ATTACHMENT 2

FACILITY DESCRIPTION

2.0 FACILITY DESCRIPTION

The ATK-Bacchus facility is located on the west side of the Salt Lake valley in West Valley City, Utah and unincorporated Salt Lake County. The facility includes over 400 buildings that are used to produce and prepare propellant ingredients, manufacture solid propellants and produce solid propellant rocket motors.

2.1.1 General Description of the ATK-Bacchus Facility

The ATK-Bacchus facility includes the following subparts: Plant 1 (or Bacchus East); the Naval Industrial Reserve Ordnance Plant (NIROP); Bacchus West; and a number of off-site groundwater sampling wells. In order to provide a complete description of the processes that generate hazardous waste at ATK-Bacchus, the treatment and storage facilities located on NIROP will be described in this application along with the other Bacchus facilities. However, the permit application information for facilities located on NIROP will be submitted as a separate application.

The facilities that comprise ATK-Bacchus are owned or leased, and operated by ATK Launch Systems, a wholly owned subsidiary of Alliant Techsystems. The contiguous areas covered by this application are shown on Figure 2-1. The NIROP facility is owned by the Navy and is operated by ATK Launch Systems as an integral part of the facility. Plant 1 and a portion of the Bacchus West facilities are owned by ATK. Most of the Bacchus West property is owned by and leased from the Kennecott Corporation.

The facility occupies about 10,000 acres within West Valley City, Utah and unincorporated Salt Lake County. It is located approximately four miles south of the unincorporated town of Magna and about 18 miles southwest of Salt Lake City, Utah. Transportation access includes 8400 West (Utah Hwy 111) that passes through the plant, 4100 South and 5400 South that are along the north and south plant boundaries, and a railroad spur through the plant.

Hercules, Inc. established the Bacchus Works in 1915 as a producer of commercial blasting powder. The plant was renovated into a modern solid rocket propulsion facility in 1958 with research, development, and production capability. ATK acquired the facility in March 1995 when they purchased Hercules Aerospace from the Hercules Company.

Both reactive and non-reactive hazardous wastes are generated at the facility. The wastes are accumulated and stored or treated at one of the onsite RCRA Interim Status hazardous waste management units (HWMUs). Reactive wastes can be treated onsite at the NIROP Burning Grounds. Chemical wastes may be stored on-site at one of the interim status storage areas for a time before being shipped off-site for treatment and disposal.

Non-reactive hazardous wastes are stored until shipped to appropriate off-site treatment or disposal facility. Reactive wastes and reactive contaminated materials are thermally treated at the NIROP Burning Grounds or shipped off-site to an appropriate treatment and disposal facility. A more detailed description of these HWMUs and their operations are described in Section 2.2, Description of Hazardous Waste Management Units, and in Section 4.0, Process Information.

2.1.2 Facility Security

The facility is secured by chain link and barbed wire fencing that surrounds the active site. The perimeter fence has warning signs posted at about 500 ft intervals, at corners, and at each gate. The warning signs display the words "Danger Explosives, No Trespassing." In addition, the HWMUs have warning signs to inform employees and discourage unauthorized access.

The facility has three primary access points through the Main, Bacchus West and NIROP gates. The Main and Bacchus West gates are manned during normal business hours and the NIROP gate is manned on an as needed basis. All gates are either locked or controlled by card readers when security personnel are not present. The site is patrolled by security guards.

2.1.3 Bacchus East (Plant 1)

Plant 1 supports manufacturing, production testing, shipping, and research and development functions. Production facilities comprise the largest area and occupy the greatest number of buildings at Plant 1. The activities conducted in the production facilities include the preparation of empty rocket motor chambers, preparation and handling of propellant ingredients, mixing and curing of propellant ingredients, propellant mold assembly/disassembly, propellant machining, in-process storage, final assembly, and shipping. HWMUs located on Plant 1 are identified in Section 1.3.

Laboratory facilities at the ATK-Bacchus once involved many buildings at Plant 1 and NIROP, but most labs were relocated to the ATK-Promontory plant in 2001-2002. Laboratory activities include, but are not limited to propellant research, process development, materials development, destructive and nondestructive testing, standards measurement, and applied physics research.

The Plant 1 Static Firing Range occupies a two-acre site in the south area of the plant and includes four firing bays. These bays provide horizontal and vertical testing capability for small propellant charges. The propellant tested typically does not exceed 1000 pounds per year.

2.1.4 NIROP

NIROP was originally built by the Air Force for production of Minuteman Stage III rocket motors. It is located immediately north of Plant 1. When Minuteman motor production finished, the facilities were temporarily converted to the production of mini-mine explosives. This plant now supports Navy programs and other production programs permitted by the Navy. The processes conducted at NIROP are similar to those described at Plant 1, and includes activities such as propellant ingredient preparation and handling, motor curing and storage, final assembly, inspection, machining and shipment.

2.1.5 Bacchus West

The Bacchus West facility is adjacent to and contiguous with Plant 1, located west of 8400 West. It consists of buildings where large solid propellant rocket motors are manufactured. The processes conducted at Bacchus West are similar to those at Plant 1, but generally operate under automated control. Closed ingredient handling systems are used in all possible applications to prevent contamination of the processes, products, and environment.

2.2 DESCRIPTION OF HWMUs

HWMUs at the ATK-Bacchus include storage areas for the management of listed and characteristic hazardous waste. In addition, the ATK-Bacchus operates a number of hazardous waste accumulation areas in accordance with the generator requirements for satellite accumulation and the less than 90-day hazardous waste accumulation rules.

2.2.1 Description of Hazardous Waste Container Storage Units

ATK-Bacchus has four hazardous waste container storage units that are operated in accordance with the interim status requirement of R315-7-16 of the Utah Administrative Code (UAC). The hazardous waste container storage units identified in Section 1.3 are:

- HS-1,
- ES-1,
- Segment Storage, and
- RH-1

2.2.2 HS-1

HS-1 is used to store non-explosive solid, semi-solid, and liquid hazardous and non-hazardous wastes. This area is used to store and consolidate waste prior to off-site shipment to an authorized hazardous waste management facility. HS-1 (Figure 2-2.2) consists of buildings 8562, 8567, 8568 and four sheds located south of the main structure. HS-1 has a combined storage capacity of 15,900 gallons. The storage capacity for each of the HS-1 buildings is listed below.

Table 2-1		
Building	Capacity (gallons)	Containment (gallons)
8562	1,200	165
8567	4,900	690
8568	9,350	NA
Sheds A-D	450	NA

Indoor concrete flooring surfaces are sealed with a commercial sealant, and the concrete joints are caulked with silicone. The sealant provides for ease of cleanup and prevents leaks or spills from migrating into the concrete pad. The specification for a typical sealant used to seal concrete floors is provided as Figure 2-2.3.

Building 8562 (Figure 2-2.4) is divided by a wall into two separate rooms. The west half of the building is office space, and the east half is a work area. No hazardous wastes are stored in the office area. The entire building is equipped with heat and lighting.

The floor in the work area was constructed using a monolithic cast concrete slab with a 6” curb on the South and North walls (Figure 2-2.5). The inside dimensions of the work area are 24’x 20’. The main concern for liquid containment is to ensure that liquids will be contained, and not released through the north personnel door. The area adjacent the personnel door is approximately 0.12’ higher than the surrounding floor area. The floor forms the secondary containment in the area west of the personnel door with a liquid collection trench forming the low point of the containment. The dimensions of the containment are approximately 12’ x 24’ x 0.12’. The volume of this area can be approximated by taking half of the volume for the containment rectangle described above, or 17 ft^3. The room also has a floor trench, which is an architectural feature from the previous occupancy of the building. The average dimensions of the trench are 0.4'deep, 0.5' width and 24' long for a volume of 5 ft^3. The total volume contained in the trench and area west of the personnel door is 22 ft^3. Using 7.48 gallons per cubic foot, the containment will hold approximately 165 gallons.

Building 8567 is an enclosed structure, built on a monolithic cement pad surrounded by a minimum 6" curb on all sides (Figure 2.2-6). The inside dimensions of this building are 21' x 52'. The floor slopes to the north and east. Any liquids released will be contained and collected along the north and east side of the building. The average depth along the north wall is 0.30'. The average depth along the east wall is 0.25'. To conservatively determine the containment capacity the size of the containment will be estimated based on a depth of 0.25' along both the north and east wall. The width will be 21' along the north wall, 35' along the east wall and will cover approximately one-half the room using a line which bisects the room running from the northwest corner to a point approximately 35' along the east wall. The 35-foot distance along the east wall is the floor elevation where liquids could start to flow through the door into the work area of Building 8562.

The volume for this area is ½ the length x the width x the depth or ½ (.25') (21') (35') = 92 ft^3. Using 7.48 gallons per cubic foot, the containment will hold approximately 690 gallons.

There are five cabinets for small containers located in the south end of Building 8567. The cabinets are constructed of steel with dimensions of 40" x 40" x 74". Each cabinet contains a 13-gallon capacity liquid sump and is self-contained.

Building 8568 (Figure 2-2.7 and 2-2.8) is an enclosed wood-framed structure fitted with two large overhead doors. It measures 30' wide x 60' long. Storage capacity is 9,350 gallons. The concrete floor in this building has no secondary containment. It is used to store both RCRA and non-RCRA wastes. RCRA liquid wastes may be stored in Building 8568 only if the containers are stored on pallets that provide secondary-containment or packaged as lab packs containing chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents.

The four wood-framed sheds each having approximate dimensions 10'4" x 10' 4" located to the south of Building 8567 (Figure 2-2.2). Actual dimensions vary slightly for each shed. The sheds are designated A, B, C and D. Shed B is used to store hazardous waste. Sheds A and C are used to store supplies. Shed D is a mechanical room for the facility. Storage capacity for Shed B is 450 gallons. The sheds have a concrete floor with no secondary containment.

Shed A is used to store waste packaging supplies including fiber, poly, and metal boxes, pails, and drums ranging from less than one-gallon capacity through 55-gallon drums, and containers for 4-foot and 8-foot fluorescent lamp tubes. No waste materials will be stored in this shed. Shed B contains cabinets for storing small containers. These cabinets are identical in design to the cabinets in Building 8562 and each contains a 13-gallon capacity liquid sump.

2.2.3 ES-1

ES-1 (Bldg 2105) is a container storage area for the accumulation and storage of reactive wastes (Figure 2-2.9). ES-1 has a storage capacity of 20,000 pounds, stored in a variety of containers. The design capacity is based on safety concerns associated with the storage of reactive materials. Figure 2.2-10 provides a floor plan for the building.

ES-1 was constructed in 1961 to store and weigh dry propellant ingredients. ES-1 is a totally enclosed structure, constructed of concrete and steel. Except for the south-facing dock area, each side is protected by a gravel and sand berm. The berm is supported along the south side by wooden beams that were constructed to direct the shock of a detonation away from neighboring facilities, equipment, and personnel.

The floor on the west side of the building is located at truck bed height, while the floor on the east side of the building is at ground level. The building is protected by a deluge sprinkling system and is equipped with a grounding system to minimize electrostatic discharge (ESD) spark hazards. Fire symbols appropriate for Class 1.1 materials are posted on the exterior of the building. A fire hydrant is located within 150 ft of the building.

2.2.4 Segment Storage

Segment Storage was designed for the storage of Class 1.3 rocket motor segments, but it can also be used to store Class 1.3 containers. Containers will be stored inside a trailer. Segment Storage has a storage capacity of 75,000 pounds of Class 1.3 material. No Class 1.1 materials will be stored on this pad. The pad is located southeast of HS-1 on Plant 1. It consists of a 75' x 100' asphalt pad (Figure 2-2.11), accessible by paved roads from the north and south. The facility protected from lightning in a "tent" configuration (grounded telephone poles at each corner of the pad connected with a conductive wire). Although no building or structure is present on the pad, plant maps designate the area as Building 4643. Fire symbols appropriate for Class 1.3 materials are visibly posted. A fire hydrant is located within 1,000 feet of the area.

Segment Storage was designed for the storage of Class 1.3 rocket motor segments, but it can also be used to store Class 1.3 containers. Rocket motors will be stored on shipping trailers or storage chocks. Containers will be stored inside enclosed locked trailers. Segment Storage has a storage capacity of 75,000 pounds of Class 1.3 material. No Class 1.1 materials will be stored on this pad. The pad is located southeast of HS-1 on Plant 1. It consists of a 75' x 100' asphalt pad (Figure 2-2.11), accessible by paved roads from the north and south. The facility is protected from lightning by a "tent" configuration (grounded telephone poles at each corner of the pad connected with a conductive wire). Although no building or structure is present on the pad, Plant 1 maps designate the pad as Building 4643. Fire hazard symbols appropriate for Class 1.3 explosives materials are visibly posted at the entrances to the pad. A fire hydrant is located within 1,000 feet of the area.

2.2.5 RH-1

RH-1 is a wood-framed, earthen-covered structure (Figure 2-2.12). Floor dimensions are 37' x 90' (Figure 2-2.13). The front of the building has two large double doors (11'6" x 12' high) to allow access for rocket motors. A set of rails enters the building through the double doors enabling rocket motors to be brought in on rail dollys.

The building is designed to safely store bulk explosives and rocket motors (Figure 2-2.14). Hazardous waste and production rocket motors may be stored at RH-1. Hazardous waste stored in RH-1 will be clearly labeled and segregated from stored production rocket motors. RH-1 has a total storage capacity of 250,000 pounds, of which only 150,000 pounds can be used for hazardous waste storage. Fire symbols appropriate for Class 1.1 materials are posted on the exterior of the building. A fire hydrant is located within 150 ft of the building.

2.3 QUANTITY DISTANCE DETERMINATION

The facility uses the Department of Defense (DOD) guidance to calculate quantity distance relationships. Guidance is contained in DOD 4145.26-M," DOD Contractor's Safety Manual for Ammunition and Explosives," September 1997, Under Secretary of Defense for Acquisition and Technology. DOD 4145 is derived from DOD 6055.9-STD," DOD Ammunition and Explosives Safety Standards," October 1992. The method used to determine safe quantity distance relationships for both Class 1.1 and 1.3 propellants is provided below.

The quantity distance relationship for Class 1.3 propellant is determined by the following formula: $\mathbf{D=5W^{1/3}}$. Where W is the weight of Class 1.3 propellant and D is the safe distance. The formula applies to Class 1.3 propellant and Class 1.3 propellant ingredients. The safe distance is defined as the interline protection for mass fire for Class 1.3 propellant.

The quantity distance relationship for Class 1.1 propellant is determined by the following formula: $\mathbf{D = 18W^{1/3}}$. Where W is the weight of a Class 1.1 explosive and D is the safe distance. The formula applies to Class 1.1 propellant and Class 1.1 propellant ingredients. The safe distance is defined as the unbarricaded interline protection for Class 1.1 propellant. Refer to Figure 2-3.15 for safe distances for the hazardous waste storage facilities and significant 90-day accumulation areas identified in this application.

The quantity distance relationship for ES-1and RH-1 is based on the more conservative requirement for a Class 1.1 explosive.

2.4 90-DAY ACCUMULATION UNITS

The facility maintains 90-day storage areas. These 90-day areas include waste accumulation stations and one wastewater collection tank at operating buildings.

2.4.1 Wastewater Collection Tanks

Wastewater collection tanks are used to collect process and building wash water. There are approximately 40 tanks located at individual buildings at the facility. The majority of the wastewater collected at the facility can be discharged either directly to the municipal sewer or discharged to the sewer after being processed at the on-site Waste Water Treatment Plant (WWTP). Piping for most of the tanks is above ground; underground piping is double-walled. Cloth filters are used, where applicable, to prevent propellant or explosives particulates from entering the tank. Filters contaminated with explosives are thermally treated at the Burning Grounds. All tanks have level indicators, and use either secondary containment leak detection or visual confirmation where leaks can be visually identified. Wastewater generated at Bacchus West is currently not included in the discharge permit from the Magna sewer. It is either held in tanks for off-site disposal, or discharged to the Kearns Improvement District.

The hazardous waste tank identified in Table 2.2, is a double-wall steel tank with cathodic protection, leak detection equipment and high-level alarms.

Table 2.2			
90-Day Hazardous Wastewater Storage Tanks			
No.	Building	Tank Type	Capacity
2440	Carbon/Carbon	Double-wall steel	6000 gal

2.4.2. Accumulation Stations

Waste accumulation stations support most waste-producing operating buildings at the facility. Waste handling processes are discussed in more detail in Section 4. The number of accumulation stations varies according to need. Accumulation stations at explosive generating operations are referred to as "slum sheds". Slum sheds are three-sided wooden structures, typically 6' x 17' x 8' high (Figure 2-4.16). They are built on a concrete pad open to the north to protect explosive wastes from southern sun exposure. A similar structure is used at nearly every accumulation station but the design is not necessarily standardized.

2.5 LOCATION INFORMATION

The following sections contain information relating to the surface topography of the facility, consideration for potential seismic activity, floodplain location, and on-site traffic control.

2.5.1 Topographic Map Information

A topographic map is presented showing the various ATK-Bacchus facilities: Plant 1, NIROP, and Bacchus West in Figure 2-5.17. The map shows plant facilities, security fences and gates, and the hazardous waste management facilities. The topographic map includes:

- Surface contours
- Surface water flow and drainage barriers

2.5.2 Surface Run-on/Run-off

Highly fractured limestone and quartzite, and permeable alluvial deposits near the mountain front, allow most of the run-off originating in the Oquirrh Mountains to infiltrate into the subsurface before it reaches the facility. Therefore, run-off from the Oquirrh Mountains to the valley floor is limited. Stream flow from the Oquirrh's is intermittent and occurs primarily during the spring and summer run-off months from snowmelt and precipitation.

Streams that flow across the facility originate in the Oquirrh Mountains to the west. The main streams that contribute surface water on the facility are Coon Creek and an unnamed stream in Harkers Canyon. These streams converge immediately upstream of the facility. The stream is known as Coon Creek below the confluence. The Coon Creek drainage enters the Plant 1 facility via a culvert under State Highway 111, and proceeds northerly to a Salt Lake County flood control detention basin, near 4100 South.

Except for Coon Creek, no major drainages cross the facility. Run-off from most areas on the site occurs as overland flow that collects in small northeast trending channels that follow the local topography.

2.5.3 Floodplain Boundary

Between 1983 and 1986, the region surrounding the facility experienced a cycle of above-normal precipitation. The increased run-off accelerated erosion of Coon Creek and other minor channels. The channel surface for Coon Creek degraded to levels that in a few locations are now several feet below the previous channel surface. The most current map published by the Federal Emergency Management Agency (FEMA) showing the 100-year floodplain boundary, dated September 21, 2001 (Figure 2-5.18), does not indicate a change in the delineation of the floodplain boundary. An independent engineer has reviewed the floodplain boundary (reference: R.B. White, letter to R.A. Bowlin, "Review of Floodplain Information in Bacchus Part B Permit Application," February 13, 2006). A visual inspection of the Coon Creek channel also does not indicate any apparent erosional floodplain concerns.

2.5.4 Wind Direction

The wind rose (Figure 2-5.19) for the Salt Lake area shows the frequency of winds, in percent by direction and speed, and indicates the average wind speed in miles per hour. The predominant wind direction is from the south with an average wind speed between 8.9 and 11.3 mph. The next most prominent wind direction is from the north with an average wind speed of 7.9 to 8.8 mph.

2.5.5 Miscellaneous Facilities

A production well and water storage tank are located in the foothills above (approximately 1-mile west) the Bacchus West production facilities. This withdraw well is currently not in use, but could be brought into service if required. This system was designed to supply pressurized potable water to the facilities and for fire protection (deluge) systems and hydrants throughout the entire plant. This system is accessed by a system of internal roads that connect the buildings and facilities at the ATK-Bacchus facility. Fire control water is supplied through underground water lines.

The facility sanitary sewage system consists of sewage collection and septic systems, specific to areas in the plant. A domestic sewage collection system connects the Plant 1 and NIROP buildings and a few production buildings to the Magna sewer. Individual septic tank and drain field systems serve the majority of buildings in the NIROP, Plant 1, and Bacchus West operating areas.

2.5.6 Seismic Considerations

The location and potential affect an earthquake within the local Intermountain Seismic Belt (ISB), more specifically the Wasatch Front, could have on the facility has been evaluated. The general consensus is that a Magnitude 6.5 or greater earthquake may occur along the Salt Lake Valley segment of the Wasatch Fault at any time.

2.5.7 Location

The facility is located within the Salt Lake Valley at the eastern edge of the Basin and Range Physiographic Province. More specifically, the site is located within the Magna Block, just east of the Oquirrh Mountains (Tooker, E.W. and Roberts, Ralph J., 1961). In Utah, the ISB coincides with the boundary between the Basin and Range to the west and the Colorado Plateau to the east. The Basin and Range is characterized by north-south trending normal faults, caused by spreading from lateral tension and local uplift. In addition to deep-seated basement faulting, the spreading of the valleys also causes sympathetic and antithetic faulting in the sediments overlying the basement structures.

The Magna Block and northern Oquirrh stratigraphy are part of the upthrust portion of the North Oquirrh Thrust Fault. The Oquirrh Mountains are a tilted fault block associated with the eastern portion of the Basin and Range. Faulting associated with Basin and Range along the local uplifted mountain ranges, i.e. Wasatch, Oquirrh, and Stansbury, occurs only on the western side of the ranges (Utah Geological Survey, 2003, Map 193DM). There are no documented faults on the east side of the Oquirrh Mountains associated with Basin and Range or other Tertiary and early Quaternary tectonic activity (Tooker and Roberts, 1961).

The only documented sympathetic and antithetic faulting in the Salt Lake Valley near the facility is the West Valley Fault Zone (Figure 2-5.20 and 2-5.21). The faults in this zone primarily dip toward the east in antithetic response to weakness in the valley sediments caused by movement along the Salt Lake City section of the Wasatch Fault Line. No documentation is present to suggest that the West Valley Fault Zone is tectonic in nature (basement controlled).

2.5.8 Geologic Control

Tooker and Roberts produced the “Geologic Map of the Magna Quadrangle, Salt Lake County, Utah (1971)”. The map shows a northeast trending normal fault, downthrown to the east, which passes within 0.4 miles of the NIROP Burning Ground. This fault is associated with pre-uplift of the Oquirrh’s and is extended to the northeast based on a small outcrop of the Kessler Canyon Formation just east of Magna. There is no evidence that this fault has ever been active during formation of the Basin and Range. However, the “Interim Geologic Map of the Magna Quadrangle”, Open File 424, UGS, August 2004, does not show this fault to be present. The strike and dip of this outcrop appears to be more associated with outcrops north and south of the Pleasant Green Cemetery in Magna.

One of the primary linear surface features is Coon Creek. An earlier impression was that the location of Coon Creek might have been fault controlled; however, current review of the data does not confirm this. None of the published geologic maps indicates a fault, structural or near surface in the area of Coon Creek that would affect the direction of drainage. Coon Creek appears to be controlled more by folding as it exits the Oquirrh’s, than by simply following the path of preferred erosion. The upper portion of Coon Creek is in a structural synclinal trough that is perpendicular to faulting throughout most of its course. The redirection from east-northeast to a northerly trend on Plant 1 is not believed to be fault controlled. The majority of the faults shown in the

Tooker/Roberts map, are associated with the Oquirrh Mountains, and are compressional or shear features of pre-Tertiary age. Only a few of the faults appear to be extensional and associated with horst and graben release. Stratigraphic information collected by ATK-Bacchus suggests that Coon Creek has maintained its approximate line prior to and following the presence of Lake Bonneville.

Borings at the site and north of 4100 South have occasionally encountered Tertiary sediments of volcanic origin. About 8000 feet north of the site, the borings for GW-79, 80, 81, and 82 encountered a Tertiary volcanic material. It was initially thought that this change in depth of the upper contact was related to faulting. However, this would mean that a total vertical fault displacement of more than 150 feet, more than any known Holocene fault in the valley, had occurred. The volcanic material appears to be at least 60 feet thick, based on borings. None of the borings has penetrated the unit to confirm displacement of the bottom contact.

Borings along the northern boundary of the site seem to indicate a similar subsurface condition. Although borings for GW-53 and GW-54 did not encounter the volcanic unit near the termination depth, the boring logs document that volcanic material and cobbles are present at a depth similar to where they appear in the boring logs of GW-79, 81, and 82. No volcanic debris was identified in the next boring to the west (GW-52), which was terminated at a depth approximately 60 feet greater than GW-53 and 54. It is believed that the streams eventually cut through the volcanic layer and into the Tertiary sediments below. Later with the formation of Lake Bonneville, sediments covered the volcanic material to the present surface, allowing the current upper and lower water bearing zones to be in hydraulic communication.

A current review of the data concluded that this is not a fault-induced graben, but simply an erosional feature. The volcanic layer appears to have been deposited as a flow from somewhere in the southern Oquirrh’s during mid-Tertiary time. A trough appears to have been cut by erosion from stream running out of the Coon and Harkers canyons which followed the topography northward, bound on the west by the uplifted Oquirrh’s, near the location of present day Coon Creek.

2.5.9 Local Faulting

Various faults and linears are documented or inferred to be present near the facility. Some of the more pertinent ones are discussed below.

The Granger fault, as named by Marine and Price (1964) and evaluated by Keaton and others (1987), is the nearest Holocene age fault with possible recent displacement. It is located about five miles east-northeast of the site. The Granger and Taylorsville faults to the east comprise the West Valley Fault Zone (Figure 2-5.20).

Slentz (1955) refers to a suspected east-trending fault passing south of the old gravel pits. The evidence used to infer the existence of such a fault consisted of steep dips in rocks of the Salt Lake Group as exposed in the gravel pits, warm water from rising groundwater in the bottom of the gravel pits, and the east-trending landform on which the Provo Level Shoreline of the ancient Lake Bonneville has been eroded.

Cook and Berg (1961) found a northeast-trending, southeast-facing gravity anomaly they interpreted to represent a fault close to the Oquirrh Mountains south of the site and swinging northeastward through the site. They used Slentz's evidence to support their interpretation of the gravity anomaly. There is no surface expression or documentation to verify the existence of this fault.

Examination of stereoscopic aerial photographs dating from 1946 to 1965 revealed that Lake Bonneville shoreline features across the site were continuous and showed no evidence of disturbance by fault offset. Since the shoreline features at the site are greater than 10,000 years old, absence of fault offset clearly indicates the absence of Holocene faults within the 3,000 ft radius. Observations of the distribution of bedrock exposures in the area made during site reconnaissance supports the interpretation of the aerial photographs and further indicates that the presence of a possible east-trending fault south of the old gravel pits, as inferred by Slentz (1955), certainly does not affect Lake Bonneville deposits and probably does not exist. Figure 2-5.22 presents geologic features identified at ATK-Bacchus during field reconnaissance.

A geologic map of the site area included in Sterns (1984) shows five faults relatively close to the ATK-Bacchus site. The largest of these faults has been named the Principal Marginal Fault. The other four faults that have not been named are shown to pass through or within 3,000 ft of the site. The geologic cross-section included in Sterns (1984) shows the upper surface of the Salt Lake Group and the lower part of the Lake Bonneville deposits to be faulted. Such an interpretation would indicate that the most recent movement of the faults was younger than late Pleistocene, and possibly Holocene.

2.5.10 Seismic Activity

Seismic activity has been documented in 1962 and later years, clustered north of ATK-Bacchus in the Magna area. Based on an evaluation of published geologic data supplemented by examination of stereoscopic aerial photographs and field reconnaissance, no faults that have had displacement in Holocene time (<10,000 years before present [b.p.]) are present within 3,000 ft of any hazardous waste management facilities at the facility. Furthermore, published geologic studies pertaining to the site area do not indicate the presence of Holocene faults within five miles of the site. A major earthquake of > 6.5M could still possibly generate ground shaking and potential liquefaction at the facility.

Ground shaking caused by the vibrations of passing seismic waves. The intensity is dependent on the location and magnitude of the earthquake and the geologic conditions of the site. The most recent publication on ground shaking in the Salt Lake Valley area is "Earthquake Scenario & Probabilistic Ground Shaking Maps for the Salt Lake City, Utah, Metropolitan Area", Utah Geological Survey, Miscellaneous Publication 02-5, 2002 (MP 02-5).

The MP 02-5 report presents hazard maps that show the frequency-dependent amplification of unconsolidated sediments in the Salt Lake Valley. In summary, locations along the bench areas near the Wasatch Fault will exhibit the highest peak accelerations, while the central portion of the valley will show lower peak accelerations due to damping. The site is situated on, what is termed in the report as, lacustrine alluvial gravels (Figure 2-5.23). This material, along with a shallowing of the sediments near the Oquirrh Mountains would cause an increase in ground shaking. The study estimates the peak horizontal ground acceleration (PGA) in the site area to be between 0.5g and 0.6g (Figure 2-5.24). This level of PGA is considered moderate to heavy, with slight damage to specially designed structures and considerable damage to ordinary buildings.

Long-term explosive storage building ES-1 is a large timber, wood framed structure. This building is surrounded and supported on three sides by earthen bunkers. The HS-1 buildings are wood-framed structures. RH-1 is a wood-framed quonset building. Evaluation by our facility engineering department indicates that because of the size, light ground loading, building construction, and where present, the support of earthen bunkers, these buildings should fare well should ground shaking from a Wasatch Fault earthquake occur.

Liquefaction occurs when water-saturated sandy soils are subjected to ground shaking and loss of bearing strength during an earthquake, generally of at least a magnitude of 5.0. The likelihood of liquefaction caused damage is greatest where the groundwater is shallow. Damage can be either subsidence in nature or induced ground/slope failure (landslides). The most recent publication on liquefaction in the Salt Lake Valley area is “Geologic Evaluation and Hazard Potential of Liquefaction-Induced Landslides along the Wasatch Front, Utah”, Utah Geological Survey, Special Study 104 (SS104). Liquefaction is not generally a life-threatening hazard. However, failures initiated by liquefaction can present a hazard to life as well as property. Thirteen liquefaction-induced landslides have been identified along the Wasatch Front (SS104). There are no published reports on subsidence or landslides along the eastern slopes of the Oquirrh Mountains.

Liquefaction generally occurs in areas of shallow groundwater (generally less than 30 ft deep) and loose sandy soils. Earthquake-induced liquefaction may cause four principal ground-failure types: 1) loss of bearing strength on relatively flat ground, 2) ground oscillation where the ground slope is less than 0.1 percent, 3) later-spread landslides where slopes range between 0.1 and 5.0 percent, and 4) flow failures where slopes exceed 5.0 percent (SS104). Only the first two failure types could possibly occur at the facility.

Groundwater depth across the facility varies. The groundwater level is about 140 ft below ground surface (bgs) for explosive storage buildings while the groundwater level is about 40 ft bgs at HS-1. The depth to groundwater is deep enough to mitigate potential vertical sand blows and lateral spreads that could cause settlement of the ground surface due to liquefaction. Therefore, liquefaction should not pose any serious risk to the waste storage units at the facility.

2.5.11 Floodplain Considerations

A copy of the portion of the FEMA Flood Insurance Rate Map for the area of the facility that includes HS-1, ES-1, ES-2, and the NIROP Burning Grounds is presented in Figure 2-5.18. None of the hazardous waste management areas on Plant 1 are located within or immediately adjacent to a 100-year floodplain (Zone A designation).

2.6 ACCESS CONTROL AND TRAFFIC

ATK-Bacchus can be accessed from 8400 West (Utah Highway 111) that passes through the plant and from 4100 South and 5400 South that are along the north and south plant boundaries. A railroad spur used by both ATK-Bacchus and Kennecott also accesses the plant.

ATK-Bacchus is secured by chain link and barbed wire fencing that surrounds the site. The perimeter fence has warning signs posted at about 500 ft intervals, at corners, and at each gate. The warning signs display the words "Danger Explosives, No Trespassing.” In addition, the operating HWMUs have warning signs to inform employees and discourage unauthorized access.

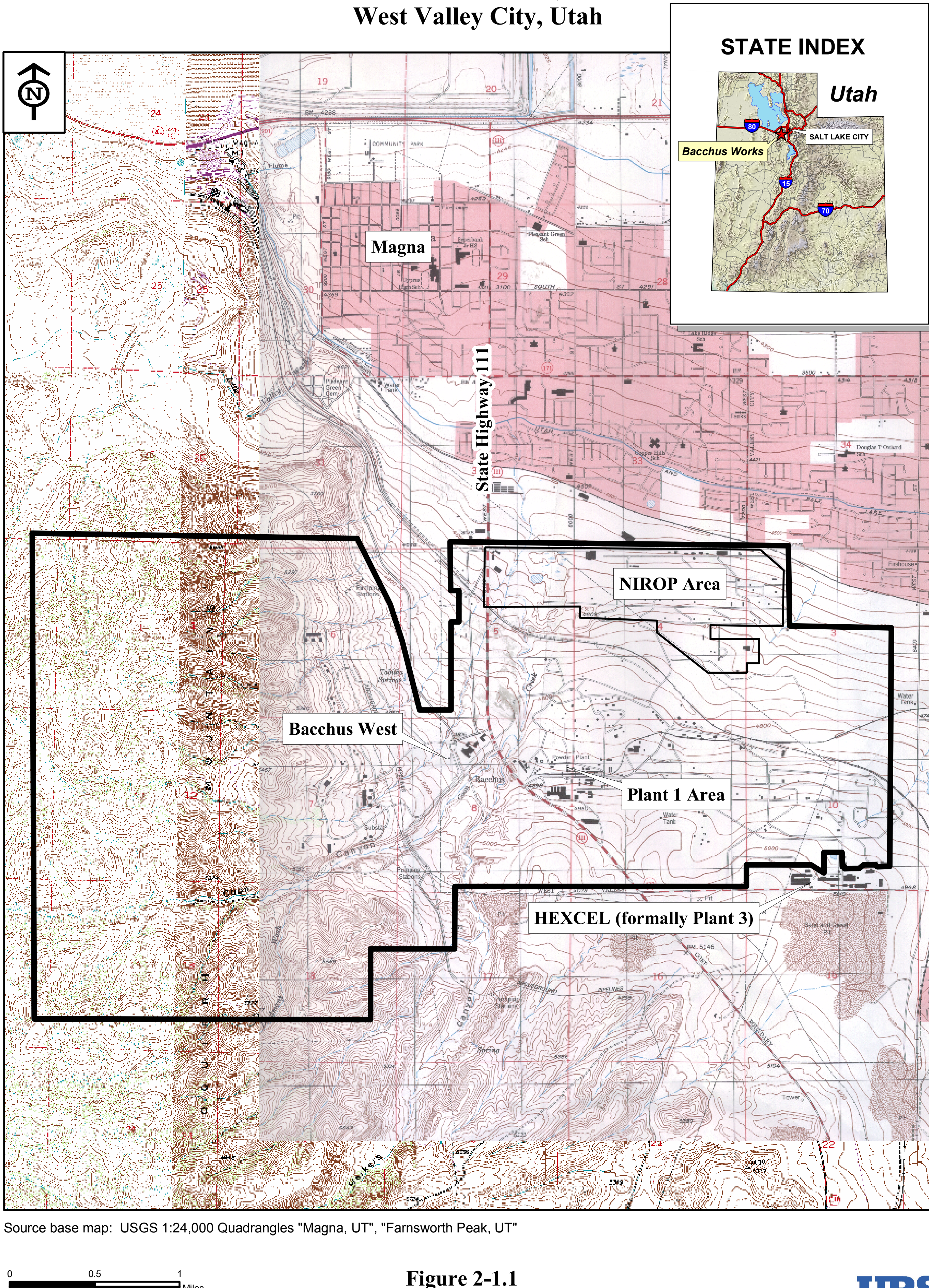
ATK-Bacchus has three primary access points - the Main, Bacchus West and NIROP gates. The Main and Bacchus West gates are manned during normal business hours, and the NIROP gate is manned on an as needed basis. All gates are locked or controlled by magnetic card readers when security personnel are not present. The site is also patrolled by security guards on a 24-hour basis.

Roads to the operating HWMUs are surfaced with asphalt or compacted road base. Minimum design loading criteria is based on 8,000 pounds per wheel (16,000 pounds per single axle and 32,000 pounds per tandem axle). Each operating HWMU has parking and maneuvering space to facilitate the unloading and loading of wastes.

2.7 SAFETY RESTRICTIONS

No unusual traffic patterns exist. Main, secondary, and other roads are controlled by stop signs. Speed limits are posted throughout the facility. Facility personnel operating motor vehicles must possess a valid Utah State driver's license. Forklift operators must pass additional classroom and operating exams for each individual forklift they are assigned to operate. Disciplinary action may be taken for any traffic violation.

ATK Thiokol
Bacchus Facility
West Valley City, Utah



Source base map: USGS 1:24,000 Quadrangles "Magna, UT", "Farnsworth Peak, UT"

Figure 2-1.1

URS

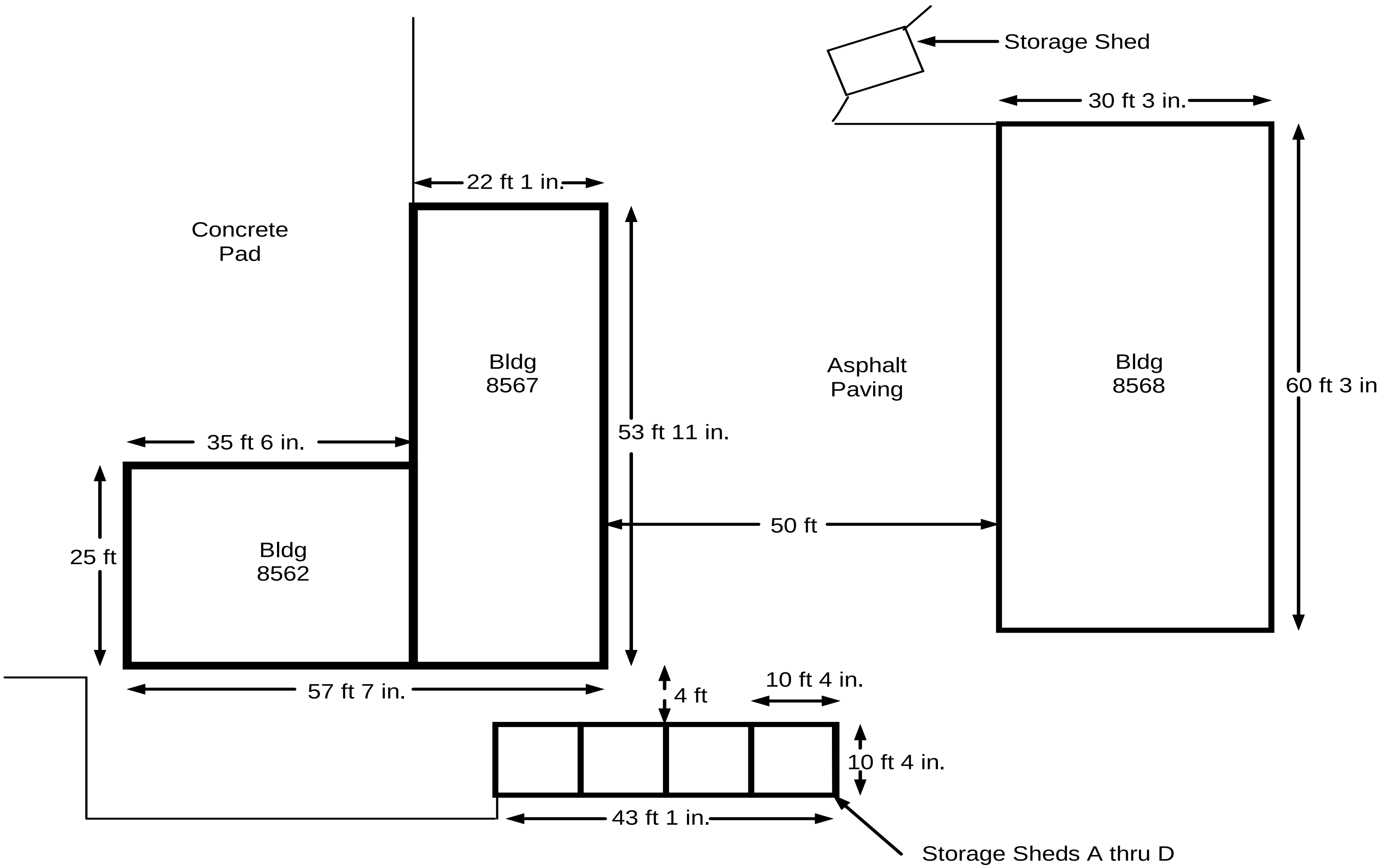


Figure 2-2.2
HS-1 Building Complex

Standard Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants[1]

This standard is issued under the fixed designation D 3912; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method establishes procedures for the evaluation of the chemical resistance of coatings used in light-water nuclear power plants.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 714 Test Method for Evaluating Degree of Blistering of Paints[2]

D 1193 Specification for Reagent Water[3]

D 5139 Specification for Sample Preparation for Qualification Testing of Coatings to be Used in Nuclear Power Plants[4]

2.2 *NACE Standard:*

NACE TM-01-74–91 Laboratory Methods for the Evaluation of Protective Coatings Used as Lining Materials in Immersion Service[5]

3. Significance and Use

3.1 The specific chemical resistance tests to be performed are dependent upon the relative severity of the service conditions. Fig. 1 lists some chemical solutions that may be applicable to nuclear power plants and may be considered for use in testing chemical resistance of coatings when applicable. Testing these, or other chemical solutions should not be construed as mandatory, but may be specified by the owner when desired.

3.2 The lining test may be used to evaluate the resistance characteristics of coating systems for lining surfaces of tanks, vessels and similar facilities used in a light-water nuclear power plant.

4. Sampling

4.1 Prepare individual specimens for testing in each of the pertinent solutions.

4.2 Prepare one additional specimen as a control. Multiple tests may be performed.

5. Preparation of Test Specimens

5.1 *Steel Panels*:

5.1.1 Prepare steel panels in accordance with Specification D 5139.

5.1.2 Use carbon steel panels in lining tests at least 7 by 7 by ¼ in. (178 by 178 by 6.4 mm) thick for Procedure A only.

5.2 *Concrete Blocks*—Prepare blocks in accordance with Specification D 5139 with the exception that the top and bottom ends of the block shall be coated.

6. Procedure

6.1 Test in accordance with NACE TM-01-74–91, Procedure B, Immersion Testing, except use Procedure A, One-Side Testing (cold wall) when a significant temperature differential is anticipated across the coating film as for tank linings.

6.2 *Lining Test*:

6.2.1 Immerse lining test specimens in the appropriate test solutions listed in Fig. 1 or as otherwise specified for a minimum of 180 days.

6.2.2 Maintain a temperature of 72 ± 5°F (22± 3°C) unless otherwise specified by the owner.

6.2.3 Use deionized water with an initial resistivity of not less than 2.5 mΩ/in. at 77°F (1 MΩ/cm at 25°C) and with a total solids of no more than 0.5 ppm, no more than 0.15 ppm of chloride or no more than 0.15 ppm of fluoride. Maintain the pH range from 6.0 to 8.0.

6.2.4 Change the deionized water daily during the first week and weekly thereafter. Measure any constituents leached out before the water is changed.

6.3 *Chemical Exposure Tests*:

6.3.1 Test the chemical resistance properties of the coatings by immersion in the appropriate test solutions with duration as required.

[1] This test method is under the jurisdiction of ASTM Committee D-33 on Protective Coating and Lining Work for Power Generation Facilities and is the direct responsibility of Subcommittee D33.02 on Service and Material Parameters.

Current edition approved Oct 10, 1995. Published December 1995. Originally published as D 3912 – 80. Last previous edition D 3912 – 80 (1989).

[2] *Annual Book of ASTM Standards*, Vol 06.01.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] *Annual Book of ASTM Standards*, Vol 06.02.

[5] Available from the National Association of Corrosion Engineers, P.O. Box 218340, Houston, TX 77218.

CHEMICAL-EXPOSURE TEST RESULTS

Specimen No. ____________ Date ________

Coating System: Primer ____________ DFT ____________

Intermediate ____________ DFT ____________

Finish ____________ DFT ____________

Batch Number(s) ________ Method of Application ____________

Temperature ________ °F, Relative Humidity ________ %, Curing Time ________ at ________ °F.

Surface Preparation ____________

Panel Substrate ____________

Chemical	Concentration, weight %	8 h	24 h	5 days
General Service:				
Hydrazine (NH_2NH_2)	5			
Sodium borate ($Na_2B_4O_7 \cdot 10H_2O$)	5			
Deionized water				
Boric acid	5			
Sulfuric acid	5			
Decontamination Solutions:				
Hydrogen peroxide (H_2O_2)	1.03			
Trisodium phosphate ($Na_3PO_4 \cdot 12H_2O$)	11.5			

FIG. 1 Sample Form

6.3.2 Maintain a temperature of 72 ± 5°F (22 to 3°C) unless the service conditions require a higher temperature.

6.3.3 Use reagent grade chemicals and water conforming to Specification D 1193, Type III, for all solutions.

7. Examination and Evaluation

7.1 *Lining Test*:

7.1.1 Examine the test specimens weekly for the first month and then monthly thereafter.

7.1.2 Inspect specimens immediately upon completion of the test period. Make a final inspection not later than 24 h after removal from the test solution.

7.1.3 Evaluate the test specimens at each inspection for peeling, delamination, blistering (Test Method D 714), discoloration, and softening.

7.2 *Chemical Exposure Tests*:

7.2.1 Examine the test specimens at the end of the test period or every 24 h, whichever is the shorter time.

7.2.2 Evaluate the condition of the specimens within 1 h after removal from the test solutions.

7.2.3 Evaluate the test specimens at each inspection as in 7.1.3.

8. Documentation and Report

8.1 Report all procedures and conditions relating to the test specimen preparation.

8.2 Document the testing procedure and test results. A suggested format is illustrated by Fig. 1.

9. Precision and Bias

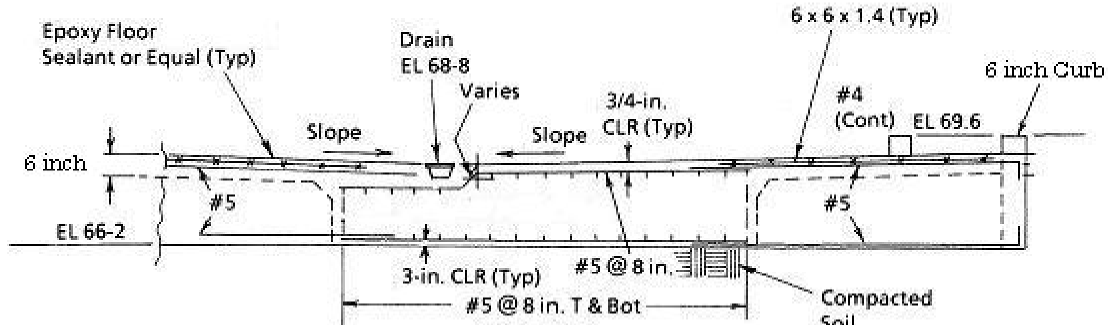
9.1 These tests are qualitative in nature. Precision and bias are not definable.

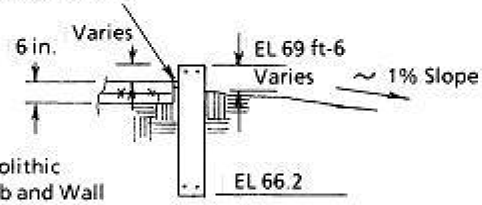
10. Keywords

10.1 chemical resistance; coatings and linings; nuclear

Figure 2-2.3
Floor Sealer Test Method

Figure 2-2.3
Floor Sealer Test Method





Section H-H (Typ of Curbing Construction)

Not To Scale

Figure 2-2.5
Bldg 8562 Floor Details

Bldg. 8567 - 89 drums (4,900 gal)

Bldg. 8562 - 22 drums (1,200 gal)

Total - 111 drums (6,100 gal)

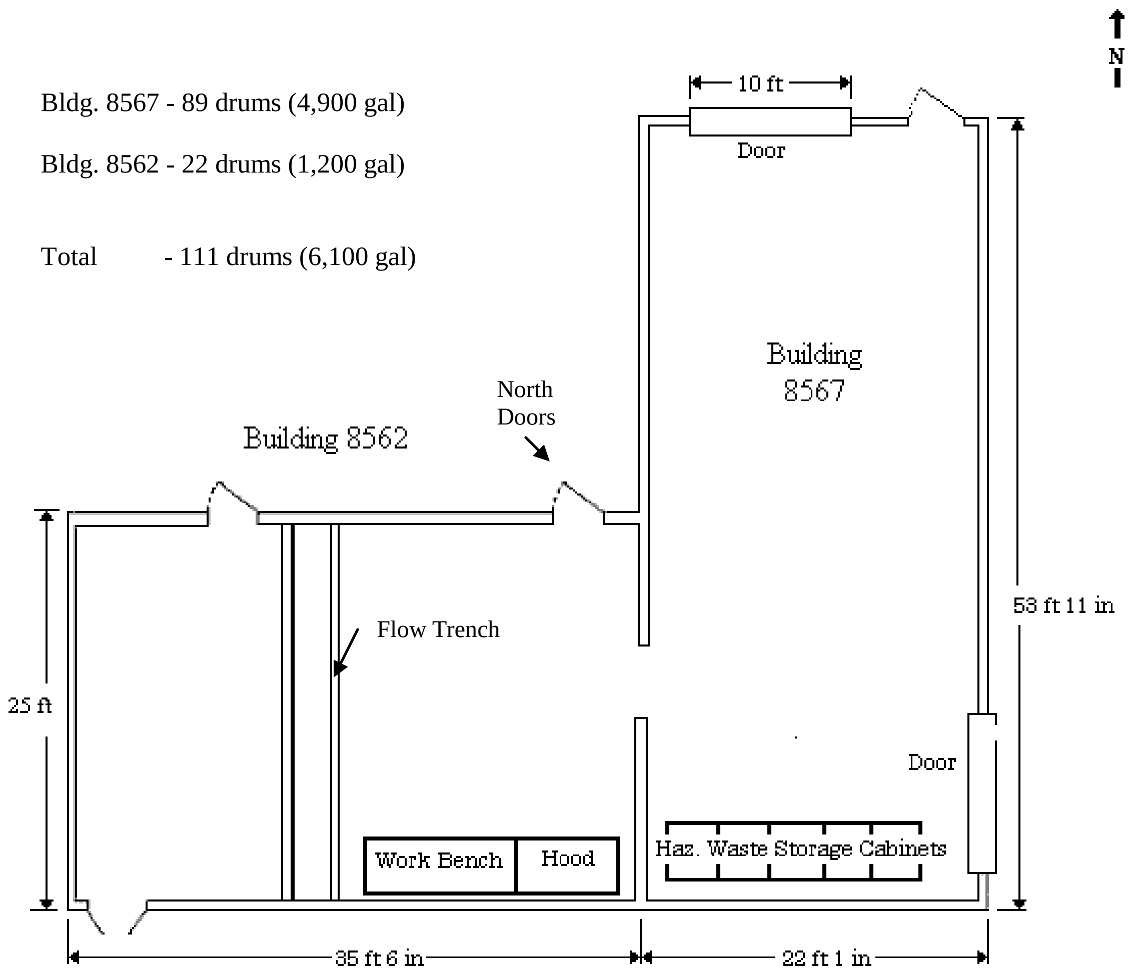


Figure 2-2.4
Bldg. 8562 and 8567 Drum Storage

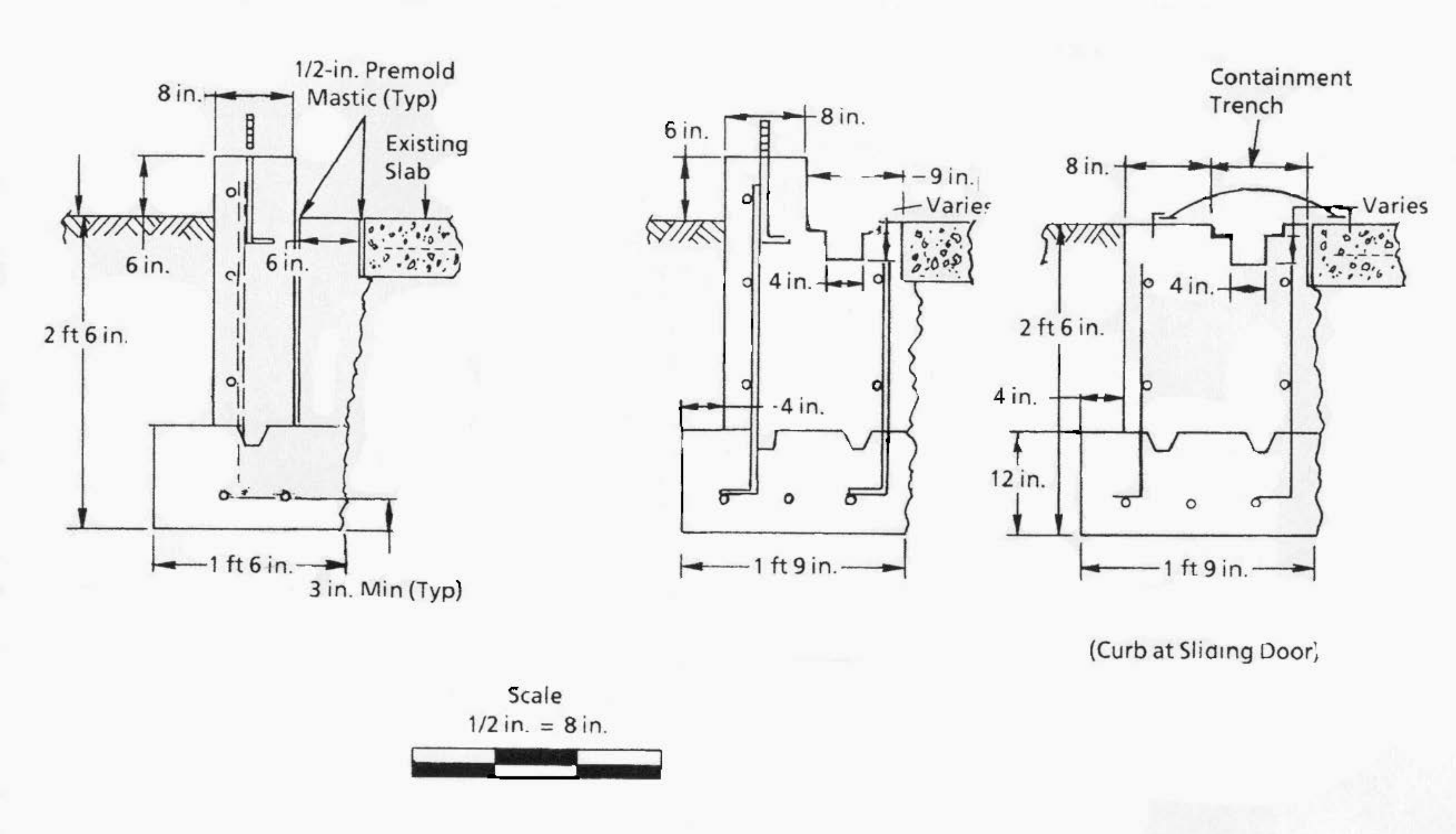


Figure 2-2.6
Bldg 8567 Floor/Curbing

Figure 2-2.7
Bldg 8568 Hazardous Waste Storage Building

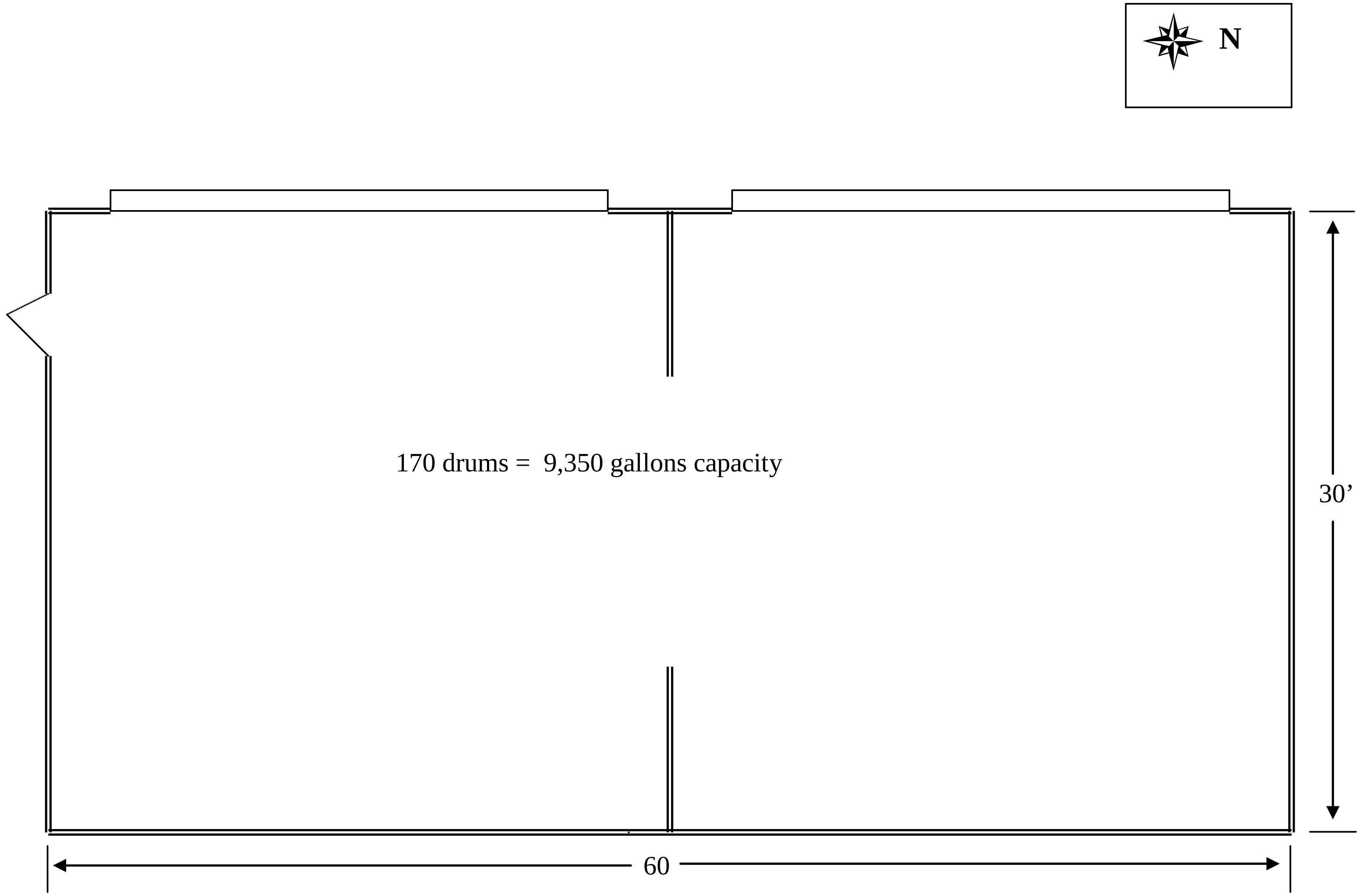
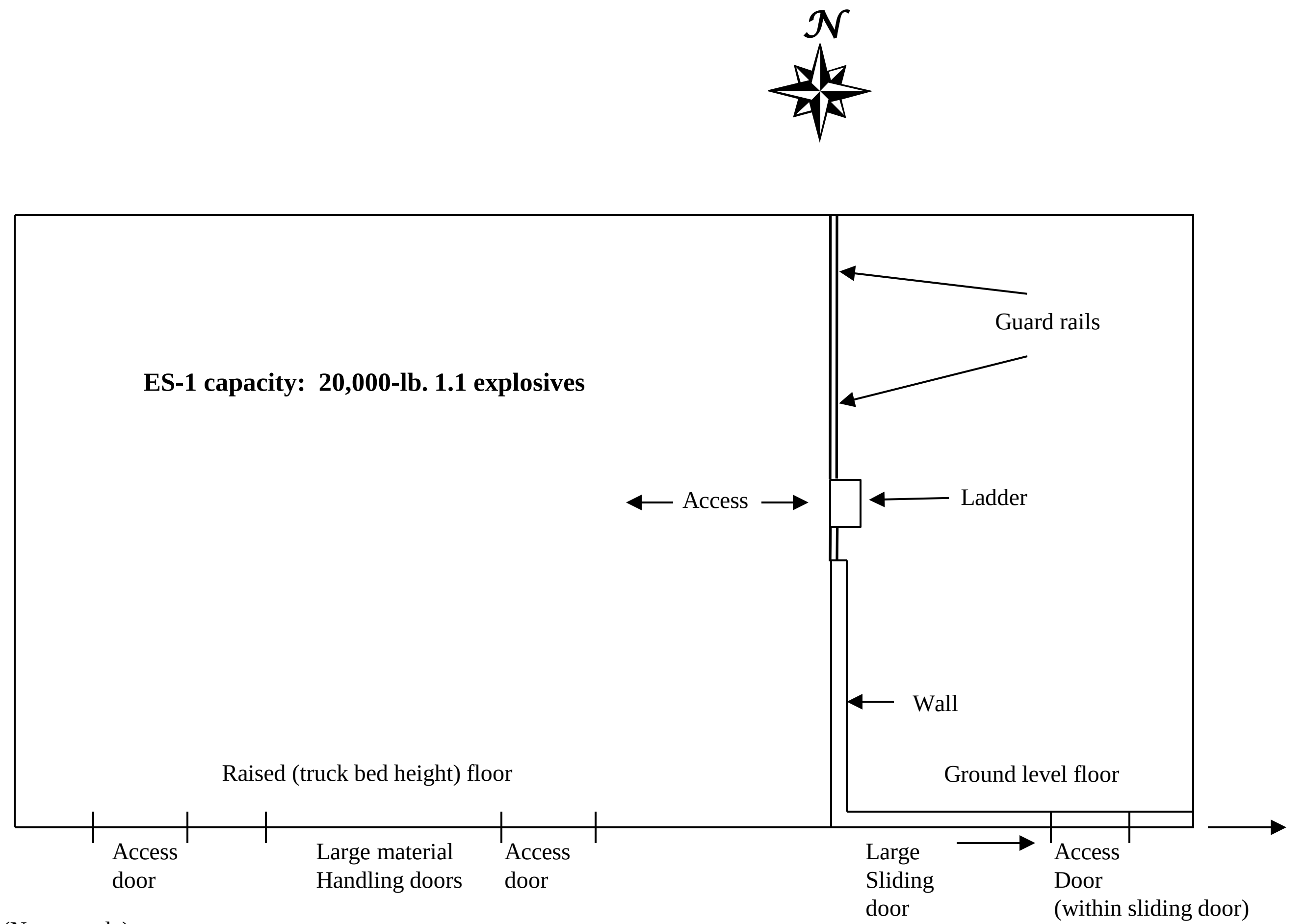


Figure 2-2.8
Bldg 8568 Maximum Drum Storage

Figure 2-2.9
ES-1 Explosives Storage Building



(Not to scale)

Figure 2-2.10
ES-1 Floor Plan (revised 2/14/2011)

Figure 2-2.11
Segment Storage Pad

Figure 2-2.12
Resthouse 1 Photo

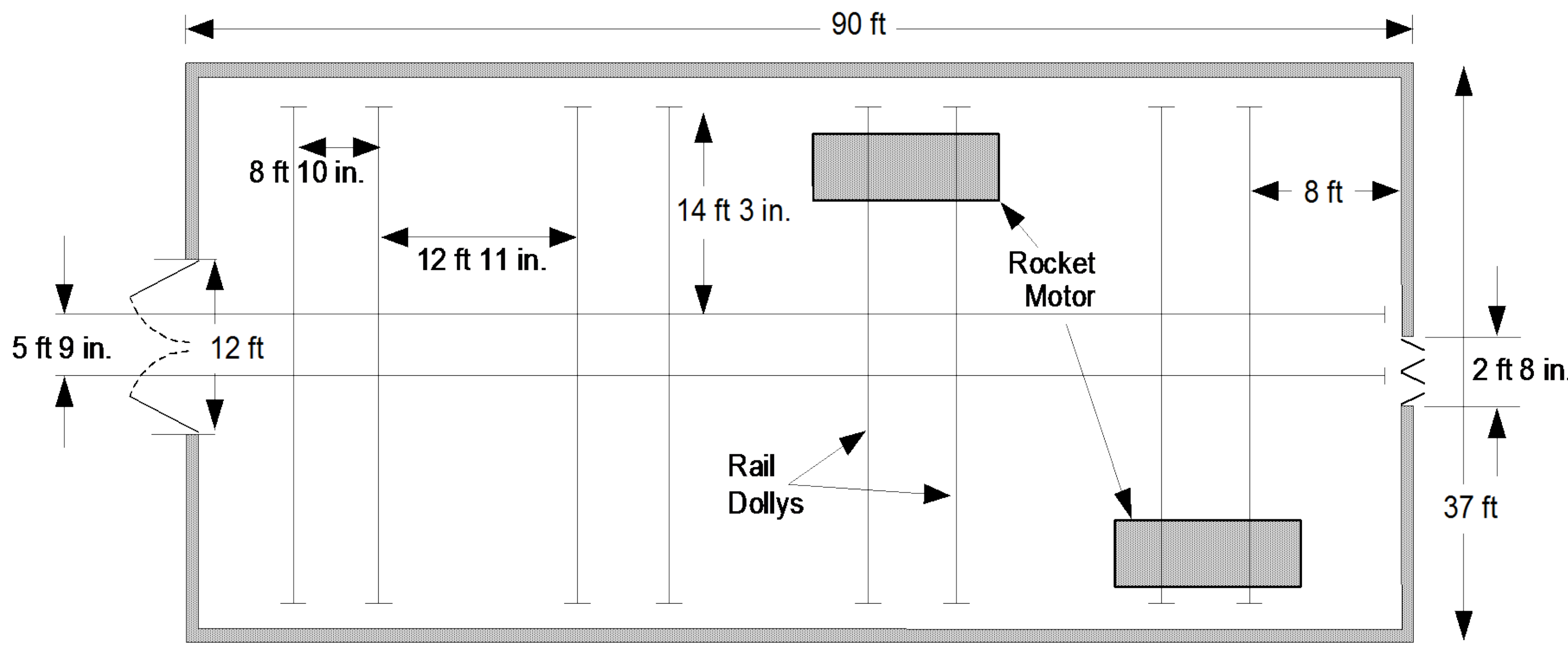


Figure 2-2.13
Floor Plan Schematic, Rest House 1

Figure 2-2.14
Resthouse 1 Interior

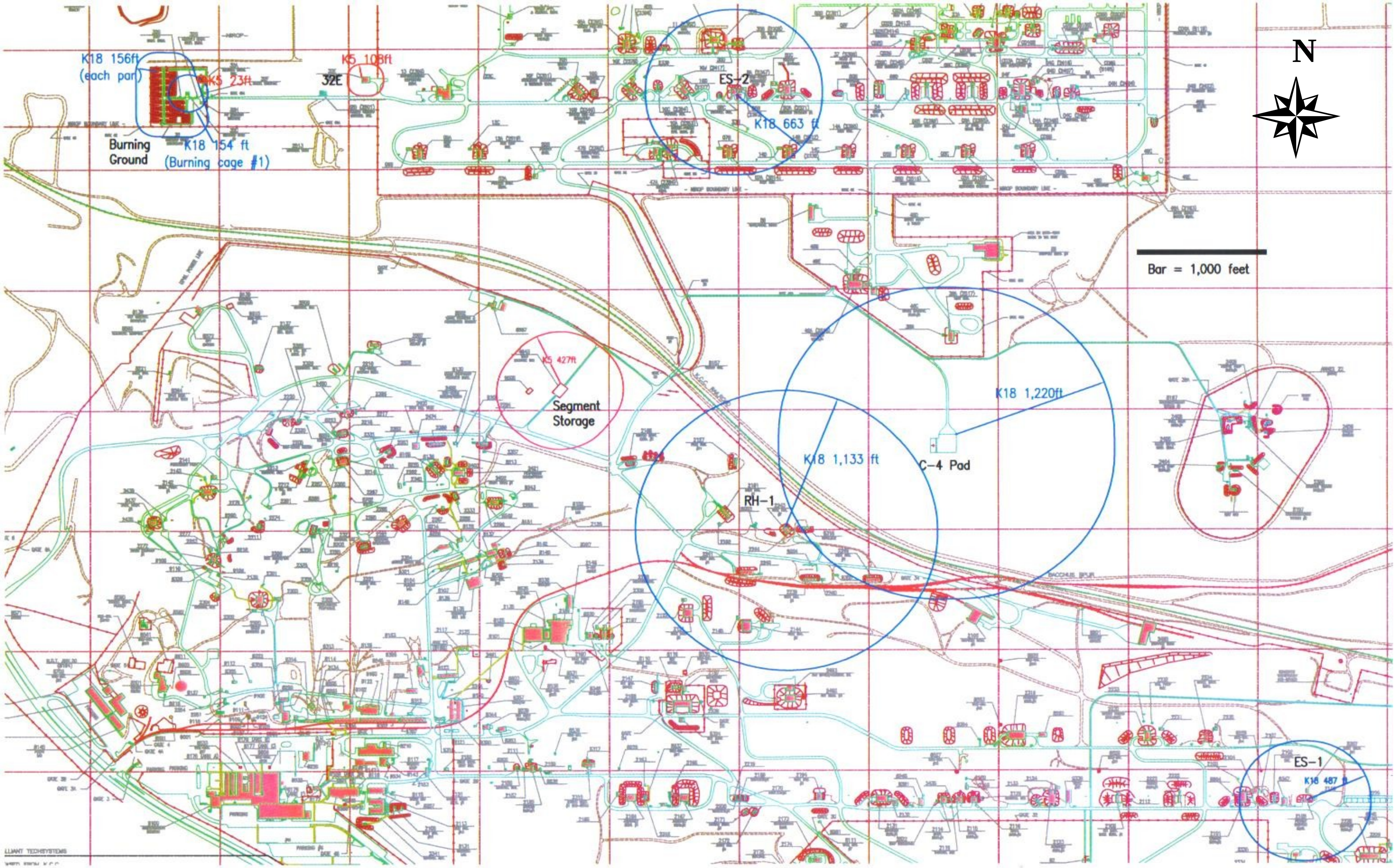


Figure 2-3.15
Quantity/Distance Map

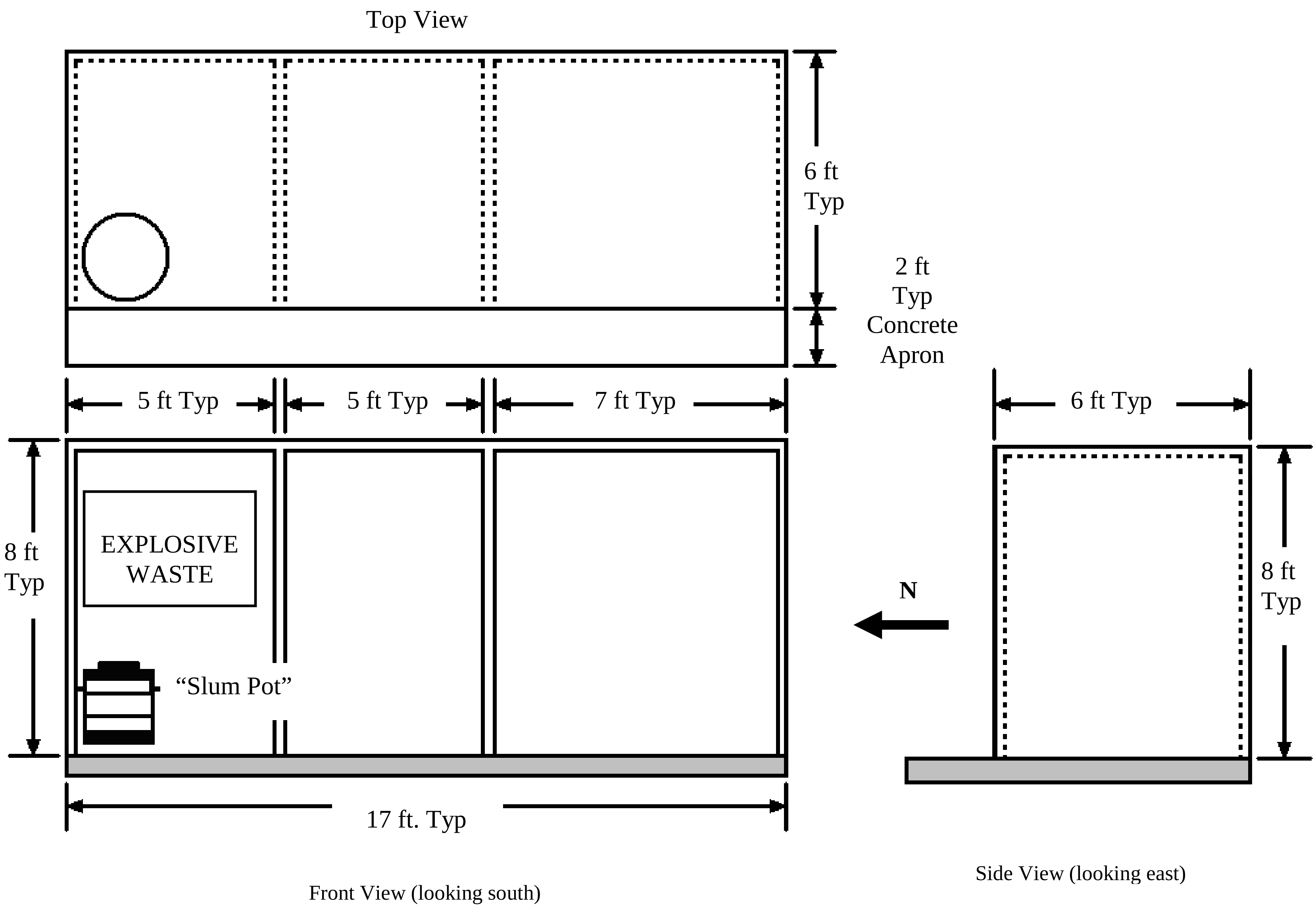


Figure 2-4.16
Hazardous Waste Collection (SLUM) Shed

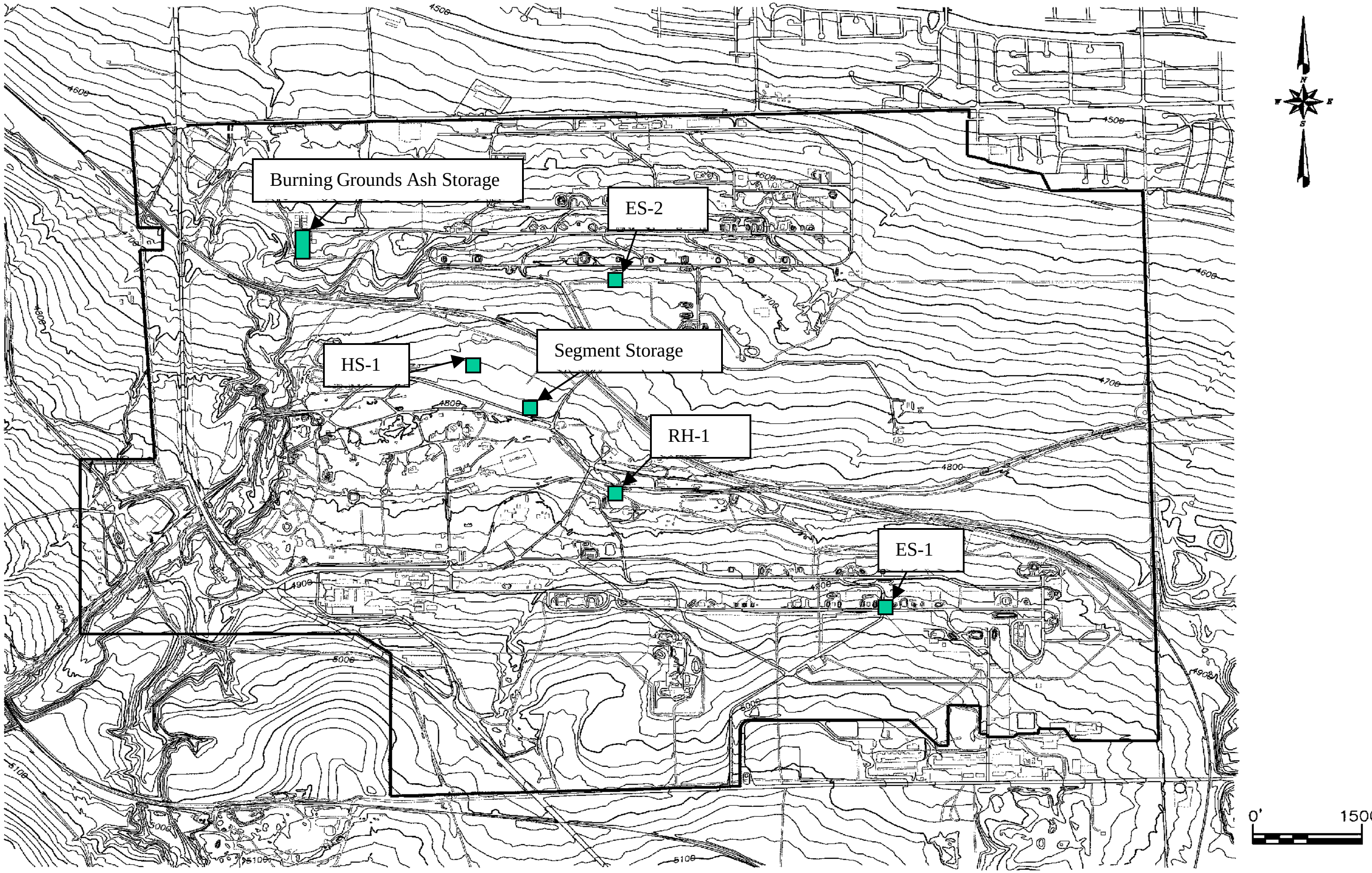
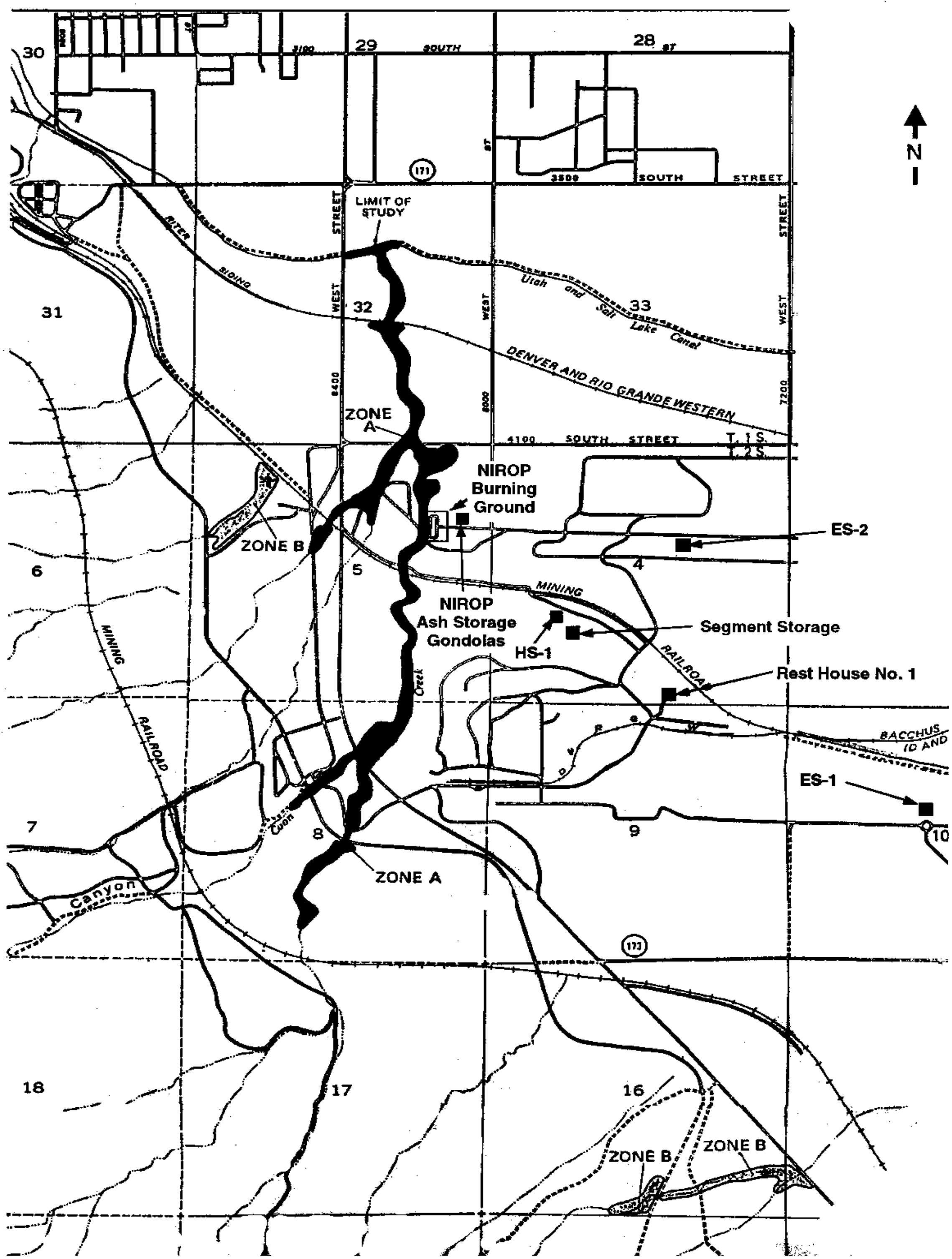


Figure 2-5.17

ATK-Bacchus Topographic Map



© Federal Emergency Management Agency (FEMA), September 21, 2001

Figure 2-5.18
Granger Area FEMA Flood Plain

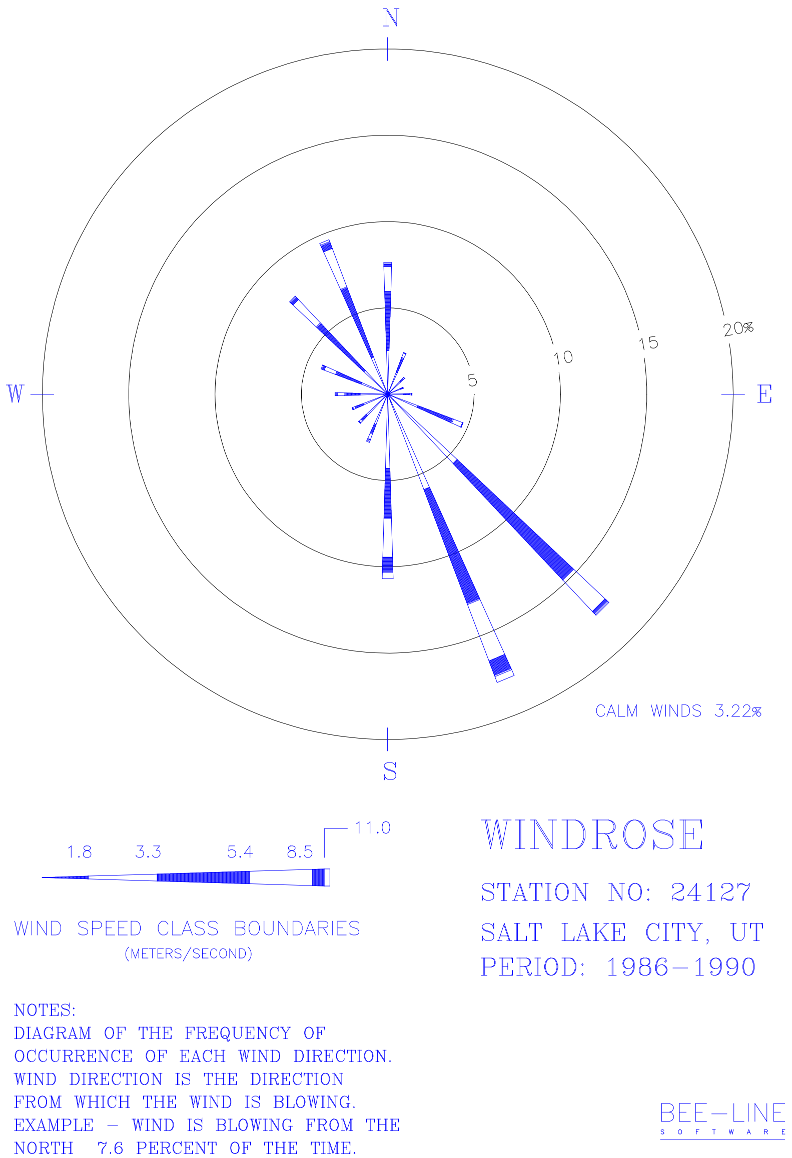


Figure 2-5.19
Salt Lake City Area Windrose

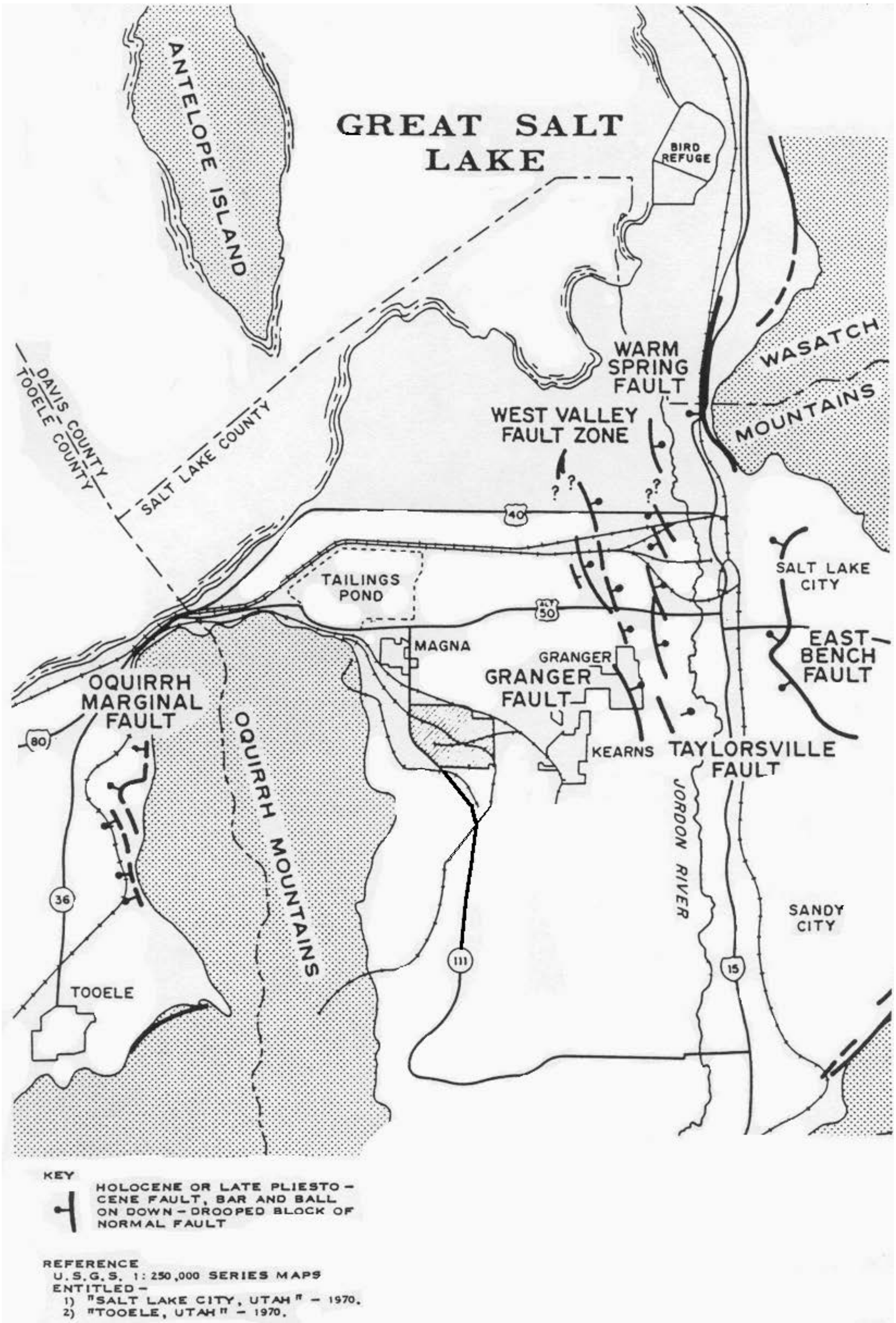


Figure 2-5.20
Salt Lake City Area Geologic Faults

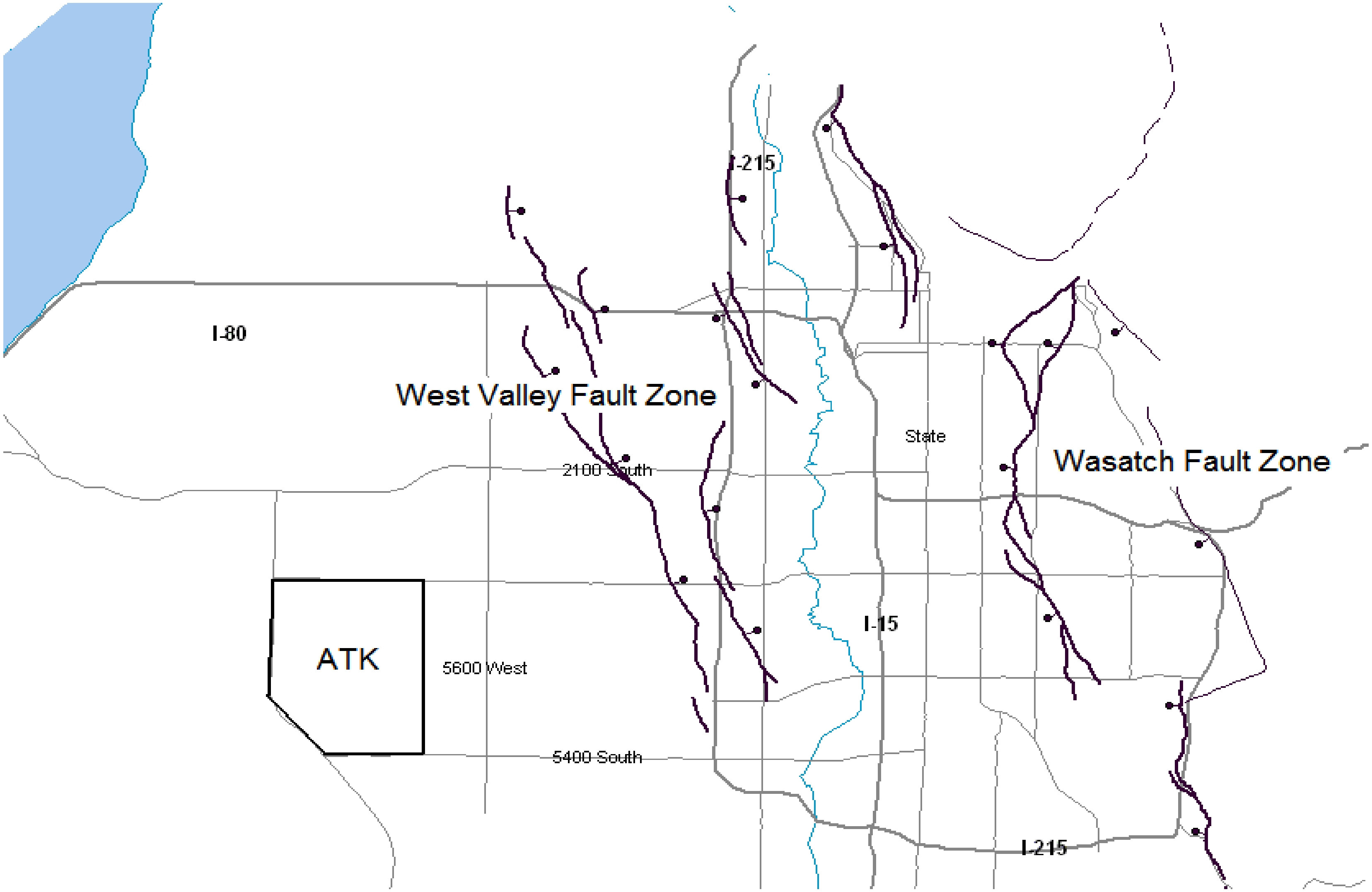


Figure 2-5.21
Faults in the Salt Lake Valley

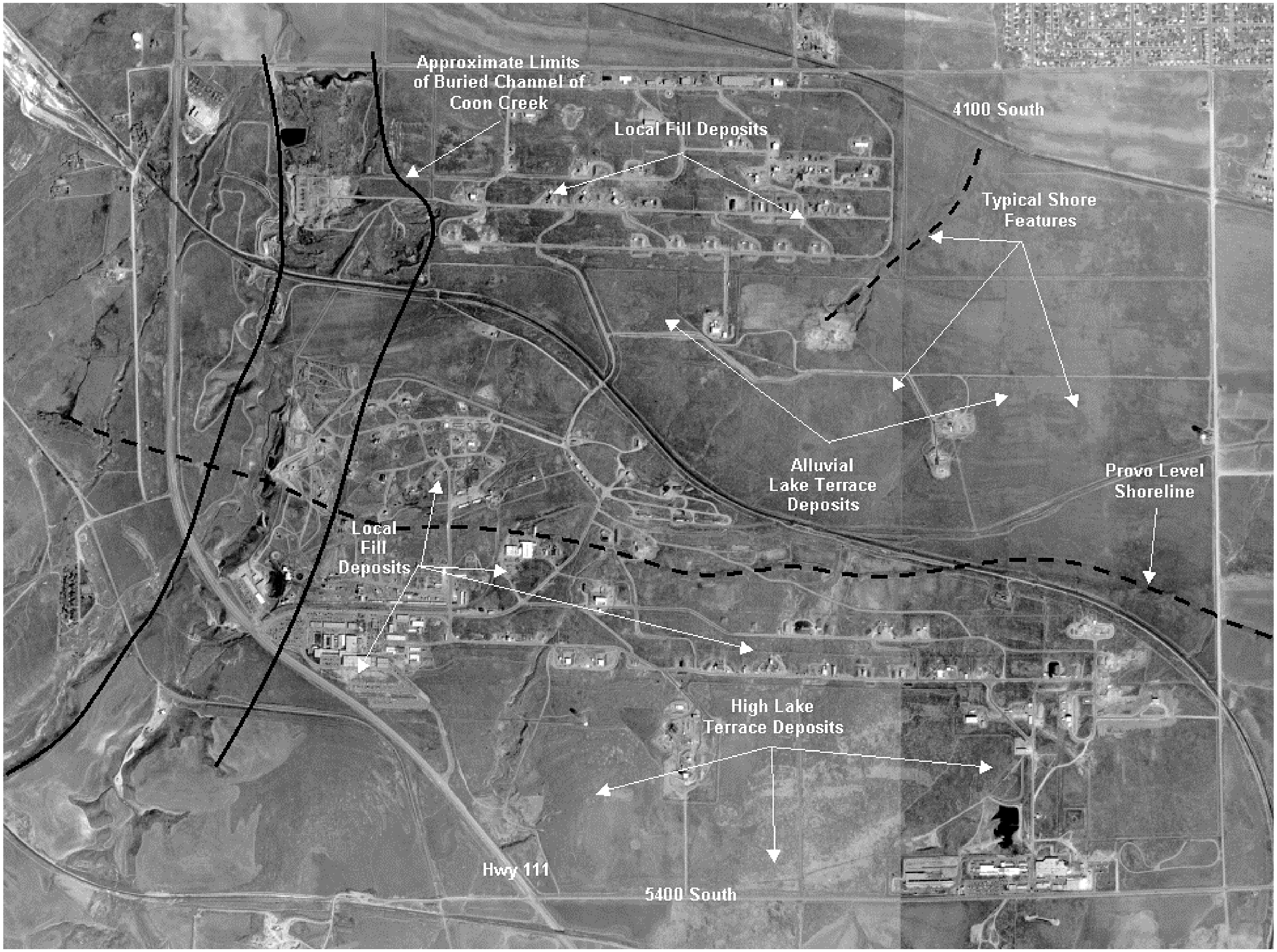


Figure 2-5.22
Bacchus Area Geologic Features

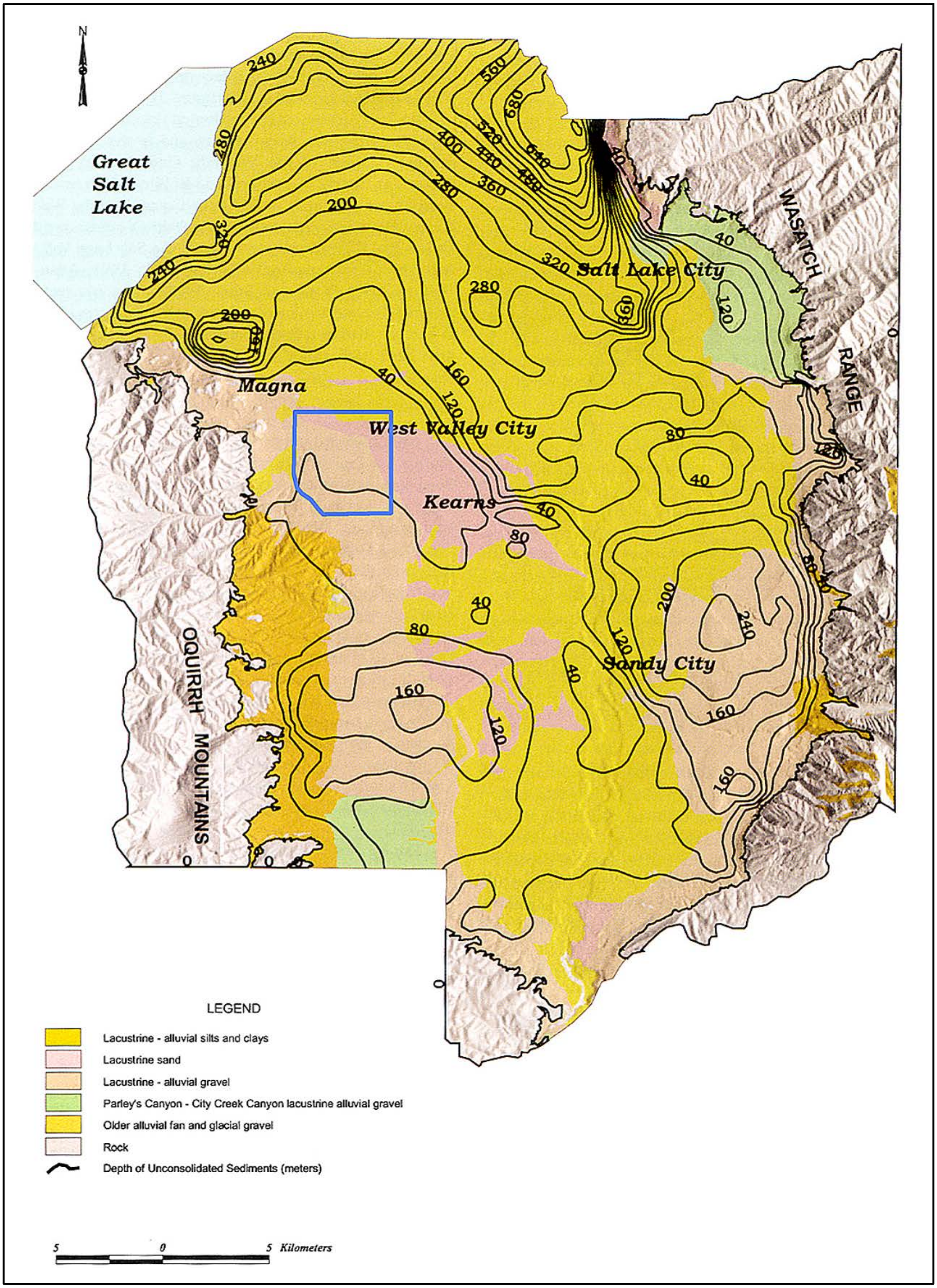


Figure 2-5.23
Site-response Units and Depth of Quaternary Valley Fill.
UGS MP 02-5, 2002

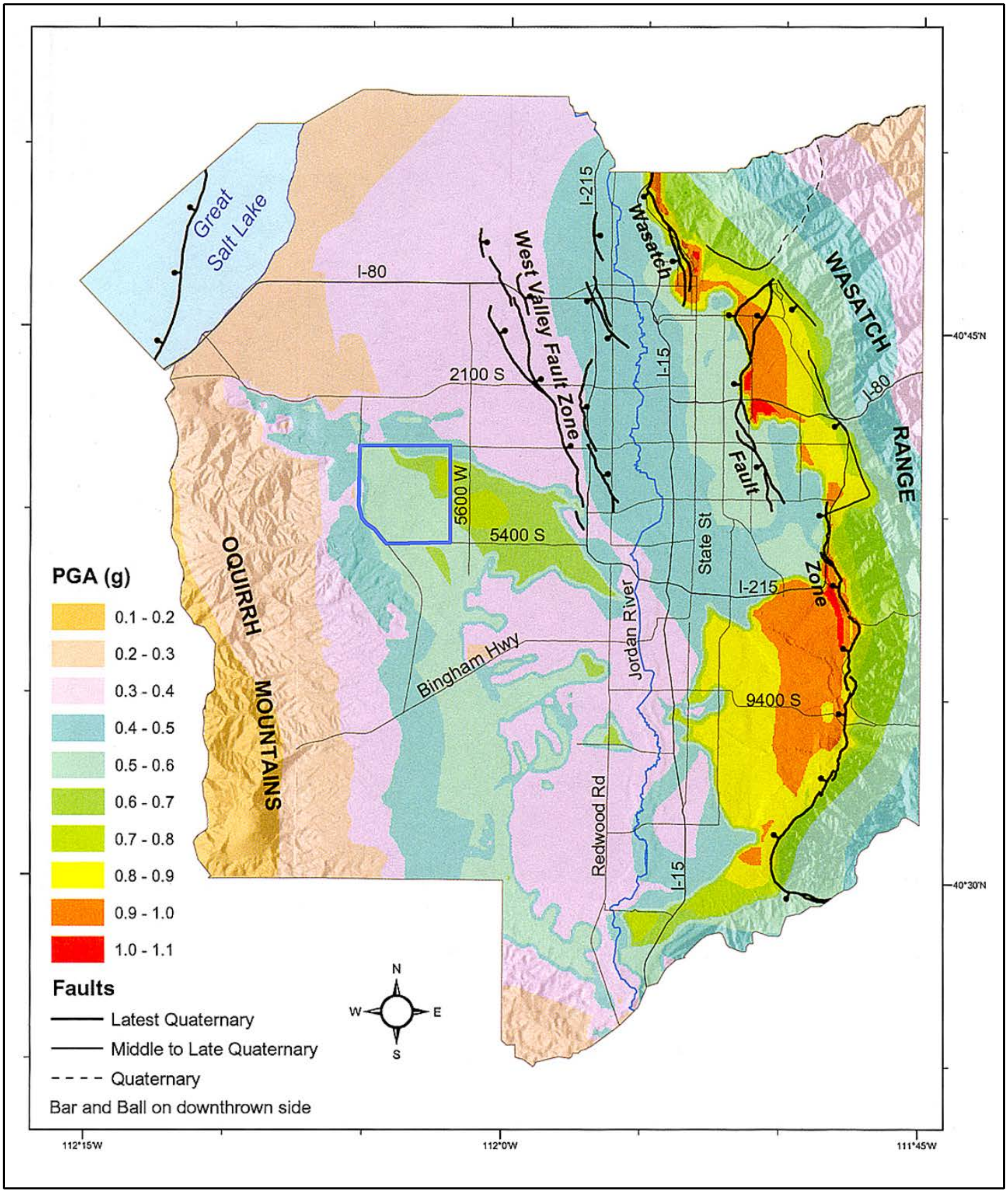


Figure 2-5.24
Salt Lake City Segment, Wasatch Fault M 7.0 Earthquake, Peak Horizontal Acceleration (g) at Ground Surface
UGS MP 02-5, 2002