENT DEVICES AT THE STORAGE FACILITY (2233)

ARCADIS BBL

Arcadis BBLES
600 Metcalf Rd.
Building 12
San Jose, CA 95138
Tel: 408-776-4387
Fax: 408-776-4264

MEMO

To:
Tim Marker

Copies:
File: 39598.002

From:
Rebecca Lindeman, P.E.

REGISTERED PROFESSIONAL ENGINEER
REBECCA D. LINDEMAN
EXP. 9/08
67218
CIVIL
STATE OF CALIFORNIA

Date:
January 17, 2007

ARCADIS BBL Project No.:
B0039598.0000.00002

Subject:
Containment Certification for Station 2233 (Hazardous Waste Transfer Facility) and Station 0312 (Magazines A-C)

Pratt & Whitney Rocketdyne (PWR) Requested ARCADIS BBL conduct an evaluation and certification of secondary containment for Stations 0312 and 2233 located at their site in San Jose, CA. ARCADIS BBL conducted a site walk on January 9, 2007 of the RCRA facilities

Secondary Containment Requirements

As specified by Section 66264.175(b)(3) of the California Code of Regulations, Title 22, Chapter 14, Article 9 "Use and Management of Containers", the secondary containment system must have sufficient capacity to contain precipitation from at least a 24-hour, 25-year storm plus 10% of the aggregate volume of all containers or the volume of the largest container, whichever is greater.

The following calculations demonstrate compliance through comparison of the required containment and the available containment volumes.

Station 2233 – Hazardous Waste Transfer Facility

Station 2233 consists of a hazardous waste transfer building, ten hazardous waste storage sheds, a building used for drum crushing, and a containment-tank storage building. See Figure 1, attached. The hazardous waste transfer building and each of the hazardous waste storage sheds are subject to secondary containment requirements and are described in more detail below.

Hazardous Waste Transfer Building

Required Containment Volume:

This building is designed with four areas, each to contain 80 drums of 55 gallons each, the secondary containment is required to hold ten percent of the maximum volume. The required containment volume for this building is 1,760 gallons. Detailed calculations of the required containment volume are attached.

Precipitation:

The Hazardous Waste Transfer Building is weather covered, with an overhang that both extends over the concrete berm and lowers the height of the opening to approximately ten feet. Containment for precipitation is not required for covered areas. Although there is a chance for accumulation of storm water to develop under heavy wind conditions, the amount is assumed negligible. See attached building plan for more detail. The existing secondary containment provides for approximately 2,800 gallons of additional storage volume, above the ten percent required. Therefore, it is assumed that any wind-blown rain collected under the covered area would be contained by the secondary containment.

Available Containment Volume:

Approximately 4,630 gallons of secondary containment is available for the Hazardous Waste Transfer Building. This was calculated to include the drainage volume for each of the four building areas, as well as the two 1,000 gallon stainless steel storage tanks. This is a conservative calculation as it does not include the added volume provided by the containment berms around the storage areas, or the piping connecting each area to the containment tanks. Detailed calculations of the available containment volume are attached.

Hazardous Waste Storage Sheds

Required Containment Volume:

The required containment volume for each storage shed is 85 gallons, based on the maximum allowable container size of 85 gallons in one steel drum.

Precipitation:

Each Storage Shed is weather covered, with three enclosed sides and an overhanging roof on the open front side. Secondary containment for precipitation is not required for covered buildings.

Containment for precipitation is not required for covered areas. Although there is a chance for accumulation of storm water to develop under heavy wind conditions, the amount is assumed negligible. The existing secondary containment provides for approximately 120 gallons of additional storage volume, above the maximum container size required. Therefore, it is assumed that any wind-blown rain collected under the covered area would be contained by the secondary containment.

Available Containment Volume:

The volume of each shed is 205 gallons as specified by the manufacturer.

Station 0312, Storage Magazines

Required Containment Volume:

Each magazine is designed to contain six secondary containment pallets holding four drums of 55 gallons each. The secondary containment is required to hold ten percent of this maximum volume. The required containment volume for each magazine is 132 gallons. Detailed calculations of the required containment volume are attached.

Precipitation:

Each magazine at Station 0312 is enclosed on all sides and is equipped with a thick gauge iron door for access, which remains closed during storage.

Available Containment Volume:

396 gallons of secondary containment is available for each magazine. The volume of each secondary containment pallet is 66 gallons as per the manufacturer. Detailed calculations of the available containment volume are attached.

BBL
an ARCADIS company

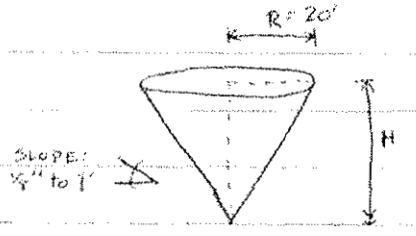
Subject	Project No.	By	Date	Sheet
2233 & 312 CONTAINMENT CERT.	39598.002		1/17/07	1/1

Calculations By: MARK ROBERTS Date 1/17/07 Checked By: RDL Date 1/17/07

HAZ. WASTE TRANSFER BUILDING (2233):

- REQUIRED VOLUME: $0.1 \times 4 \times 80 \times 55$ = **1,760 gallons**
  (10%)(4 areas)(80 drums/Area)(55 gallons/drum)

- VOLUME AVAILABLE: 4 DRAIN AREAS + 2 COLLECTION TANKS
  - EACH DRAIN AREA:



$H = \text{SLOPE} \cdot \text{RADIUS} = (0.125''/12'') \cdot 20'$

$H = 0.21'$

$V_D = \frac{1}{3}\pi R^2 H = \frac{1}{3}\pi (20')^2 \cdot (0.21')$

$V_D = 87.96\ sf \cdot (7.48\ \frac{gal}{sf})$

$V_D = 657.9$ gallons per drain area

- EACH STORAGE TANK: $V_S = 1{,}000$ gallons each as per manufacturer

- TOTAL VOLUME: (NOT INCLUDING PIPING)
  4 DRAIN AREAS + 2 COLLECTION TANKS

$V = 4 \cdot 657.9 + 2 \cdot 1{,}000$

V = 4,631.6 gallons

STORAGE MAGAZINES (0312):

- REQUIRED VOLUME: 10% × 6 pallets × 4 drums/pallet × 55 gallons/drum (PER MAGAZINE)

$V = 0.1 \cdot 6 \cdot 4 \cdot 55$

V = 132 gallons

- AVAILABLE VOLUME: 6 pallets × 66 gallons/pallet as per manufacturer

V = 396 gallons

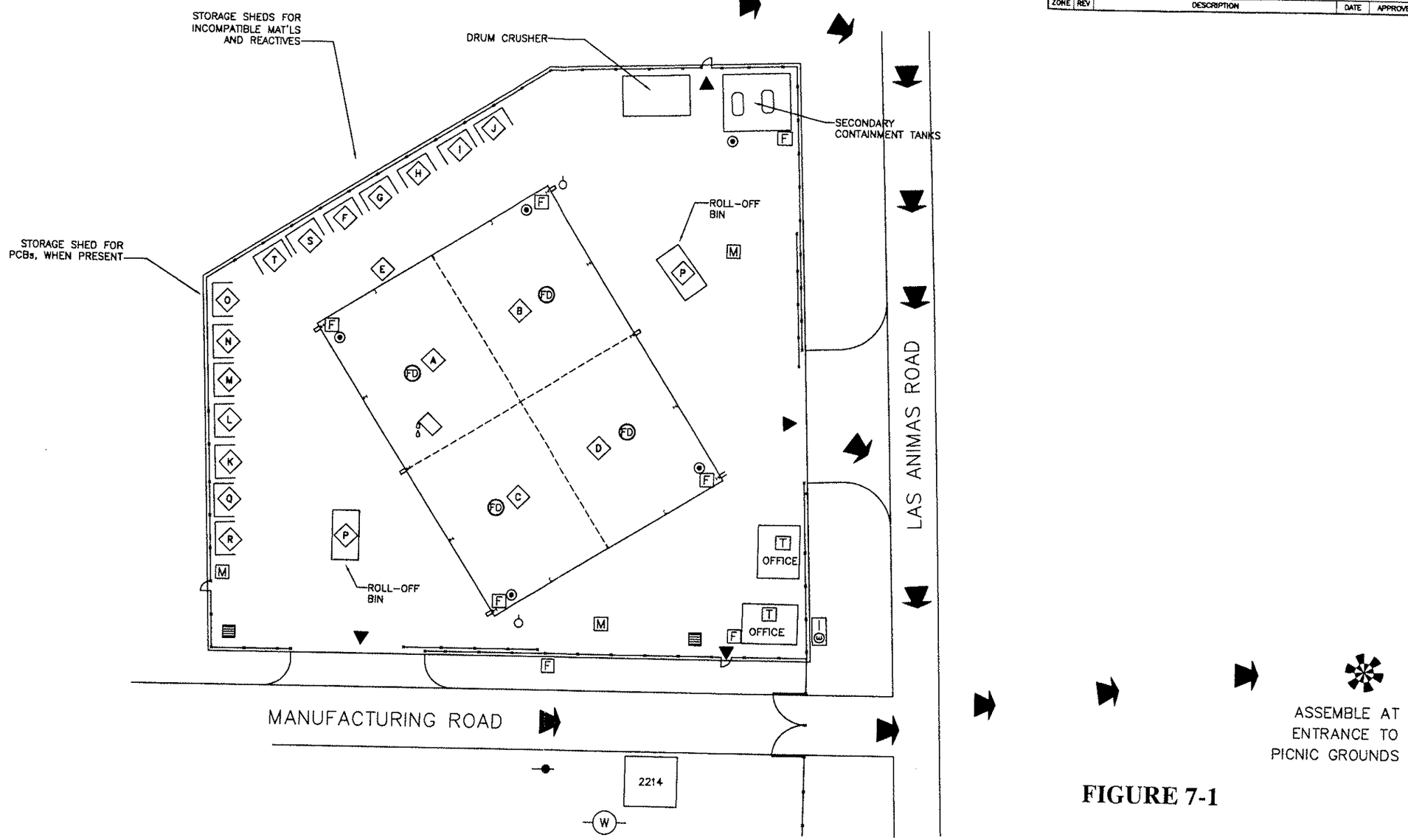


FIGURE 7-1

EMERGENCY EVACUATION ROUTES

LEGEND

- FIRE PROTECTION SPRINKLER RISER
- FIRE SPRINKLER
- FIRE EXTINGUISHER
- EVACUATION ALARM MUSHROOM BUTTON
- EVAC ALARM RESET
- EYEWASH / SHOWER
- SPILL KIT
- EVAC ASSEMBLY AREA
- EVACUATION ROUTE
- EXITS
- MONITORING WELL
- STORM / SEWER DRAIN
- TELEPHONE
- FLOOR DRAIN
- HAZMAT STORAGE NOTE: LETTER DESIGNATION IS REFERENCE TO ENVIROMENTAL INVENTORY LIST

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

QUALITY:	DATE	DRAWN BY: FBCopp	DATE 2/1/96
OPERATIONS:	DATE	CHECKED BY: T. Rumbolz	DATE 9/16/02
PROGRAM:	DATE	DES/FAC ENGR:	DATE
ESD:	DATE	SAFETY:	DATE
APPROVED:	DATE	CLIENT ORG:	DATE
APPROVED:	DATE	RELEASE APPROVAL	DATE

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UNITED TECHNOLOGIES CHEMICAL SYSTEMS — SAN JOSE, CALIFORNIA 95138

FACILITIES DEPARTMENT

STATION 2233 HAZARDOUS WASTE STORAGE FACILITY

SIZE	CAGE CODE	DRAWING / PART NO.	REV.
D	14134	2233L101	C

SCALE 1/16"=1' — CAD FILE: Part A B 2233 Map.dwg — SHEET 1 OF 1

DWG NO. 2233L101 — SHT 1

File: L101A01 Date/ 13, 1998 9:33 a.m. Scale: 1=192 Steve Holt, UTC Inc. Xrefs:

APPENDIX H

CONTAINMENT DESIGN SPECIFICATIONS FOR THE STORAGE FACILITY (2233)

internal correspondence

UNITED TECHNOLOGIES CHEMICAL SYSTEMS

TO: Bernie Zaboski

FM: D. N. Uyematsu

CC: T. Marker

RE: Containment Certification for Station 2233

DT: August 20, 1996

NO. DNU/tm - 027.96

REGISTERED PROFESSIONAL ENGINEER
NAOJI UYEMATSU
No. C27348
EXP. 3-31-97
CIVIL ENGINEER
STATE OF CALIFORNIA

GENERAL FACILITY DESCRIPTION

Station 2233 (Hazardous Waste Transfer Facility) is comprised of three corrugated metal buildings (Hazardous Waste Transfer, Drum Crushing, Collection Vault), and ten steel Storage Sheds

The Hazardous Waste Transfer building is the largest building (100 ft x 80 ft) at 8,000 square feet. It is used for storage of waste. It is a weather covered (e.g. roofed) concrete slab that is open on all four sides. The pad is divided into four separate drainage areas with sloped floors. Drainage lines from each area consist of polypropylene double walled (2" inner pipe, 4" outer pipe) butt-welded piping. The drain lines are interconnected, which are valved in such a way that each drain area can be isolated prior to draining to a large in-ground vault.

The Drum Crushing building contains equipment to crush empty steel drums for subsequent disposal. The weather covered building is 240 square feet (12 ft x 20 ft), enclosed on three sides and has a concrete slab foundation.

The Collection Vault building is 288 square feet (16 ft x 18 ft), weather covered and enclosed on three sides. The building contains the in-ground vault. The vault is constructed of cast-in-place concrete and contains two stainless steel tanks. Each tank has 1000 gallons capacity and is connected to the polypropylene drain line system from the Hazardous Waste Transfer building. The concrete vault also has a corner sump and pumping system to aid in removing small quantities of liquid.

Each Storage Shed is 60 square feet (6 ft x 10 ft), weather covered and enclosed on three sides. The sheds are built with 10-12-14 (floor, walls, roof) gauge steel, and are protected by a 2-part epoxy chemical-resistant coating. Each shed provides secondary containment

based on the Shed's storage capacity with safeguards against hazardous material spills or leakage.

PRECIPITATION

California Code of Regulations. Title 22, Article 24, Section 67245, par. B.3. specifies secondary containment must include provision to contain precipitation for a 24 hour , 25-year storm.

This report assumes all concrete slab containment areas are weather covered with minimal exposure to precipitation. The following calculations compensate for building areas exposed to precipitation when extreme winds accompany the specified storm.

i = 0.25 in/hr x 24 hrs = 6 inches

Waste storage tributary area	= 100' + 80' x 10'	= 1,800 sf
Drum crusher tributary area	= 20' x 6'	= 120 sf
Containment Vault trib area	= 18' x 6'	= 108 sf
	total tributary area	= 2,028 sf

Q = (7.48 gal/cf) (0.5 ft x 2,028 sf) = 7,554 gallons

CONTAINMENT VOLUMES

1. Volume of each controlled drain area (four total) in Transfer building.
   Elev. difference @ 1/8 per ft = 0.33 ft

   Volume = $1/3\pi(20)^2$ (.33) = 138 cf

   Gallons = 138 cf x 7.48 gal/cf = 1,032 gallons each

2. Volume of in-ground Collection Vault with stainless steel collection tanks.

   Volume = 18' x 16' x 8' x 7.48 gal/cf = 17,234 gallons

3. Volume of each Storage Shed

Volume = 205 gallons as per manufacturer

LIQUID CHEMICALS STORED

cooling tower solution	paints
acetone	paint thinner
resins (various types)	well purge water
coolant	water with AP
dichloromethane	toluene
isopropanol	IPDI
oil	NMA
freon TF	TDI
small quantities of acids and bases (laboratory quantities)	