

**Class IIIb Landfill
Permit Application**
Pacific States Cast Iron Pipe Co.

Submitted to:
Utah Division of Solid and Hazardous Waste
Department of Environmental Quality
288 North 1460 West
PO Box 144880
Salt Lake City, Utah 84114-4880

Prepared by:

*Pacific States
Cast Iron Pipe Co.*
Division of McWane Inc.



and

HAND DELIVERED

October 2008

OCT 30 2008



**UTAH DIVISION OF
SOLID & HAZARDOUS WASTE**
2008.03394

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1.0

GENERAL INFORMATION

Pacific States Cast Iron Pipe Co. (PSCIPCO) proposes to permit their existing Class IIIb Industrial Waste Landfill located in Provo, Utah. The information provided in this Class IIIb Landfill Permit Application serves to satisfy the requirements of Utah Administrative Code (UAC) R315-304, which became effective on July 15, 1999 for facilities that receive waste exclusively from on-site sources. The proposed Landfill will be designed, constructed, and operated in accordance with all Federal and State laws and regulations applicable to the management and operation of Landfill sites. This includes, but is not limited to, Subtitle D of the Federal Resource Conservation and Recovery Act and the Rules of the Utah Solid and Hazardous Waste Act.

1.1

NAME OF FACILITY

Pacific States Cast Iron Pipe Co. Class IIIb Landfill.

1.2

SITE LOCATION

The Landfill is located in the northeast quarter of Section 20, R3E, T7S, SLB&M.

1.3

FACILITY OWNER

Name	Pacific States Cast Iron Pipe Co.
Address	2550 S. Industrial Parkway P.O. Box 1219 Provo, Utah 84603
Phone/Fax	(801) 373-6910/(801) 377-8104

1.4

FACILITY OPERATOR

Pacific States Cast Iron Pipe Co.

1.5

CONTACT PERSON

Name David Georgeson
Title Environmental Manager
Address 2550 S. Industrial Parkway
P.O. Box 1219
Provo, Utah 84603
Phone/Fax (801) 373-6910/(801) 377-8104

1.6

TYPE OF APPLICATION

Existing Class IIIb Landfill.

1.7

PROPERTY OWNERSHIP

The PSCIPCO Class IIIb Landfill property is currently owned by the applicant, PSCIPCO of Provo, Utah (Proof of ownership is provided in Attachment 1).

1.8

CERTIFICATION OF SUBMITTED INFORMATION

JOHN BALIAN
(Name of Official)

VP/GM
(Title)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature: [Signature]

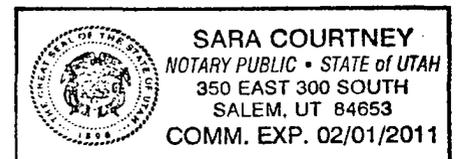
Date: 10/28/2008

SUBSCRIBED AND SWORN to before This 28th day of October, 2008.

My commission expires on the 1st day of Feb, 2011.

Sara Courtney
Notary Public in and for

(SEAL) Utah County, Utah



2.0 INTRODUCTION

2.1 GENERAL FACILITY DESCRIPTION

Pacific States Cast Iron Pipe Co. (PSCIPCO) proposes to continue operation of an existing Class IIIb Industrial Waste Landfill facility to provide for existing and future industrial solid waste disposal associated with its Provo, Utah plant operations. The existing PSCIPCO Landfill is located on PSCIPCO property and serves as the sole disposal area for the majority of the industrial waste generated on-site. The PSCIPCO facility manufactures ductile iron pipe for sale and distribution. In general, the facility receives scrap iron via railcar and truck semi-trailer and processes the scrap material to produce ductile cast iron pipe. Once formed, the cast iron pipe is lined with concrete to improve flow characteristics and to protect against corrosion.

2.2 LEGAL DESCRIPTION

The Landfill is located on two parcels of PSCIPCO's property. The tax identification numbers (i.e. serial numbers) and descriptions follow:

- PARCEL # 22-046-0048; Total Acres: 59.36; Legal Description: Com S 0.01 FT FR SW COR. SEC. 17, T7S, R3E, SLB&M.; N 89 DEG 39'7"E 898.92 FT; and
- PARCEL # 23-001-0109; Total Acres: 62.74; Legal Description: Com S 234.93 FT & E 1531.49 FT FR SW COR. SEC. 17, T7S, R3E, SLB&M.; S 88 DEG.

The total area of the PSCIPCO property is 128.39 acres. The active Landfill (Phase I and Phase II) covers an area of approximately 9.7 acres on the northeast portion of the property. An aerial photo is provided as Figure 1. A Vicinity Map and Facility Site Map are provided as Figures 2 and 3, respectively. PSCIPCO intends to expand the Landfill in the future towards the south (referenced as Phase III). Additional information associated with the future design and expansion of Phase III will be submitted at a later date. Future submittal of this information should in no way delay UDEQ review and approval of this application. A topographic map of the Landfill is provided as Figure 4.

2.3

TYPES OF WASTE

Class III Landfills, as stated in the Utah Administrative Code, R315-304-3, "*are industrial solid waste Landfills that are not open to the general public and may accept any non-hazardous industrial solid waste.*" Class IIIb Landfills may not accept: "*...waste that is exempt from hazardous waste regulations under Section R315-2-4, excluding Subsections R315-2-4(b)(3), (4), (5), (7), and (14); or accept conditionally exempt small quantity generator hazardous waste as defined by section R315-2-5.*"

2.4

NON-COMMERCIAL LANDFILL

The PSCIPCO Class IIIb Landfill is currently used for the disposal of approximately 20 waste streams generated at the PSCIPCO facility. The waste streams are further described in Section 3, Plan of Operation.

PSCIPCO will not include janitorial wastes such as bathroom and lunchroom wastes in the materials disposed at the Landfill. These waste streams will be shipped off site to reduce the potential impact of disease vectors at the Landfill.

PSCIPCO will test all potentially questionable wastes such as sludge from closure of settling ponds, non-RCRA occasional remedial waste, waste oil absorbents and petroleum contaminated soils to document that these wastes are not RCRA characteristic hazardous wastes.

The PSCIPCO Class IIIb Landfill serves only the PSCIPCO facility.

3.0 *PLAN OF OPERATION*

The purpose of the Plan of Operation (Plan) is to provide an accurate description of the daily operations of the PSCIPCO Class IIIb Landfill while allowing for modifications that may be required to address minor operational changes.

3.1 *SCHEDULE OF CONSTRUCTION*

The Landfill is an existing Class IIIb Landfill, and as such, has been receiving waste since prior to 1999. No construction is required to prepare the Landfill for receiving waste; therefore, a construction schedule has not been developed for this application and is not considered necessary. No construction is currently planned for the additional Landfill phase.

3.2 *ON-SITE SOLID WASTE HANDLING PROCEDURES*

Daily operation of the Landfill is under the direction of the PSCIPCO Environmental Manager. When the Environmental Manager is absent, the Environmental Manager will designate an appropriate representative to oversee operation of the Landfill.

Industrial process waste is disposed within the active phase of the eastern portion of the Landfill (Phase I). Sludge or wastes with high moisture content are spread out and allowed to dry. Hot wastes, such as slag, are separated to allow for adequate cooling prior to covering. All remaining process wastes are placed within Phase I. All waste loads are recorded on the Landfill Log, including the type/source and volume of waste, a copy of which is included as Attachment 2.

The Landfill receives on-site industrial process wastes utilizing a berm and fill method within the eastern (Phase I) portion of the Landfill. As a lift is completed, the next lift is constructed by excavating interior material and forming a three-sided berm around the perimeter of the area. Waste is then placed within bermed area. As each lift begins to reach the desired elevation, the next lift is constructed. This method of construction will continue throughout the permit term of the Landfill. The Landfill is currently disposing of waste as shown on Figure 4: Landfill Topographic Map.

Packaging/shipping debris waste (i.e., wooden pallets, etc.) generated on-site was previously disposed in a similar manner on the western half (Phase II) of the Landfill; however, the packaging/shipping debris waste

was disposed of in a three-sided area. The Phase II area has been cleared of packing waste to allow for future disposal of process waste following completion of Phase I.

As subsequent lifts are placed above the current lift, the side slope of the Landfill will be constructed with a 1.5H:1V to 2H:1V (horizontal: vertical) ratio in accordance with the existing slopes and the slope stability analysis completed by ERM. The findings of the slope stability analysis are summarized in Attachment 3. An access road sloping at an average 5% grade will continue along the perimeter. Approximately 20,000 to 25,000 tons of waste annually will be placed in the Landfill until the design height is reached, as shown on Figure 5.

In order to increase the Landfill capacity for industrial waste disposal, PSCIPCO intends to modify the Phase II area for exclusive disposal of process waste. Due to the high density of the industrial waste materials, PSCIPCO expects placement of the industrial waste to maximize settlement and compaction of the Phase II area during the operating life. Industrial wastes will be placed into the Phase II area in the same manner that waste is currently placed in the Phase I area. Disposal will continue in Phase II until the waste reaches the design height as shown on Figure 5, which also shows the finish profile for the final grade upon completion of Phase II.

3.3

INSPECTIONS AND MAINTENANCE

PSCIPCO personnel will inspect the Landfill facility to prevent malfunctions and deterioration, possible operator errors, and potential discharges that may cause or lead to the release of the wastes to the environment, or pose a threat to human health. Inspection personnel will keep an electronic or hard copy Inspection Form to include the date and time of the inspection, the printed name and handwritten signature of the inspector, a notation of observations made, and the date and nature of any repairs or corrective action. The log will be kept at the PSCIPCO facility for at least three years from the date of inspection. The inspection schedule is provided below in Table 3-1. An example copy of the Weekly Routine Landfill Inspection Log is provided in Attachment 2.

Table 3-1 Inspection and Monitoring Schedule

Inspection/ Monitoring Activity	Frequency
Access Road Condition and Maintenance	Weekly During Operation, as Needed
Waste Disposal Area Development	Weekly During Operation (at least one of the weekly inspections will be conducted by the Environmental Manager or a designated representative each month)
Drainage Channels Condition	Weekly in conjunction with Stormwater Inspections
Post-Closure Final Cover Inspection	Weekly in conjunction with Stormwater Inspections
Fence Inspection and Maintenance	Quarterly

3.4 CONTINGENCY PLAN

This Contingency Plan is provided to minimize potential hazards to human health and the environment in the event of a fire or explosion, or any unplanned sudden or non-sudden discharge to air, soil, or ground water. The provisions of the Contingency Plan shall be carried out immediately when there is an emergency situation or release, which could threaten human health or the environment.

Emergency evacuation of the site will not be necessary given the nature of the waste materials stored at the site. The probability of fire, explosion, or toxic vapor generation from an emergency incident is considered minimal.

The only possibility of a fire would be in areas where hot slag is disposed within the active disposal areas of Phase I and II. The possibility of fire is minimized through proper disposal techniques, including separation of waste slag from potentially combustible material (i.e., wood or paper materials).

The primary means of fire control will be the exclusion or isolation of loads with elevated temperatures. In the event that a fire occurs during operating hours, the burning material will be separated from other material and covered with soil, using on-site equipment. Small fires may be extinguished using a water truck, sprinklers, or fire extinguishers present in on-site vehicles. PSCIPCO currently has an on-site water truck and has installed sprinklers for dust control located along a portion of the Landfill perimeter.

Upon notification of an on-site fire which is not controllable with on-site fire protection equipment, radio type communications will be used to notify employees. Employees will follow PSCIPCO's Employee Emergency Plan and the Fire Prevention Plan.

3.5

FUGITIVE DUST

Dust control is necessary at the Landfill due to the types of wastes disposed, periodic Landfill traffic, and the potential for wind dispersion. The PSCIPCO Landfill currently utilizes two methods to minimize fugitive dust. Primary dust control is accomplished with a water truck. Periodically, the water truck wets down the existing access road and turn around area. Secondary dust control consists of a sprinkler system surrounding some of the perimeter of the first lift. Dry wastes or soils producing dust will be wetted once prior to starting work each day, if necessary, and whenever fugitive dust emissions are visible.

3.6

MAINTENANCE OF INSTALLED EQUIPMENT

No equipment is installed at the Landfill, consequently no maintenance schedule is provided here.

3.7

PROCEDURES FOR EXCLUDING REGULATED WASTES

All wastes disposed of at the Landfill are generated through on-site sources. Therefore, PSCIPCO controls which wastes are disposed on-site and which wastes are transported off-site. All municipal wastes, packing waste, waste oil, antifreeze, parts wash, etc., are transported off-site for disposal. The purpose of the Class IIIb Landfill is solely for disposal of on-site, non-hazardous, industrial wastes. By definition, a Class IIIb Landfill can only dispose of non-hazardous industrial solid waste, or specific wastes that are exempt from hazardous waste regulations under Utah R315-2-4 (Exclusions). Included within exempt wastes allowed are fly ash waste, bottom ash waste, slag waste and flue gas emission control waste, generated primarily from the combustion of coal or other fossil fuels. The Landfill is required to exclude regulated hazardous wastes containing PCBs.

The Landfill is currently used for disposal of approximately 20 waste streams from the PSCIPCO facility, including:

1. Desulf slag from the foundry

2. Solids from wastewater management systems
3. Bag house dusts
4. Core sand
5. Inert slag from the melting process
6. Sludge from the settling ponds
7. Inert general plant construction & demolition (C&D) waste
8. Grinding waste from cut-off Saws
9. Dust from the sweeper truck
10. Cement waste from lining operation
11. Spent cores
12. Refractory materials from ovens and ladles
13. Rail road ties from repairs made on site
14. Non-RCRA occasional remedial waste
15. Occasional broken pipe not suitable for re-melting
16. Bottom drop & demolition/construction waste from cupola maintenance
17. General plant trash considered to be non-RCRA regulated waste
18. Waste asphalt
19. Petroleum contaminated soils
20. Miscellaneous plant waste subject to review of acceptability

The disposal operators are responsible for identification and prohibition of excluded wastes. All employees associated with the Landfill are trained in techniques for spotting liquid wastes, drums, and wastes in sealed containers. Such wastes will not be disposed in the Landfill, and a record of proper management of these non-Landfill wastes will be recorded in the operating records. If such waste is discovered within the

active area(s) of the Landfill, it will be segregated from the other wastes for alternative disposal.

Load inspections are carried out by drivers to verify that incoming waste loads are acceptable. Results of unacceptable load inspections will be documented on a Load Inspection Record.

PSCIPCO may direct inert wastes to areas of the facility requiring fill material. Only inert wastes will be used for fill.

3.8 DISEASE VECTOR CONTROL

The types of wastes disposed at the Landfill are primarily inert and therefore do not harbor disease vectors. The continued exclusion of specific types of solid wastes will be necessary to control disease vectors and the subsequent spread of disease. Special wastes, such as municipal solid waste, liquid wastes, and tires, which may directly carry disease or lead to the propagation of disease vectors, will be excluded from the Landfill. Periodic load inspections and Landfill inspections will identify these wastes and minimize the potential for disease vectors. Standing water shall be allowed to drain to the extent possible to preclude harboring of mosquito larvae.

3.9 ALTERNATIVE WASTE HANDLING OR DISPOSAL PLAN

The potential need for the facility to control or prevent unacceptable wastes is remote, due to the fact that it accepts only on-site material. In the event the Landfill is unable to accept on-site industrial waste, it will be held on site until it can be disposed of in the Landfill or transported to an appropriate off-site industrial waste Landfill.

3.10 CLOSURE AND POST-CLOSURE PLANS

The Closure Plan for the PSCIPCO Landfill is provided as Section 5. The Post-Closure Plan is provided as Section 6.

3.11 CLOSURE COST ESTIMATES AND FINANCIAL ASSURANCE

Closure and post-closure cost estimates and financial assurance are provided as Section 7.

GENERAL TRAINING AND SAFETY PLAN

Each employee who works with solid waste at the PSCIPCO Class IIIb Landfill facility will be trained and have a working knowledge of basic maintenance and operational techniques necessary to operate and maintain the Landfill in a manner that does not endanger human health and safety or environmental quality. Training will be accomplished through on-the-job training and instructional sessions in house. Training will be provided by the Environmental Manager or a designated trainer. Initial training will be completed within three months of assignment. Thereafter, a review of basic waste management skills will be conducted annually.

3.12.1

Training Schedule

Introductory Training (half hour minimum) includes: Synopsis of solid waste regulations, Plan of Operation, record keeping, and transporter requirements.

Requirement:	All personnel responsible for segregating, loading, hauling and disposing of identified Class III Landfill wastes
Method:	Lecture/On-the-job training
Review:	Annual

Policies and Procedures (half hour minimum) includes: Security, inspections, and emergency response.

Requirement:	All Personnel directly responsible for operating the Class III Landfill
Method:	Lecture/On-the job training
Review:	Annual

Fire and Safety (one hour minimum) includes: Personnel protection, hazardous waste recognition, hazardous material handling, personal protective equipment, emergency response, and first aid.

Requirement:	All Personnel directly responsible for operating the Class III Landfill
Method:	Lecture/video course
Review:	Annual

3.13 **INDUSTRIAL WASTE WATER TREATMENT REVIEW**

PSCIPCO does not operate an industrial wastewater treatment facility to pre-treat any potential runoff or leachate from the Landfill. The run-off from exposed areas is contained within the Landfill. Therefore, the Landfill is not subject to review by the Division of Water Quality (DWQ) as required in Subsection R315-310-3(1)(i).

3.14 **RECORDKEEPING**

The PSCIPCO Landfill is required to maintain certain records for inspection by UDEQ or other authorized personnel. The required records are described in this section.

3.14.1 ***Operating Records***

Load counts of waste being disposed at the Class IIIb Landfill are kept by each of the various operations on-site (i.e. bag house, scrubbers, etc.). Generally, the same quantity of waste is disposed on a daily basis. The quantities of waste disposed on an annual basis are tabulated in the annual report. The quantities are based in part on the annual tonnage of iron produced.

3.14.2 ***Annual Report***

An annual report for the previous calendar year will be prepared and submitted by March 1 to the Executive Secretary of the Utah Solid Waste Board. The annual report shall be prepared on forms provided by the UDEQ and will contain all information requested on those forms.

3.14.3 ***Closure and Post-Closure Plans***

Closure and Post-Closure Plans are provided as Sections 5 and 6, respectively. These plans will be kept on site and made available for inspection.

3.14.4 ***Financial Assurance Plan***

The Financial Assurance Plan is provided as Section 7. It will be updated annually, and made available for inspection upon request.

3.14.5 ***Training Records***

Training documents will be kept for 5 years by PSCIPCO.

4.0

ENGINEERING REPORT

Currently, the Landfill operates as a non-commercial Landfill accepting only waste generated from the PSCIPCO facility. The Landfill will only accept waste identified as acceptable for Class IIIb Landfills. No groundwater monitoring is required per R315-304-5(4)(c).

The current design of the Landfill limits construction within the existing footprint, which has not changed since prior to July 15, 1999. Industrial wastes from manufacturing operations are disposed in the eastern area (Phase I) of the Landfill, comprising approximately 7.45 acres. Short term future disposal of process waste will occur in the western portion (Phase II) of the Landfill, comprising approximately 2.25 acres.

4.1

LOCATION STANDARDS

The PSCIPCO Landfill is an existing Landfill as defined in R315-304-3.(3)(b). The Landfill has been in operation for a number of years prior to the July 15, 1999 solid waste rule change requiring the Landfill to obtain a permit. The current footprint of the Landfill is considered entirely existing as of July 15, 1999. Therefore, according to R315-304-4(2)(c), the Landfill is not required to meet the Location Standards of R315-304-4(2)(a).

4.2

DESIGN

The Landfill has side slopes constructed with 1.5H:1V to 2H:1V (horizontal: vertical) ratios, with horizontal terraces where the access road circles around the perimeter of slopes from the base to the top of the Landfill. The slope has proved to be stable over the current life of the Landfill. The material is significantly well drained and compacted to provide a stable slope, as evidenced in the slope stability analysis conducted by ERM (Attachment 3). Potential localized failures would not result in a threat to human or environmental health other than an immediate danger due to the operation of equipment on a steep slope. Based on the results of the slope stability assessment (Attachment 3), the potential for slope failure is considered unlikely.

Periodically, the Landfill receives sludge from the facility's wastewater pond. Any sludge that is placed within the Landfill, is first sampled and characterized.

4.2.1 *Fugitive Dust*

The industrial wastes disposed at the PSCIPCO Landfill consist of sludge, slag, bag house dust, and sand-like materials with some larger broken sand shell cores discarded during casting of the bell ends of the pipe. The waste materials have a significant moisture content, which minimizes wind blown dust. The Landfill is routinely watered by truck and sprinkler system (partial) to further control potential dust. Please refer to the Section 3.5 for control of fugitive dust.

4.2.2 *Fencing and Roads*

The PSCIPCO property is fenced, as is the Landfill. The Landfill perimeter fence is a five feet tall, four-strand barbed-wire fence.

4.2.3 *Fire Protection*

Combustible wastes are not placed in the Landfill, so the potential for a fire is remote.

4.2.4 *Operational Design*

None of the waste materials disposed at the Landfill contain free liquids, so no active program is in place to otherwise minimize disposal of liquids. Since no daily cover is required for the types of wastes placed within the Landfill, the entire surface of the Landfill constitutes a working face. All waste loads are weighed or have their weight estimated by the area of the plant that generates the waste. This information is recorded on the Landfill Log, a copy of which is provided in Attachment 2.

No waste materials are placed in the Landfill that can be wind-blown, therefore no litter control program is in place. Additionally, plant personnel have been instructed not to scavenge waste materials from the Landfill for their own purposes.

There are no full-time personnel on duty at the PSCIPCO Landfill. Rather, designated individuals have been given the responsibility of delivering waste loads to the Landfill. A designated individual is always on site when waste disposal operations are being performed. The designated individual is in full communication with the Environmental Manager via cell phone and/or mobile radio, and is able to summon immediate assistance in the event of a fire or other accident.

4.3

CLOSURE DESIGN AND LAND USE

Closure of the PSCIPCO Landfill will minimize the need for further maintenance and will minimize any potential threats to human health and the environment. After waste has been placed to the final design grade, a final cover will be placed on the Landfill comprised of a minimum of six inches of gravel, or crushed slag generated on site. The waste disposal area is not expected to experience significant settlement, so the Closure Plan has no provision for maintaining a positive drainage off the Landfill slopes. Final grades will be constructed to a minimum 2 percent slope on the top of the Landfill. All run-off will be directed off and around the Landfill. The entire Landfill site will be constructed with a perimeter drainage system which will minimize run-on and control run-off. PSCIPCO has no plans for future use of the Landfill area following its closure.

4.4

RUN-ON/RUN-OFF CONTROLS

Currently, precipitation on active portions of the Landfill is contained within the Landfill. Runoff from some areas at the entrance to the Landfill, as well as runoff from the covered slopes, is allowed to run off from the Landfill area. This runoff is from side slopes, and is generally contained within PSCIPCO's property. The areas to the west are lower in elevation and provide adequate infiltration and evaporation potential prior to further migration into surface drainage channels.

The Landfill is constructed above natural grade, and therefore does not receive run-on from outside the Landfill footprint.

4.5

MAPS

An aerial photo (Figure 1) is provided which shows the PSCIPCO facility. The facility is generally located within a partially developed industrial area of the unincorporated area of Utah County. The facility has open space buffer zones surrounding the entire facility. The Landfill is located on the northeastern portion of the PSCIPCO facility.

A Vicinity Map (Figure 2) is provided which uses the most recent U.S. Geological Survey topographic map, 7½ minute series, showing the PSCIPCO facility.

A Facility Site Map (Figure 3) is provided which shows the Landfill boundary; property boundary; transportation and utility features, and the main structures of the entire facility.

A Topographic Map (Figure 4) of the Landfill is provided which shows existing topographic contours (2-foot interval). The topographic map shows the location of the fenced boundary, the access road, the surface drainage features, and the surface areas and segregated waste areas (Phase I and Phase II) of the Landfill.

Figure 5 is provided to show completed Phase I and Phase II, as well as existing profiles and the final closure design profiles. The profiles show the final top slope grades, the side slope grades, final design height, and remaining capacity for each phase as of April 2008.

5.0

CLOSURE PLAN

Final closure activities will be implemented at the completion of each disposal area. PSCIPCO currently operates two areas (Phase I and Phase II) for the disposal of all on-site industrial Class IIIb waste. Packaging and shipping wastes have been removed from the Phase II area to facilitate disposal of process waste. These materials are currently segregated and kept separate from the Landfill. Final grading and establishment of a layer of gravel or crushed slag over the top of the Landfill will occur once waste placement is completed. Closure of the site is designed to be performed in such a manner as to minimize the need for further maintenance, minimize the potential effects of the Landfill on the surrounding environment, and prepare the facility for the post-closure period.

5.1

CLOSURE SCHEDULE

The Class IIIb Landfill will be closed following the placement of waste to the proposed design height. The sides of the Landfill will be graded and covered with gravel or crushed slag material as waste lifts are placed. Each lift is approximately 10 feet high. The top of the Landfill will be covered with gravel or crushed slag cover after the final height of the Landfill is achieved. As subsequent lifts of the Landfill are completed, the side slopes will be constructed at a slope of 1.5H:1V to 2H:1V (horizontal: vertical) and areas will be covered.

As previously indicated, PSCIPCO intends to expand the Landfill in the future towards the south. Additional information associated with future design and expansion of landfill will be submitted at a later date. Future submittal of this information should in no way delay UDEQ review and approval of this application. Upon completion of waste placement activities within Phase I and Phase II, the north, east, and west faces of Phase I and Phase II of the Landfill would likely be closed while the southern face would be kept open to facilitate the expansion.

5.2

FINAL COVER AND GRADING

The PSCIPCO Class IIIb Landfill will be covered with a minimum of six inches of gravel, or crushed slag generated on site. The cover material will be placed after the final waste has been placed and contoured to the grades outlined in the engineering plan. The cover of the Landfill will be constructed with 1.5H:1V to 2H:1V (horizontal: vertical) side slopes and a minimum 2% top slope.

The gravel/crushed slag cover of the Landfill will not be seeded. Establishment of a vegetative cover is not feasible/warranted based on the inability to sustain a vegetative cover in arid climatic conditions and the protective nature of the gravel/crushed slag cover.

5.3 *VOLUME CAPACITY*

Based on surveying activities conducted in April 2008 and the final design height, the total remaining volume capacity of Phase I and Phase II of the Class IIIb Landfill area is approximately 165,000 cubic yards (cy). At an estimated waste generation rate of approximately 25,000 to 35,000 cy per year of waste (based on estimated waste volumes placed in Landfill in 2006 and 2007), the remaining life of the Landfill is projected to be between approximately 4 and 7 years.

5.4 *COST ESTIMATE*

The financial assurance cost estimate for the final closure and post-closure care of the Class IIIb Landfill is \$279,689. A detailed cost estimate is provided in Section 7 - Financial Assurance. The costs provided in the Financial Assurance Plan are based on a worst case (largest area) requiring closure at any one time. The closure activities would be administered by the State of Utah. The cost estimate presented herein was prepared using unit costs for a third party to conduct the work. These costs would be much higher than those performed by the current operator, due to the increased administrative costs and loss of benefits due to cost of material not including any on-site materials or cost savings for material cheaper due to availability, and are therefore considered conservative.

5.5 *FINAL INSPECTION*

The Landfill operators will notify the Executive Secretary of their intent to implement the closure plan in whole or in part, 60 days prior to the projected final receipt of waste at the facility. Implementation of the closure plan will be commenced for each area (Phase I and Phase II) within 30 days following receipt of the final volume of waste, or when the final elevation is attained. Closure activities will be completed within 180 days of their commencement.

A final inspection of the Landfill site will be performed at the termination of the Landfill activities. The final inspection will determine if the Landfill meets all the closure requirements outlined in the permit and closure plan. Inspection requirements of the closure plan will include: long-term

operation of run-on and run-off controls, maintenance of proper final grade on the Landfill to promote run-off, and control of access at the site (fencing).

Within 90 days of completion of closure activities, PSCIPCO will submit a certified document to the Executive Secretary, indicating that the facility has been closed in accordance with the approved closure plan. This document will include facility or closure plan sheets and record drawings.

5.6

RECORDING

Within 60 days following certification of closure, PSCIPCO will submit to the Utah County Recorder a plat and statement of fact concerning the location of the Landfill. The Recorder will be instructed to include this information as part of the record of title. PSCIPCO will provide proof to the Executive Secretary that the record of title has been filed.

6.0 POST-CLOSURE PLAN

6.1 SITE MONITORING

Following closure of the Landfill, a post closure plan will be implemented. Post-closure activities generally address the need to monitor and maintain the integrity of the Landfill containment. For Class IIIb Landfills, no groundwater monitoring program is in place; therefore post-closure activities will not include ground water monitoring. However, monitoring of the final cover will be performed as part of the routine inspections to address the long term integrity of the closed Landfill.

Monitoring and inspection activities will include inspection of the final cover system. The cover is designed to divert runoff to the bottom of the slopes without causing erosion. The cover will be inspected for erosion as a result of uncontrolled runoff. The cover will be inspected for signs of differential settling which could result in loss of design grades or slopes meeting the minimum requirements. The run-off diversion ditches at the Landfill toe and adjacent to the haul roads will be inspected for proper functioning. The fence and other security controls will be inspected for required maintenance or repairs. Other monitoring activities will include visual inspection of the area surrounding the Landfill. The inspection will include conducting observations for distressed vegetation, seepage, vector infestation and odors.

6.1.1 *Schedule for Conduction Post-Closure Inspections and Monitoring*

The schedule for inspections and monitoring of Landfill operations to ensure proper operation and maintenance is provided on Table 6-1.

Table 6-1 *Post-Closure Inspection and Monitoring Schedule*

Landfill Operation	Inspection Activity	Frequency
Cover System	Visual inspection of the final cover for indications of erosion or settling.	Annually
Fence	Visual inspection of the fence to ensure that the fence is in good repair and the Landfill area is secure.	Annually
Drainage Channels	Visual inspection to ensure that drainage channels are functioning properly and that significant erosion or blockage has not occurred.	As Needed (minimum Quarterly)

Landfill Operation	Inspection Activity	Frequency
Surrounding Areas	Visual inspection for indication of any impacts associated with Landfill (i.e., distressed vegetation, seepage, vector infestation, odors, etc.).	Quarterly

6.2 CHANGES TO TITLE, LAND USE AND ZONING

The closure of an individual disposal area (e.g. Phase I) may occur prior to closure of the entire Landfill. In this case, no changes to record of title, land use, and/or zoning restrictions would be initiated.

6.3 MAINTENANCE ACTIVITIES

All maintenance activities will be conducted as soon as possible. Inspections will identify potential requirements for maintenance of the cover system and the runoff controls. The potential problems will be investigated, and final records of findings will be kept on file. These findings will, at a minimum, identify the cause of the problem, include an evaluation on the severity of the problem, and recommendations for corrective action.

6.4 CONTACT INFORMATION

Contact information will be the same for the current operating facility until further changes are noted. This information will be updated as necessary.

7.0

FINANCIAL ASSURANCE

Pacific States Cast Iron Pipe Co. (PSCIPCO) intends to comply with the Financial Assurance requirements of the Utah Rules by satisfactorily demonstrating financial ability based on the trust fund or surety bond guaranteeing payment or insurance or letter of credit. PSCIPCO will submit the required financial accounting information in a separate submittal to the UDEQ.

The amount of financial assurance required for the PSCIPCO Class IIIb Landfill has been based on requirements for 30 year post-closure care for placement and maintenance of a cap for a total closure area not to exceed 7.5 acres (the area of Phase I, which represents the largest area that could requiring a final cover at any one time during the active life of the Landfill). This area is considered worst case, as it will decrease over time due to the ongoing closure activities. Tables 7-1 and 7-2 itemize the calculations for estimating closure and post-closure costs, respectively. Cost estimate details for closure and post-closure were obtained from the Oklahoma Department of Environmental Quality 2008 Worksheet for Calculating Closure and Post-Closure Cost Estimates.

7.1

CLOSURE COSTS

Closure costs for the PSCIPCO Class IIIb Landfill are summarized in Table 7-1. These costs include site evaluation, site grading, fence repair/replacement, placement a protective gravel cover from an off-site source, administrative services, technical and professional services, and a 10% contingency.

The estimated cost represent a worst case scenario, assuming that Phase I, the largest area that could requiring a final cover at any one time, would need to be covered. As lifts of waste are placed within the Landfill, the sides are slope to approximately 1.5H:1V to 2H:1V (horizontal to vertical) and covered with a coarse protective cover (gravel or crushed slag material of gravel to small coble size). As a result, the sides of the Landfill, for waste placed to date, are essentially closed. Assuming this method of placement/covering continues, the largest area of the Landfill requiring closure at any time is the current exposed area.

Table 7-1 Summary of Closure Costs

Task	Amount	Unit	Multiple	Unit Cost	Task Cost
CLOSURE					
Site Evaluation	1	Lump Sum	1	\$3,120.30	\$3,120.30
Repair/Replace Perimeter Fencing	2,640	Linear Ft.	0.25	\$3.06	\$2,019.60
Site Grading	7.5	Acres	1	\$1,237.14	\$9,278.55
Place Off-Site Gravel	5,647	Cubic Yards	1	\$13.35	\$75,387.45
Clean Perimeter Drainage Ditches	2,500	linear feet	0.50	\$6.10	\$7,625.00
Subtotal					\$97,430.90
Administrative Services	1	Lump Sum	10%		\$9,743.09
Technical & Professional Services	1	Lump Sum	12%		\$11,691.71
Contingency	1	Lump Sum	10%		\$9,743.09
Closure Total					\$128,608.79

7.2

POST-CLOSURE CARE COSTS

Estimated post-closure care costs for the PSCIPCO Class IIIb Landfill are summarized in Table 7-2. These costs include annual site inspection, general maintenance, erosion and settlement repair, administrative services, technical and professional services, and a 10% contingency.

Costs for groundwater monitoring have not been included in the post-closure care cost estimate, as Class IIIb Landfills are exempt from ground water monitoring requirements of R315-308 (R315-304-5(4)(c)). The PSCIPCO Landfill does not have ground water monitor wells.

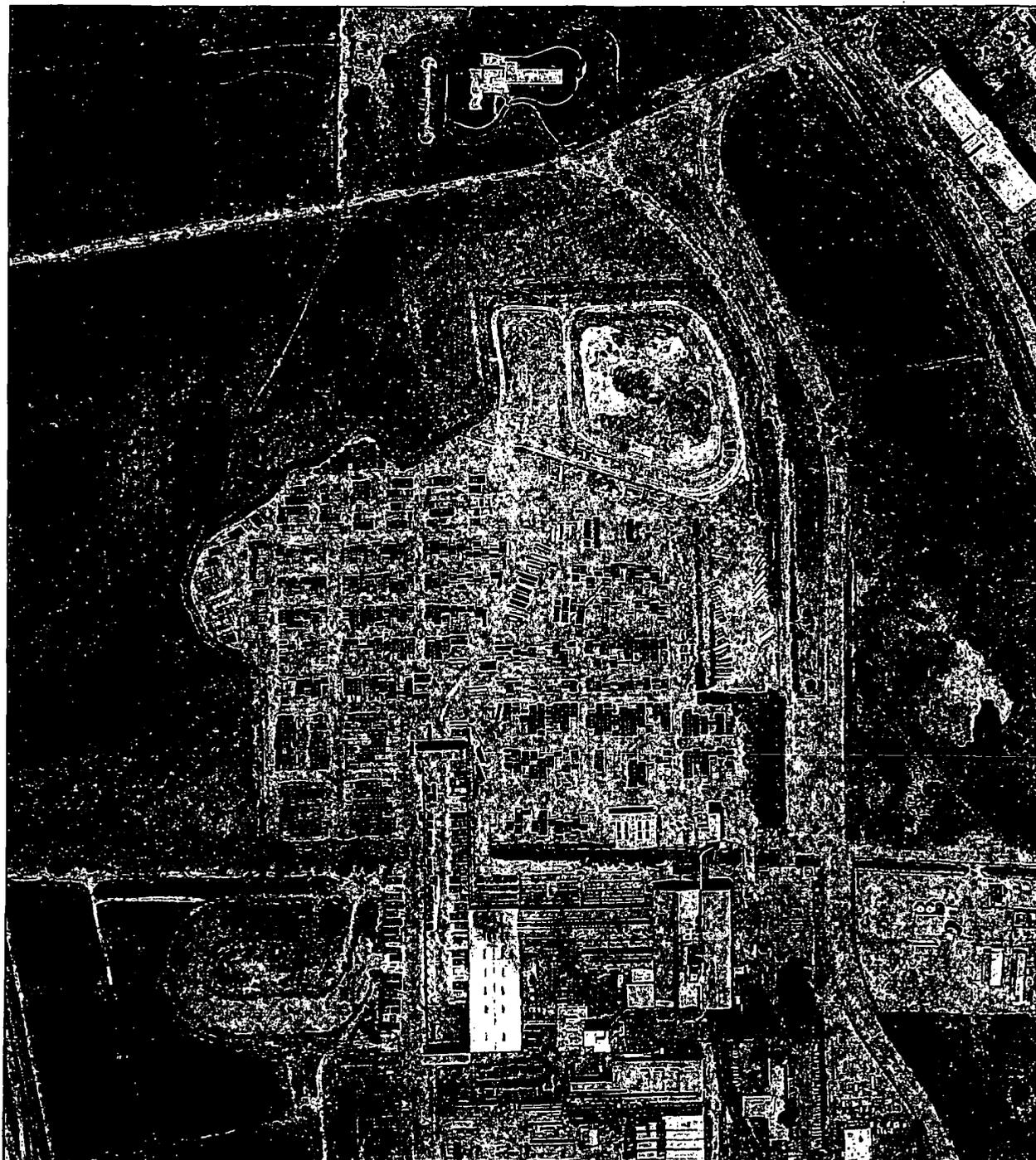
Table 7-2 Summary of Post-Closure Care Costs

Task	Amount	Unit	Multiple	Unit Cost	Task Cost
POST-CLOSURE					
Site Inspections	4	Per Year	30	\$567.63	\$68,115.60
General Maintenance	1	Per Year	30	\$1,701.77	\$51,053.10
Repair Erosion and Settlement	7.5	Acres	30	\$16.27	\$3,660.75
Subtotal					\$122,829.45
Administrative Services	1	Lump Sum	6%		\$7,369.77
Technical & Professional Services	1	Lump Sum	7%		\$8,598.06
Contingency	1	Lump Sum	10%		\$12,282.95
Post-Closure Total					\$151,080.22

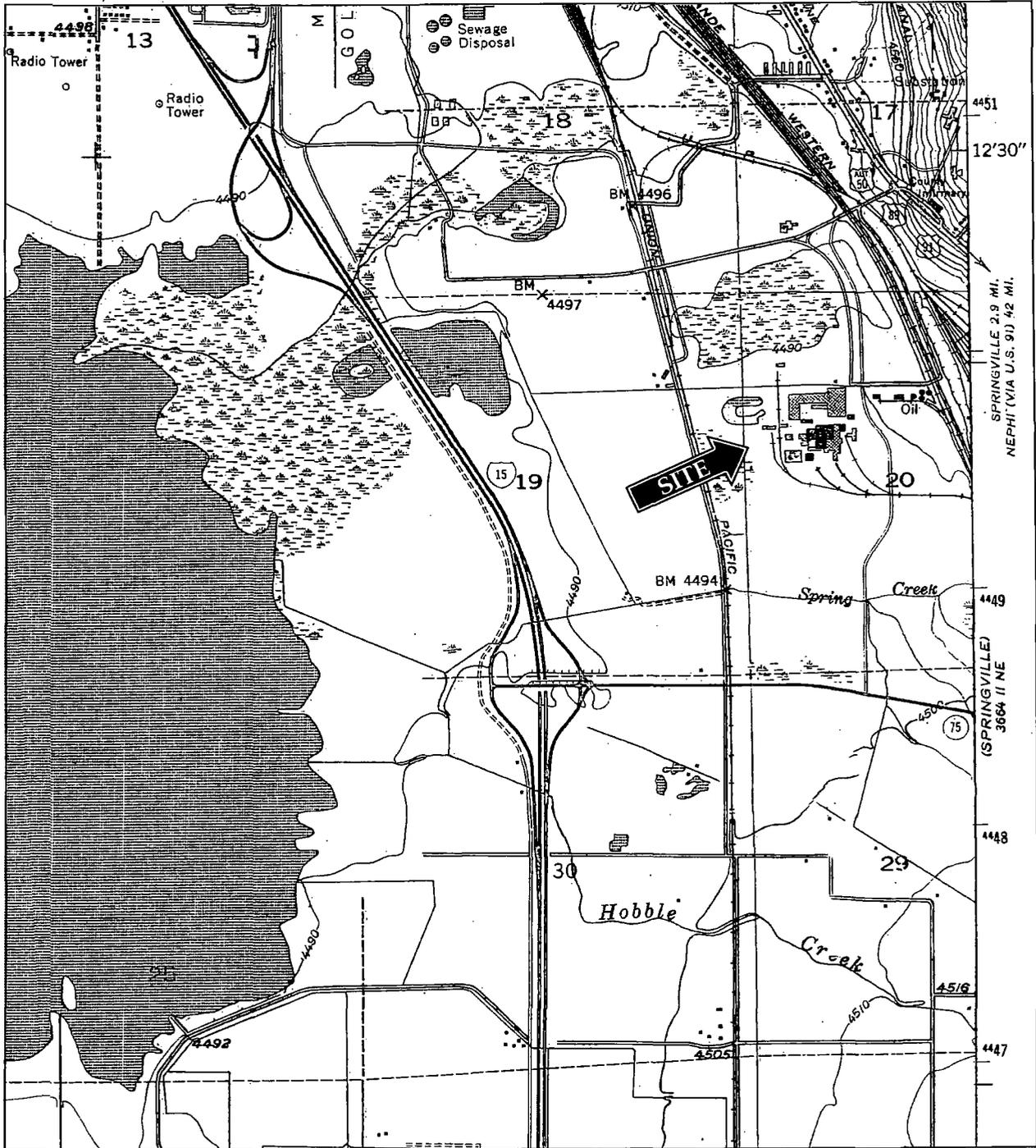
REFERENCES

- Federal Emergency Management Agency - *Flood Insurance Rate Map*,
October 15, 1982.
- Oklahoma Department of Environmental Quality - *2008 Worksheet for
Calculating Closure and Post-Closure Cost Estimates*
(<http://www.deq.state.ok.us/lpdnew/SW/2008FAUnitCosts.htm>).
- Pacific States Cast Iron Pipe Company - *Solid Waste Landfill Annual Report
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- Pacific States Cast Iron Pipe Company - *General Plant, Plant Property Plan
View Map*, April 10, 1996.
- U.S.G.S. *7.5 Minute Quadrangle Topographic Map, Provo, Utah*, 1993.
- Utah Department of Environmental Quality - *Hazardous Waste
Management Rules, R315-1, R315-2*,
www.deq.state.ut.us/eqshw/hwrules, 2003.
- Utah Department of Environmental Quality - *Solid Waste Permitting and
Management Rules, R315-301 Through 320*,
www.deq.state.ut.us/eqshw/swrules, 2003.

Figures

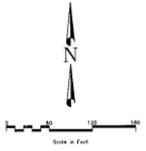


Source: Olympus Aerial Surveys	Environmental Resources Management 102 West 500 South, Suite 650 Salt Lake City, Utah 84102 (801) 595-8400	
Figure 1 Aerial Photo July 2005 Pacific States Cast Iron Pipe Company	Drawn By: Checked By: Date:	Scale = Not to Scale Project No. 0049111



<p>Source: USGS Topo Map</p>	<p>Environmental Resources Management 102 West 500 South, Suite 650 Salt Lake City, Utah 84102 (801) 595-8400</p>	
<p>Figure 2 Site Vicinity Map Pacific States Cast Iron Pipe Company</p>	<p>Drawn By: Checked By: Date:</p>	<p>Scale = 1:24 000 Project No. 0049111</p>

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- LEGEND:
- PROPERTY LINES
 - SECTION LINE
 - - - - - EXISTING EDGE OF ROAD
 - - - - - EXISTING BARBED WIRE FENCE
 - - - - - EXISTING GRAIN LINK FENCE
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - - - - - FUTURE LANDFILL EXTENSION FOOTPRINT

CP-12
PC 346.6
P+ 388.05
E+ 1828.24
ELEV=4523.97

CP-11
PC 346.6
P+ 388.05
E+ 1528.27
ELEV=4512.86

PACIFIC STATES CAST IRON PIPE COMPANY
SERIAL NO. 25C048-0048

PACIFIC STATES CAST IRON PIPE COMPANY
SERIAL NO. 25B016-0048

FUTURE PHASE IV

PACIFIC STATES CAST IRON PIPE COMPANY
SERIAL NO. 25B011-0109

FUTURE PHASE III

PHASE II

PHASE I

ENVIRONMENTAL RESOURCES MANAGEMENT
SALT LAKE CITY, UTAH



PSCPCO
TOPOGRAPHIC MAP

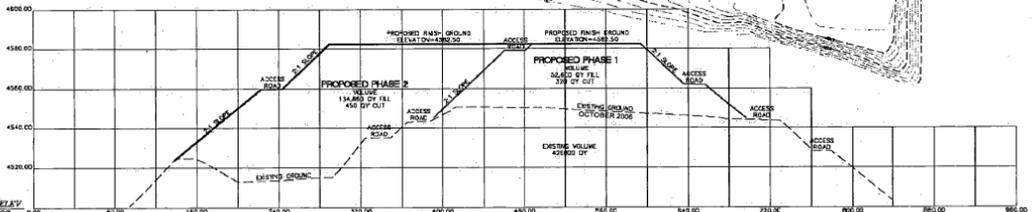
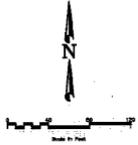
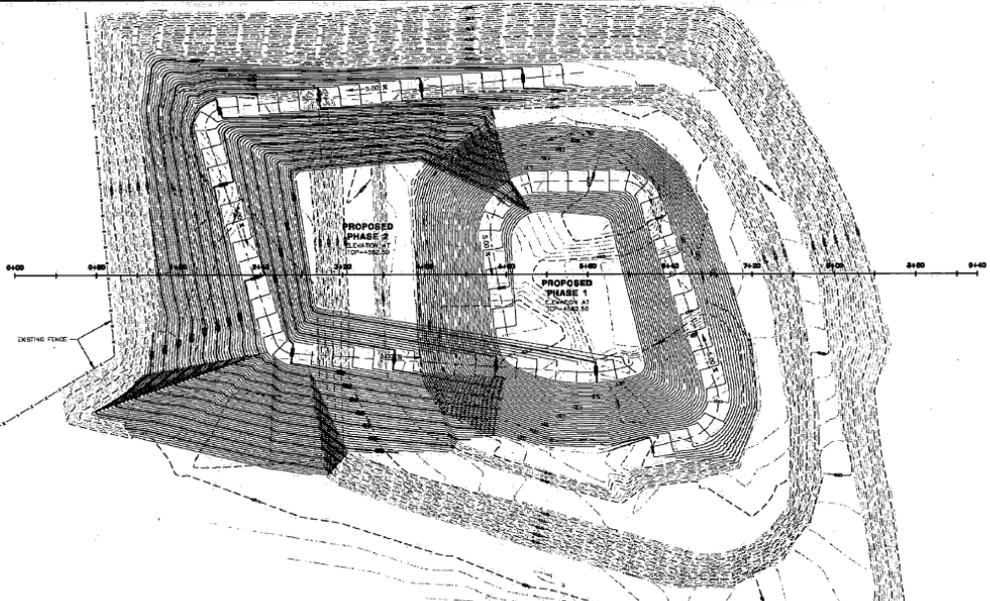
CP-10
PC 346.6
P+ 388.05
E+ 1528.27
ELEV=4505.35

INDUSTRIAL PARKWAY

PROJECT NO.		SHEET NO.	
1 QUANTITIES 3/08 TO 04/08		4	
NO.	REVISIONS	BY	DATE
FILE NAME:		SCALE:	
TOP.Dwg		1"=50'	

CP-10
P.L. MAIL
#1022.88
E=1842.18
ELT=402.87

CP-11
P.L. MAIL
#1022.88
E=1842.18
ELT=402.88



DATUM ELEVY
4500.00
GROUP
SECTION 2

CP-10
P.L. MAIL
#1022.88
E=1842.18
ELT=402.88

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DRAWN BY: JLO/DT	CHECKED BY: JLO/DT
DESIGNED BY: JLO/DT	PROJECT NUMBER:
APPROVED BY: JLO/DT	DATE:

ENVIRONMENTAL RESOURCES MANAGEMENT

SALT LAKE CITY, UTAH

dominion
Engineering Associates, L.C.
2654 South Green Street
Worren, Utah 84121 801-733-0000

PSC/CO LANDFILL

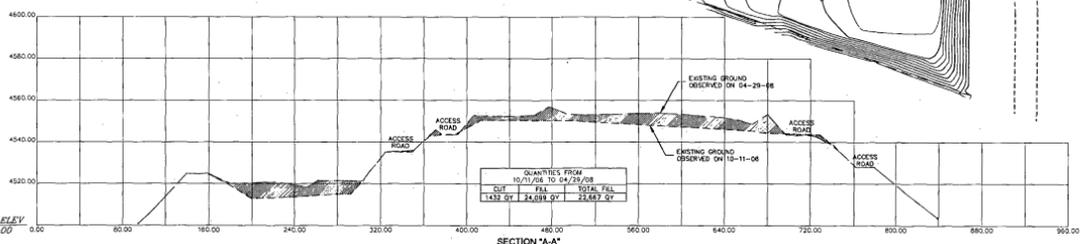
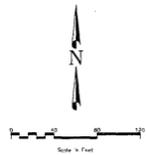
COMPLETED PHASE I & PHASE II PROFILES

PROJECT NO.	
SHEET NO.	5
NO.	REVISION
BY	DATE
BY	DATE

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PK NAIL
N=4869.99
E=4505.37
ELEV=4503.87

CP-11
PK NAIL
N=4823.92
E=4956.27
ELEV=4972.86

- LEGEND:
- PROPERTY LINES
 - SECTION LINE
 - - - EXISTING EDGE OF ROAD
 - - - EXISTING BARBED WIRE FENCE
 - - - EXISTING CHAIN LINK FENCE
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - EXISTING PERCENT SLOPE



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 CHECKED: DATE:
 DESIGNED: DATE:
 APPROVED: DATE:

ENVIRONMENTAL RESOURCES MANAGEMENT
 SALT LAKE CITY, UTAH

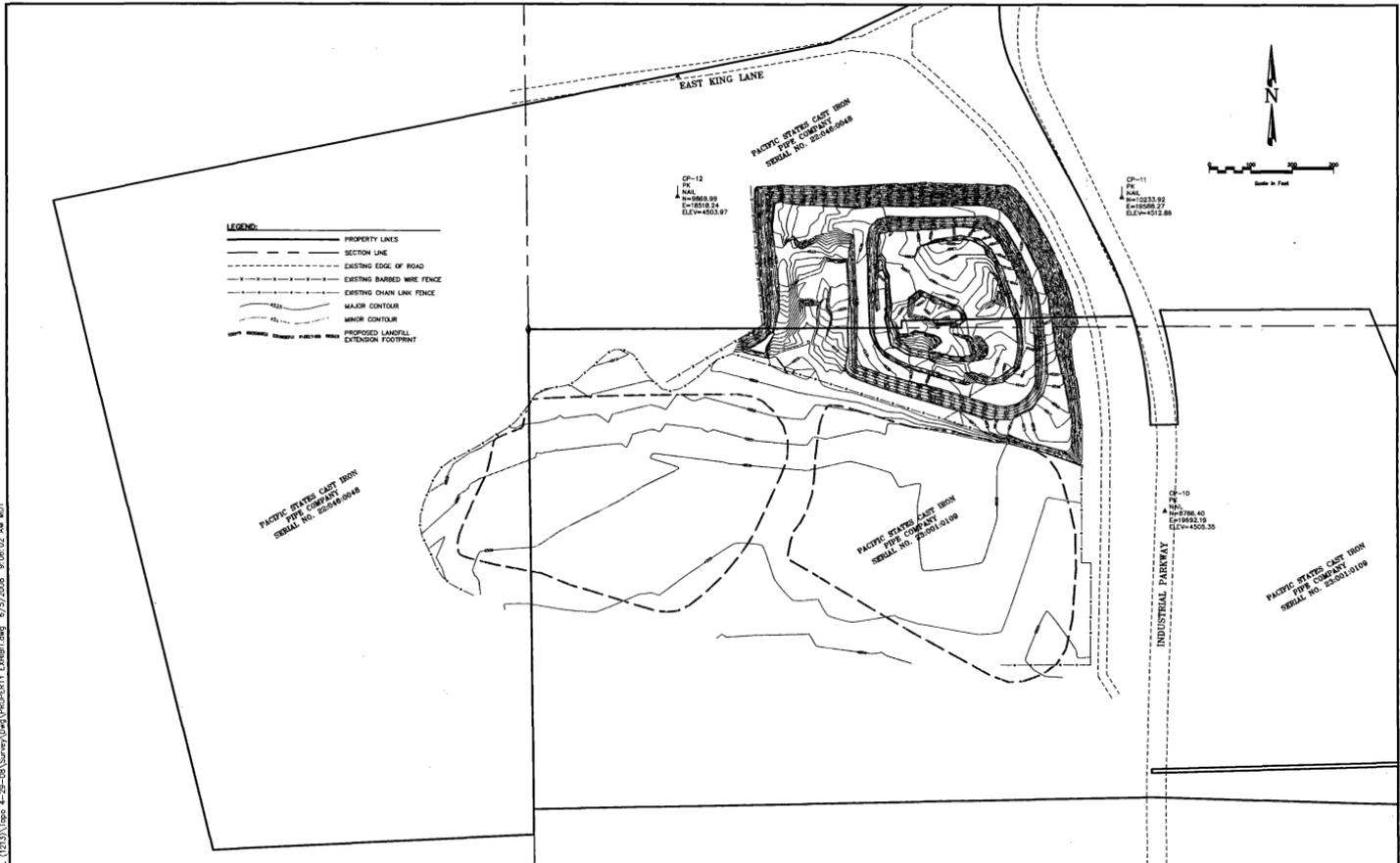


PSCIPCO
 APRIL 2008 WASTE QUANTITIES

PROJECT NO.	
SHEET NO.	6
DATE	5/15/08
BY	
SCALE	AS SHOWN

Attachment 1
Legal Description and Proof of Ownership

P:\PSC LANDFILL (1213)\Topic 4-20-03\Survey\DWG\PROPERTY EXHIBIT.dwg 6/2/2008 9:06:02 AM MDT



DRAWN	JL 08/08	CHECKED	JCF 08/08
DATE		DATE	
DESIGNED	KT 08/08	PROJECT NUMBER	
DATE			
APPROVED	JCF 08/08	JCF	
DATE		PROJECT NUMBER	

ENVIRONMENTAL RESOURCES MANAGEMENT

SALT LAKE CITY, UTAH



PSC LANDFILL

BOUNDARY EXHIBIT MAP

PROJECT NO.	1213
SHEET NO.	1 of 1
SCALE	AS SHOWN
DATE	
BY	
REVISIONS	
NO.	

2001 UTAH COUNTY TAX NOTICE

SEE REVERSE SIDE FOR IMPORTANT INFORMATION

MAKE CHECK PAYABLE TO UTAH COUNTY TREASURER
100 EAST CENTER, SUITE 1200, PROVO, UTAH 84606-3159

Recorded owner as of JAN. 1, 2001

Pin #: 0859754 District #: 120
Serial #: 22:046:0048 V

PACIFIC STATES
PO BOX 1219
PROVO UT 84603-1219

Prices O.K.	<i>w/bk</i>
Terms 2001	<i>Net</i>
CASH/IRON PIPE COMPAN	<i>w/bk</i>
F. O. B.	
Extensions O.K.	<i>w/bk</i>
P & S Invoice	
Distribution	<i>12/4/00</i>
Approved	<i>Se</i>

2001 TAXES: \$10.76
Adjustments: \$0.00
Total Payments: \$0.00

2001 Amt. Due: \$10.76

ENTD NOV 14 2001

Property Description (not for legal documents)

COM: 3 0.01 FT FR SW COR. SEC. 17, T7S, R3E, 5LB&M.; N 89 DEG 39'7" E 898.92 FT; N 0 DEG 44' 34" W 17.82 FT; N 88 DEG 45' 26" E 536.21 FT; N 1 DEG 25' 33" W 69.5 FT; ALONG A CURVE TO L (CH ORD BEARS: N 23 DEG 36' 41" W 119.26 FT; RADIUS=1052.68 FT; ARC LENGTH= 119.32 FT; N 26 DEG 51' 31" W 472 FT; ALONG A CURVE TO R (CHORD BEARS: N 4 DEG 5' 37" W 296.41 FT; RADIUS=383 FT) A RC LENGTH = 304.35 FT; S 63 DEG 16' 26" W 476.31 FT; S 78 DEG 6' 26" W 1912.68 FT; S 13 DEG 12

Property Address:

Type	Value of Property		Effective Tax Rate	Distribution of General Taxes		
	Taxable Value	Market Value		Taxing Unit	Tax Rate	Amount
Grn Blt Real	890	1,052,269	.000000	ASSESSING	.366	.33
				UTAH COUNTY	1.038	.92
				CENTRAL UT WATER	.369	.33
				NEBO SCHOOL DIST	7.946	7.07
				SERV AREA 6-LAW, ZONE	1.110	.99
				SERV AREA 7-FIRE	.644	.57
				SERV AREA 8-PLANNING	.619	.55
	890	1,052,269	.000010		12.092	10.76

2002 BUDGET HEARINGS: North Utah County Water Dist: Nov 6, 2001 4:00pm (Prelim) & Dec 13, 2001 4:00pm (Final) 73 N Center American Fork Benjamin Cemetery Maint Dist: Dec 13, 2001 7:00 pm 7300 S 3238 W, Benjamin; Utah County, Soldier Summit, Service Areas 6, 7, 8, & 9: Dec 18, 2001 9:00 am County Bldg, Room 1400, 100 E Center, Provo; South Valley Sewer Dist: Nov 28, 2001 6:30 pm 874 E 12400 S, Draper; North Fork Special Dist: 12-6-2001 7pm

* Effective Tax Rate is computed by dividing tax amount by total market value

2001 UTAH COUNTY TAX NOTICE
SEE REVERSE SIDE FOR IMPORTANT INFORMATION

MAKE CHECK PAYABLE TO UTAH COUNTY TREASURER
100 EAST CENTER, SUITE 1200, PROVO, UTAH 84606-3159

Recorded owner as of JAN. 1, 2001

PACIFIC STATES CAST IRON PIPE CO
PO BOX 1219
PROVO UT 84603-1219

Prices O.K.	<i>W/ht Net</i>
Terms	<i>Net</i>
Extensions O.K.	<i>W/ht</i>
P & S Invoice	
Distribution	<i>12/4/00</i>
Approved	<i>[Signature]</i>

Pin #: 0859994 District #: 120
Serial #: 23:001:0109 V

2001 TAXES: \$18,927.60
Adjustments: \$0.00
Total Payments: \$0.00

2001 Amt. Due: **\$18,927.60**

ENTD NOV 14 2001

Property Description (not for legal description):

COM S 234.93 FT & E 1531.49 FT FR SW COR. SEC. 17, T7S, R3E, SLB&M. S 88 DEG 34'29"W 33 FT; ALONG A CURVE TO L (CHORD BEARS: N 9 DEG 20'19"W 289.75 FT, RADIUS 1052.68 FT) ARC LENGTH = 290.68 FT; C 89 DEG 30'0"W 542.44 FT; S 17.82 FT; W 898.92 FT; S 1224.92 FT; N 88 DEG 4 5'0"E 1484.16 FT; S 38 DEG 26'0"E 1018.3 FT; N 21 DEG 43'0"W 126.7 FT; S 88 DEG 15'0"W 965.27 FT; N 9.81 FT; N 38 DEG 15'0"E 971.52 FT; N 21 DEG 43'0"W 1205.82 FT; S 89 DEG 30'0"W

Property Address:

Type	Value of Property		Effective Tax Rate	Distribution of General Taxes		
	Taxable Value	Market Value		Taxing Unit	Tax Rate	Amount
Comm Real Es	1,565,299	1,565,299	.000366	ASSESSING	.366	572.90
				UTAH COUNTY	1.038	1,624.78
				CENTRAL UT WATER	.369	577.60
				NEBO SCHOOL DIST	7.946	12,437.87
				SERV AREA 6-LAW, ZONE	1.110	1,737.48
				SERV AREA 7-FIRE	.644	1,008.05
				SERV AREA 8-PLANNING	.619	968.92
	1,565,299	1,565,299	.012092		12.092	18,927.60

2002 BUDGET HEARINGS: North Utah County Water Dist: Nov 6, 2001 4:00pm (Prelim) & Dec 13, 2001 4:00pm (Final) 75 N Center American Fork Benjamin Cemetery Maint Dist: Dec 13, 2001 7:00 pm 7300 S 3238 W, Benjamin; Utah County, Soldier Summit, Service Areas 6, 7, 8, & 9: Dec 18, 2001 9:00 am County Bldg, Room 1400, 100 E Center, Provo; South Valley Sewer Dist: Nov 28, 2001 6:30 pm 874 E 12400 S, Draper; North Fork Special Dist: 12-6-2001 7pm

* Effective Tax Rate is computed by dividing tax amount by total market value

Attachment 2
Sample Forms



Truck ID: _____ Month: _____ Yr: _____

No.	Date	Loads					
		Desulf Slag	Baghouse (#2 Dropout)	Sand Cores	Trash Packing Material	Other	
						Desc	Est Wt.
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
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27							

PAPER COPIES ARE UNCONTROLLED. THIS COPY VALID ONLY AT TIME OF PRINTING.
The controlled version of this document is available on the McWane, Inc., EHS website at www.ehssystem.com.

Return to Environmental Department by the 5th of the following month.



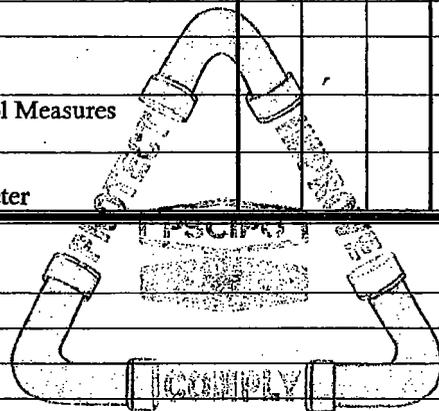
Date: _____

Inspected by: _____

Signature: _____

Instructions: Inspect the following items concerning their condition with regards to storm water impacts. Note any comments or corrections. This is to be done weekly on the active portion of the landfill and monthly on the inactive/closed/stabilized portion.

Item	Condition			Comments
	G	F	P	
Active Area				
Storage Areas—side soil				
Erosion & Sediment Controls e.g., Berms, swales				
Stabilization & Structural Control Measures e.g., riprap, vegetation, hill sides				
Landfill Access e.g., roads, entrance, exit, perimeter				
Comments:				



Attachment 3
Slope Stability Analysis

Memorandum

Environmental
Resources
Management

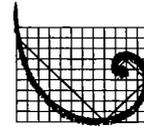
To: Pacific States Cast Iron Pipe (PSCIPCO)
Provo, Utah Facility
Att: Joe Ozimek

From: David S. Wilson, P.E., P.G.

Date: September 17, 2008

Subject: PSCIPCO Landfill Slope Stability Analysis

102 West 500 South
Suite 650
Salt Lake City, Utah 84101
(801) 595-8400
(801) 595-8484 (fax)



ERM®

Environmental Resources Management (ERM) has completed an evaluation of slope stability for the Class IIIb Landfill at the PSCIPCO facility in Provo, Utah. This analysis was performed to present information relating to the stability of the landfill side slopes in conjunction with PSCIPCO's submittal of a revised Class IIIb Landfill Permit Application to the Utah Department of Environmental Quality, Division of Solid and Hazardous Waste.

INTRODUCTION

The slope stability analysis was based on geotechnical and hydrogeological data for the landfill as presented by RB&G Engineering, Inc., (RB&G) in its Geotechnical Investigation & Slope Stability Evaluation dated November 2005. The RB&G Report presented the results of geotechnical investigation and laboratory testing for the landfill waste and underlying soils, and an analysis of slope stability based on existing landfill contours at that time.

However, the topography of the landfill area has changed since 2005, and a new survey was performed by Dominion Engineering Associates, L.C. (Dominion) during April 2008. The slope stability evaluation performed by ERM was based on the revised topographic survey provided by Dominion, and the geotechnical properties of the landfill waste and soils as determined by RB&G during its testing program. Analysis was also performed for the proposed 2H:1V slopes expected for future closure of the landfill.

The slope stability analysis was performed to satisfy the Utah Regulations for Solid Waste Landfills R315-301 and -302, particularly the requirements for a demonstration of stability for facilities within a Seismic Impact Zone. According to the 2008 United States National Seismic Hazards Maps and the Utah regulatory definitions, the subject landfill is located within a

Seismic Impact Zone (i.e., an area having a 10% or greater probability that the maximum horizontal acceleration in lithified earth material, expressed as a percentage of the earth's gravitational pull, will exceed 0.10g in 250 years).¹

The slope stability analysis was performed for the subject landfill to satisfy the stability demonstration requirements under both current operating and proposed closure conditions.

APPROACH AND BASIS FOR ANALYSIS

The general approach used for the slope stability analysis was to identify and perform static (i.e., no earthquake load) evaluations of the steepest, most critical slope on each side of the existing landfill based on current topographic data. The slope stability program used in the evaluation identified the most critical slopes based on the factor of safety (FS) against material slippage along potential failure planes generated by the program. A subsequent analysis of pseudo-static (i.e., earthquake) conditions was then performed on the most critical slope identified through the static evaluation. Finally, an evaluation of proposed final closure slopes was performed based on the anticipated final grades and elevations of the final landfill.

Current cross sections for the landfill were obtained from the April 2008 topographic contour map prepared by Dominion. The cross sections were developed along the lines of the apparent steepest slopes on the north, south, east and west sides of the landfill. Figure 1 shows the landfill plan and the cross section lines, and Figure 2 shows the four cross sections of the existing slopes. The slopes generally range from about 1.5H:1V to

¹ Utah R315-302.1 (2)(b)(iii): New landfills or lateral expansions of existing facilities shall not be located in seismic impact zones unless the owner or operator demonstrates to the satisfaction of the Executive Secretary that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

2H:1V, with horizontal terraces where the access road circles the perimeter of slopes from the base to the top of the landfill.

The waste and soil properties used in the slope stability model were the same as those recommended and used during 2005 by RB&G based on the laboratory analysis performed at that time. No additional material testing has been performed since that time to warrant changes in the unit weight or strength values. The material properties applied to the waste and soil materials are shown on Table 1.

Table 1 - Material Properties used for Slope Stability Model

Soil Layer	Moist Unit Weight (pcf)	Saturated Unit Weight (pcf)	Internal Friction Angle	Cohesion (psf)
Landfill Material	88	92	34°	50
Clay & Silt Foundation	102	107	26°	500

SLOPE STABILITY ANALYSIS

The slope stability analysis was performed using the PCSTABL software (STABL5M) developed at Purdue University. This software can perform stability analysis using a variety of methods, and the program user can select the best method based on the slope configuration and knowledge regarding the materials comprising the slope. ERM's assessment for the subject landfill slopes was performed using the Simplified Bishop Method of Slices for each existing slope. This method was selected to assess potential circular failure surfaces because the landfill material is predominantly slag which has been placed as a monolithic fill having relatively consistent unit weight and strength characteristics.

Multiple random searches for critical failure surfaces were performed by the program for each cross section to define the lowest factors of safety against slope failure. Critical failure surfaces were defined for the short, steepest section of each slope near the toe (i.e., slopes of approximately 80 feet). Also, the overall stability from top to bottom was evaluated for deep-seated failure surfaces (i.e., long slopes of approximately 160 feet).

Static Conditions

These analyses were initially performed under static conditions (i.e., no earthquake loads). The shorter slopes near the base of the landfill showed lower factors of safety than the longer slopes. A summary of the calculated factors of safety for the most critical failure surfaces for each slope cross section are presented on Table 2. The results and plots of the failure surface for each slope are provided in Attachment A.

A factor of safety of 1.5 is generally considered adequate for static, long-term slope stability conditions; lower factors of safety may be considered safe for short-term, operational conditions. The analysis showed the evaluated (most critical) slopes to satisfy this criterion.

Table 2 - Static Slope Stability Results using Simplified Bishop Method

Profile Description	Critical FS for Short Slope	Critical FS for Long Slope
North Slope	1.8	2.2
South Slope	1.8	2.7
East Slope	2.2	2.8
West Slope	1.9	Not Applicable - Long slope does not currently exist on west side of landfill

Pseudo-Static (Earthquake) Conditions

The seismic stability of the existing slopes was also assessed by applying regional Probabilistic Peak Ground Acceleration (PGA) values from the 2008 U.S. National Seismic Hazard Maps. The ranges of PGA values for the region of the PSCIPCO facility are shown on Table 3.

Table 3 - Probabilistic Ground Motion Values in Fraction of Gravity

	10% PE in 50 years	2% PE in 50 years
Peak Ground Acceleration	0.12 -0.16 (use ave. 0.14)	0.46 - 0.59 (use ave. 0.53)
Seismic Mercalli Intensity Scale (I to X)	VI (Strong)	VIII (Severe)

These pseudo-static acceleration values were applied to the critical failure surface on the landfill north slope. This slope was selected for further earthquake evaluation because it showed the lowest factor of safety under static conditions, and this slope will not receive additional abutment wastes similar to the south slope (with similar static factor of safety of 1.8).

A dynamic factor of safety of 1.0 is generally considered adequate to preclude dangerously large deformations during anticipated seismic events when subjected to a pseudo-static acceleration equal to 50% of the peak anticipated acceleration (Hynes-Griffin and Franklin [1984]). Modeling of the existing north slope under current condition showed a factor of safety of 1.1, even under the 2% probability of exceedance (PE) scenario, which indicates that the slope is not prone to failure under the prescribed earthquake acceleration.

Operational Stability Evaluation

During the 2005 RB&G evaluation, a recommendation was provided relative to the rate at which waste materials might be placed without causing a build up of pore water pressure that could cause a slope failure near the “end-of-construction.” The recommended disposal rate was less than 5 vertical feet in any 6-month period. During the past two years of operation, the average height of waste added to the landfill has been less than 5 feet based on the topographic surveys completed in 2006 and 2008 by Dominion. Therefore, this condition for potential short-term failure (near end-of-construction) is not expected to occur.

Closure Stability Evaluation

ERM also evaluated the proposed final slopes of the landfill at closure based on the drawings for Phases I and II prepared by Dominion. The final slopes are 2H:1V with a final landfill top elevation at roughly 4582.5

feet. The final slope on each side of the landfill will include one or more terraces where the access road will remain in place around the landfill perimeter. The closure stability evaluation consisted of both static and dynamic analyses for the west and east slopes as shown on Figure 3. Analysis for the north and south slopes was not performed as they are similar in length, height and slope (with terraces) to the east and west slopes; plus future expansion of the landfill (future Phase III) will eventually abut the Phase I and II south slopes.

The factors of safety for the future closure slopes are summarized on Table 4, and the plots showing the critical failure surfaces are provided in Attachment A. The stability of the slopes satisfy the conservatively accepted factor of safety of 1.5 for the static conditions, and the pseudo-static (earthquake) conditions were satisfied for the east slope, and close to the acceptable range for the west slope under the 2% probable exceedence acceleration value.

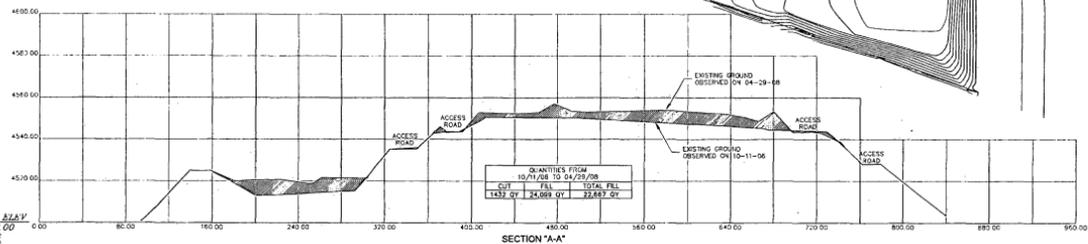
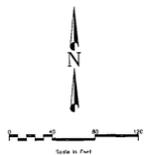
Table 4 - Factors of Safety for Landfill Closure Slopes

	Static Conditions	2% PE in 50 years (ave. PGA = 0.53)	10% PE in 50 years (PGA = 0.14)
West Slope	1.9	0.91 (Ground acceleration of 0.44g not expected to cause deformation)	1.5
East Slope	2.6	1.1	Not analyzed because 2% PE resulted in FS>1

During the dynamic analysis, the slopes were first tested using the higher PGA value with 2% PE, and then if the factor of safety was less than one, an iterative analysis was performed to estimate the maximum pseudo-static acceleration value that could be applied while maintaining a factor of safety of one. Through this analysis, the west slope was determined to be stable under a ground acceleration value of up to 0.44g without significant deformation. This value is just below the potential range of ground acceleration values (2% PE) for this area.

DP-12
 DW: MBL
 N=1008.89
 E=1009.24
 ELEV=4503.97

GP-11
 PW: MBL
 N=1023.82
 E=1028.27
 ELEV=4512.86



DATUM ELEV
 4500.00
 CIP: 1
 SECTION: 1

DATE: 10/17/06
 BY: MBL
 CHECKED: MBL
 DATE: 10/17/06

DRAWN: 10/17/06
 CHECKED: MBL
 DATE: 10/17/06
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 APPROVED: 10/17/06
 DATE: 10/17/06
 PROJECT MANAGER: MBL

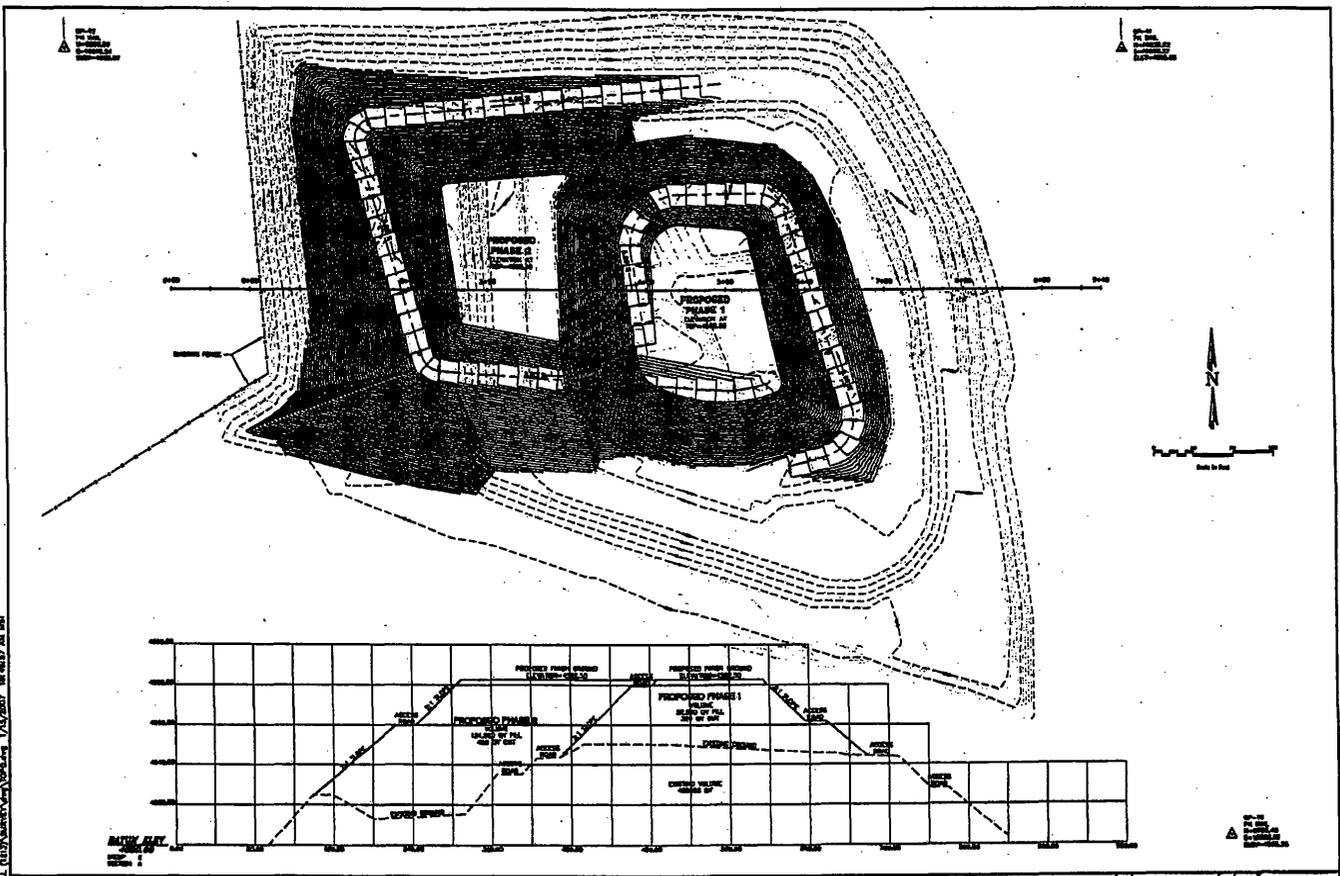
ENVIRONMENTAL RESOURCES MANAGEMENT
 SALT LAKE CITY, UTAH



PSC LANDFILL
 TOPOGRAPHIC MAP

PROJECT NO.	
SHEET NO.	1
QUANTITIES FROM TO DRAW	41 10-11-06
NO.	REVISIONS
BY	DATE
FILE NAME:	SCALE: 1"=40'

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P:\P&G Landfill (LUT)\SALT\Topo\Topo.dwg 1/21/2007 10:46:37 AM MEF

DATE:	1/21/2007
BY:	MEF
CHECKED BY:	
APPROVED BY:	

ENVIRONMENTAL RESOURCES MANAGEMENT
 SALT LAKE CITY, UTAH

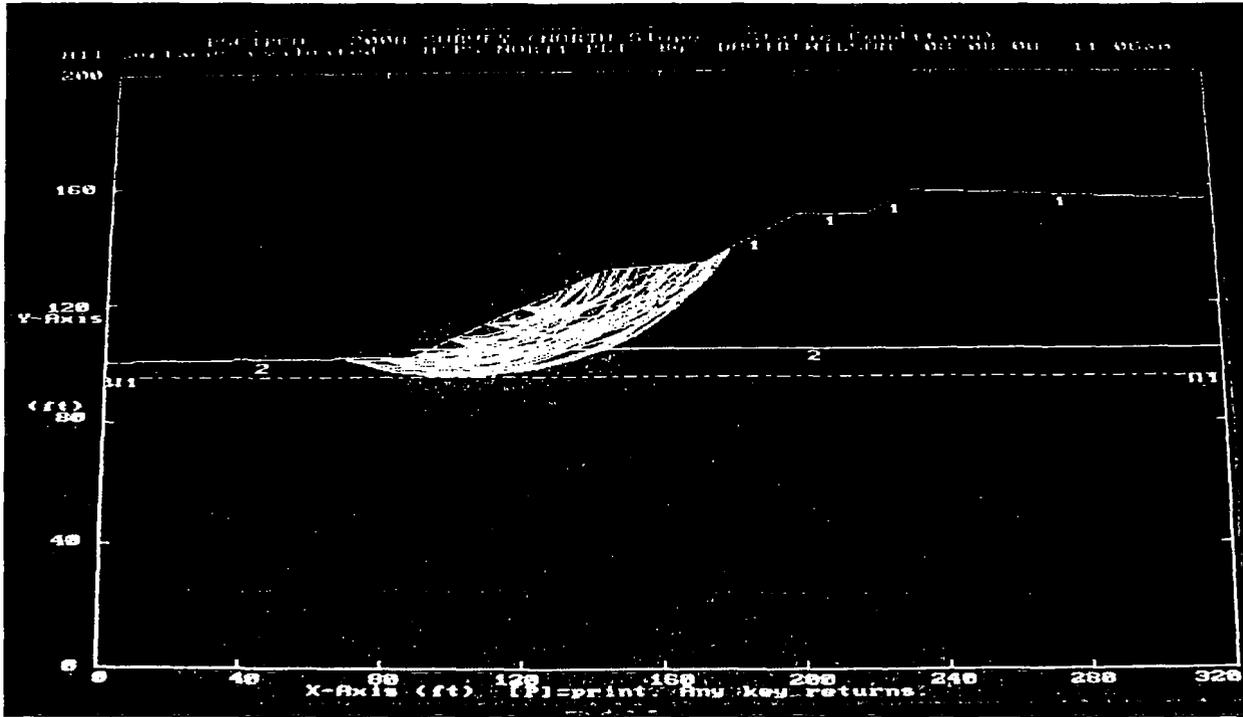


P&G LANDFILL
TOPOGRAPHIC MAP

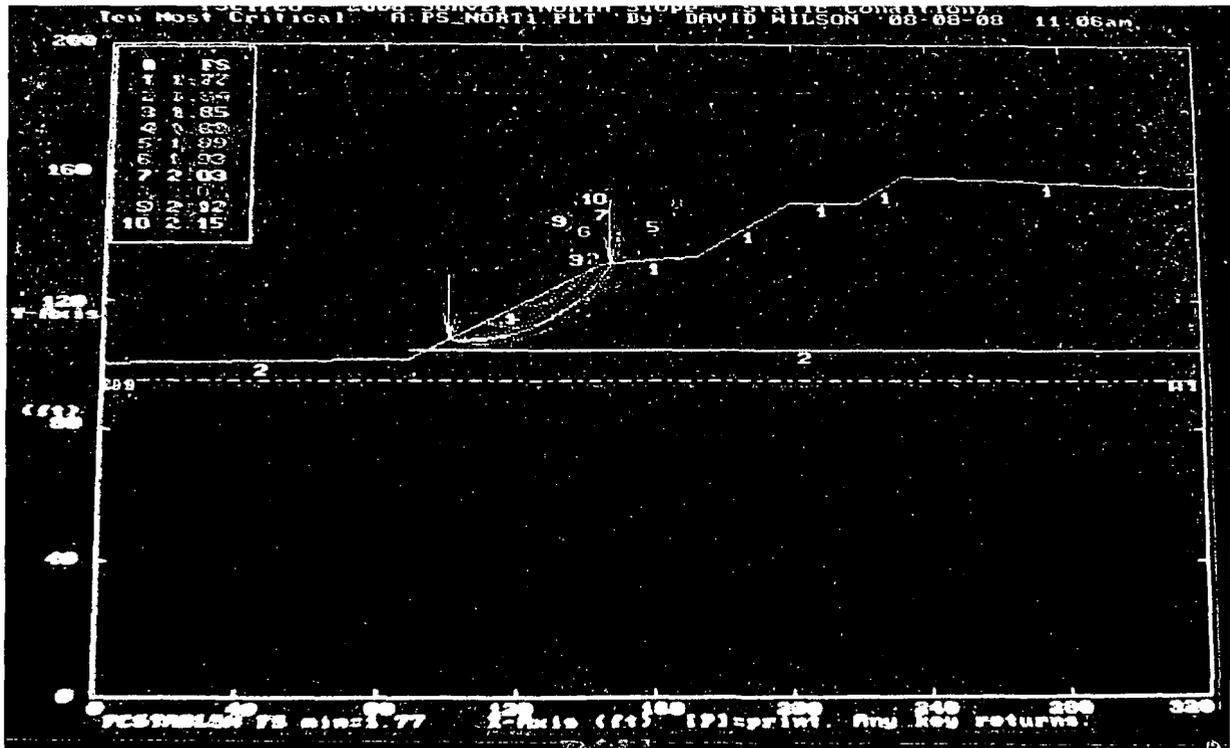
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3

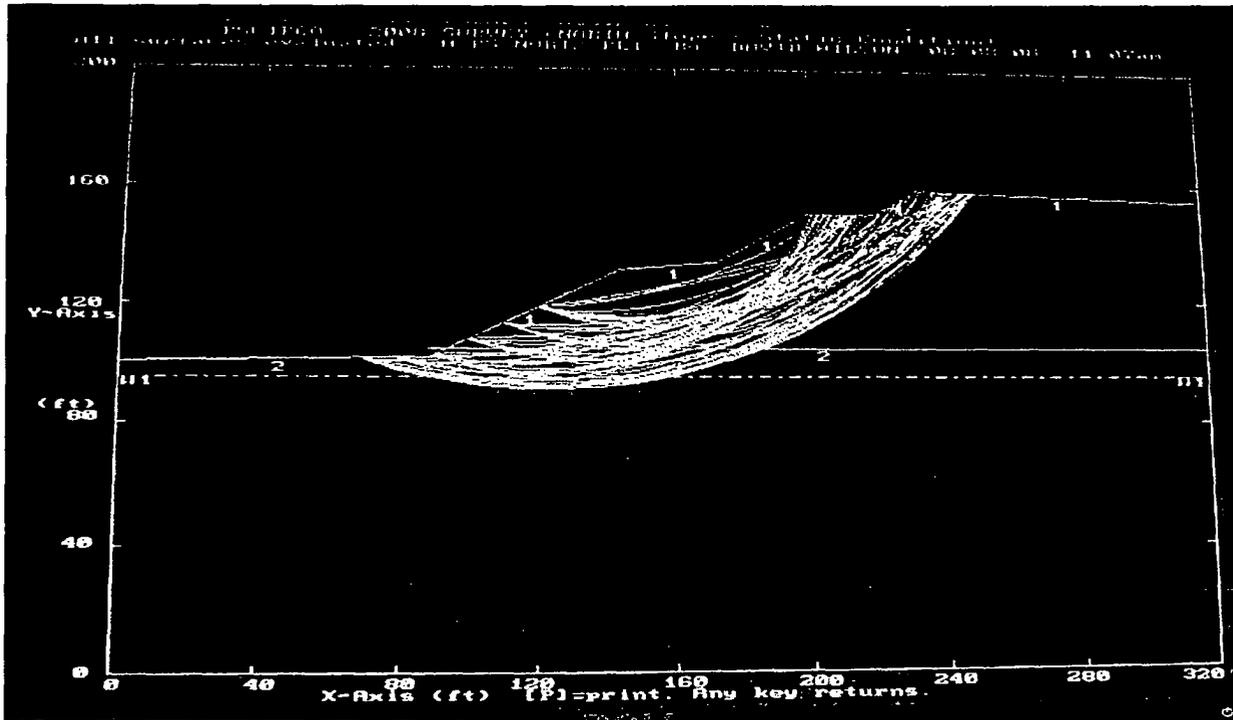
Attachment 3
Slope Stability Analysis



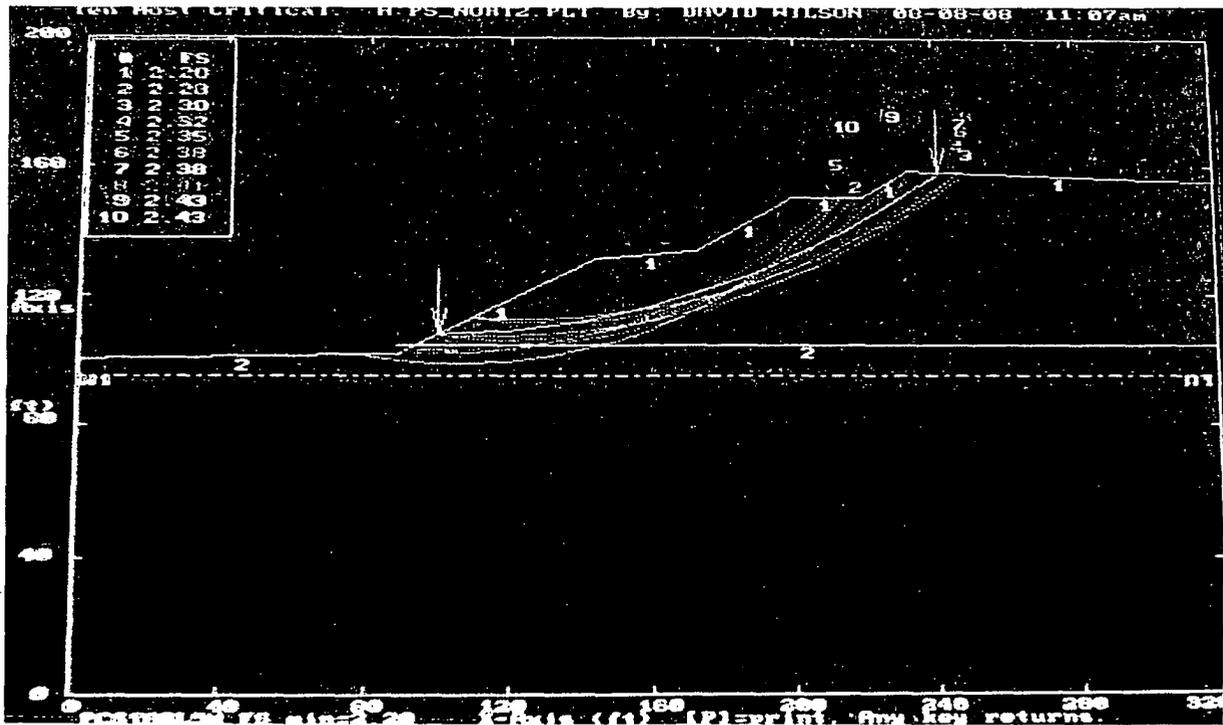
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2008 Survey North Slope



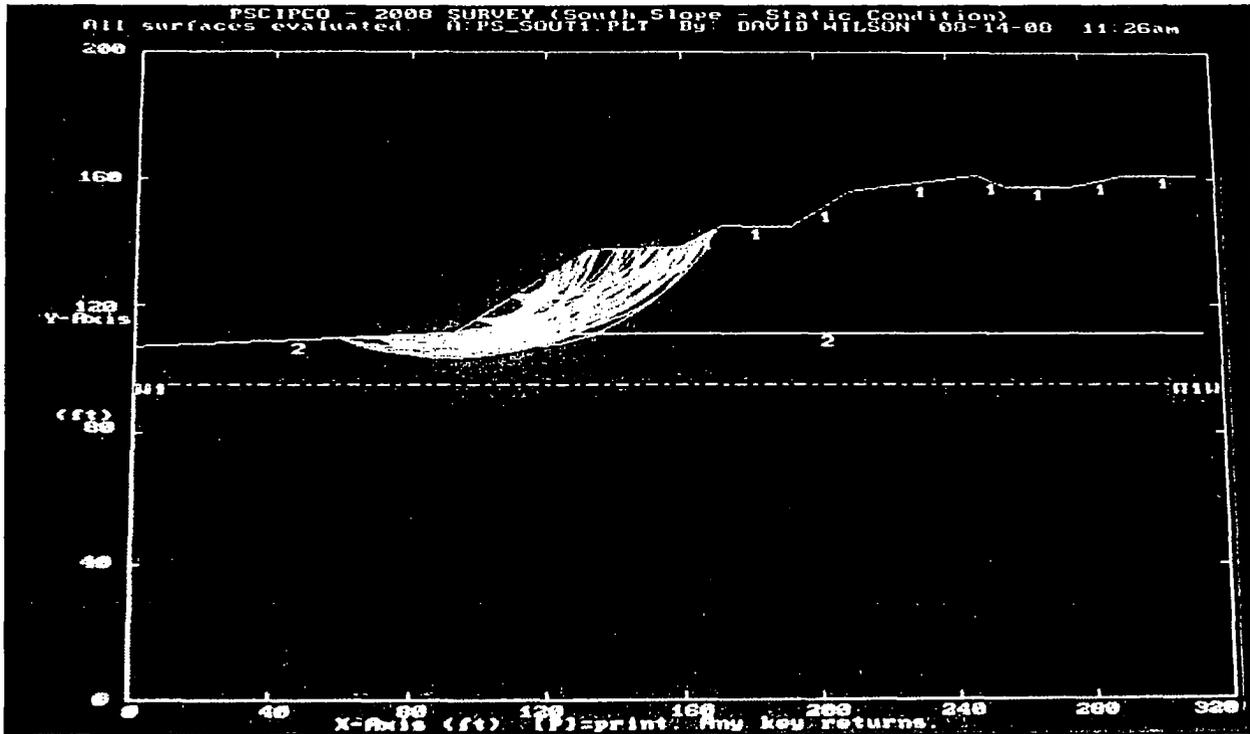
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2008 Survey North Slope Static Condition



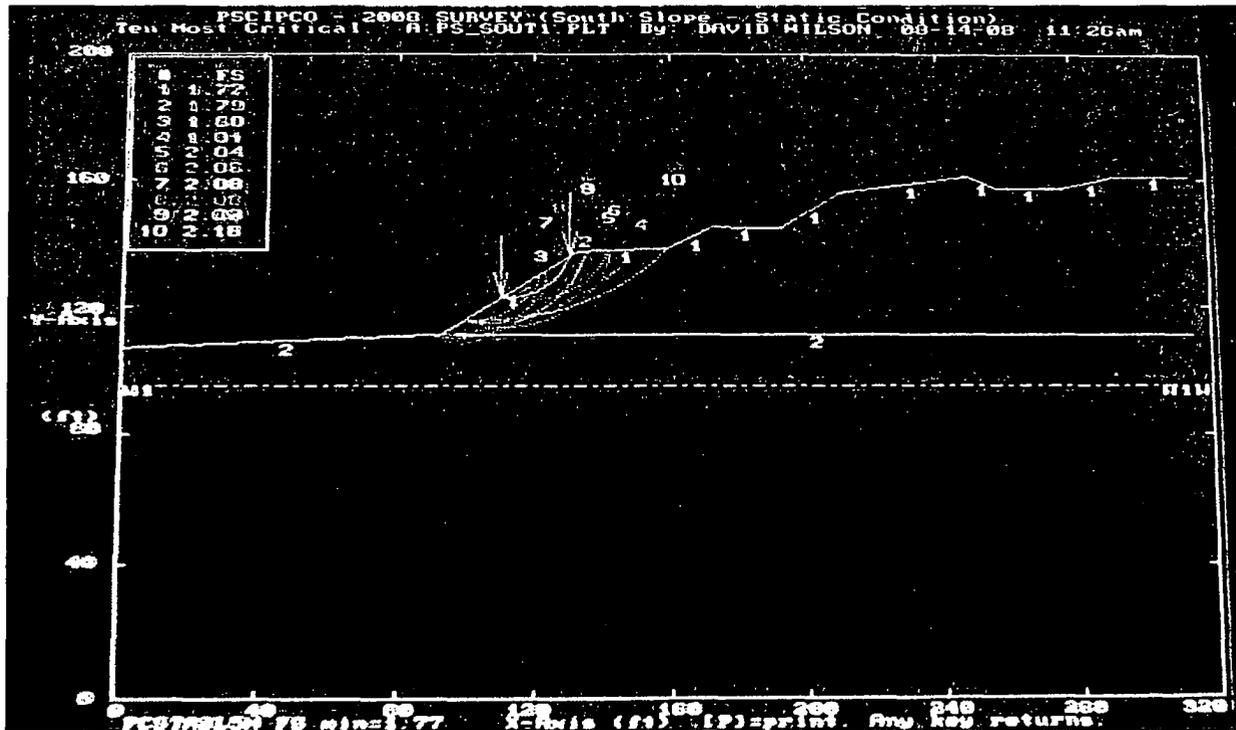
PS_NORT2
2008 Survey North Slope



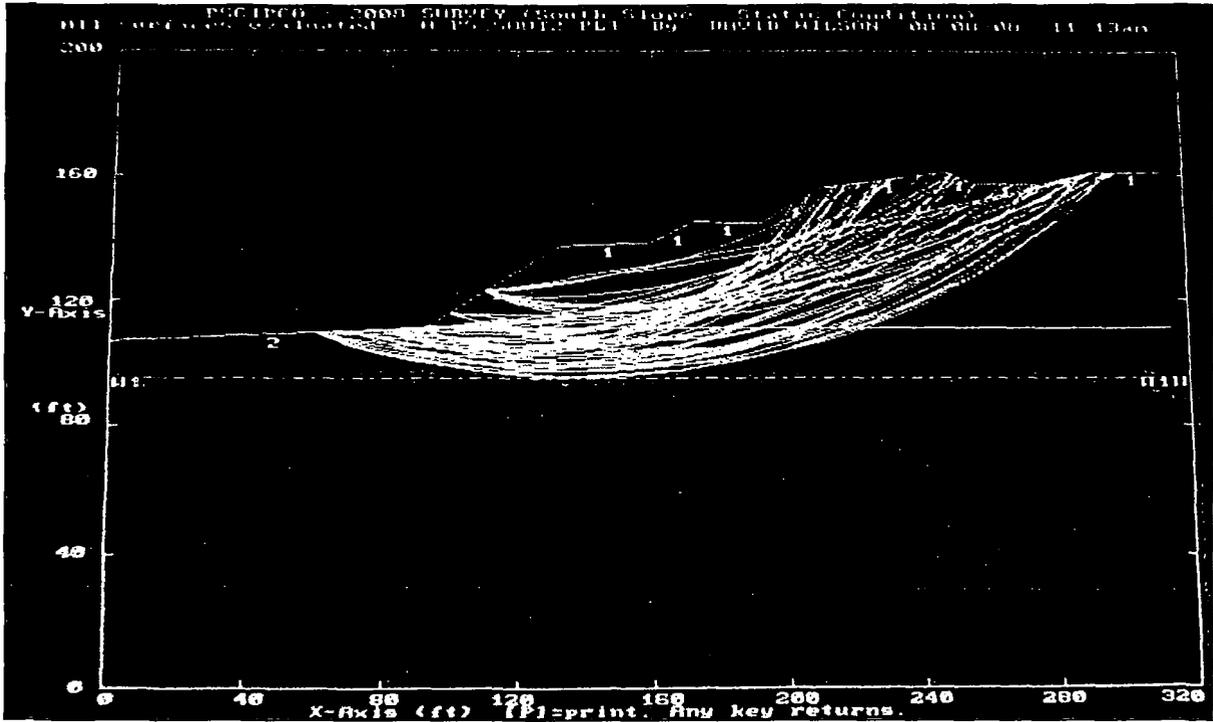
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2008 Survey North Slope Static Condition



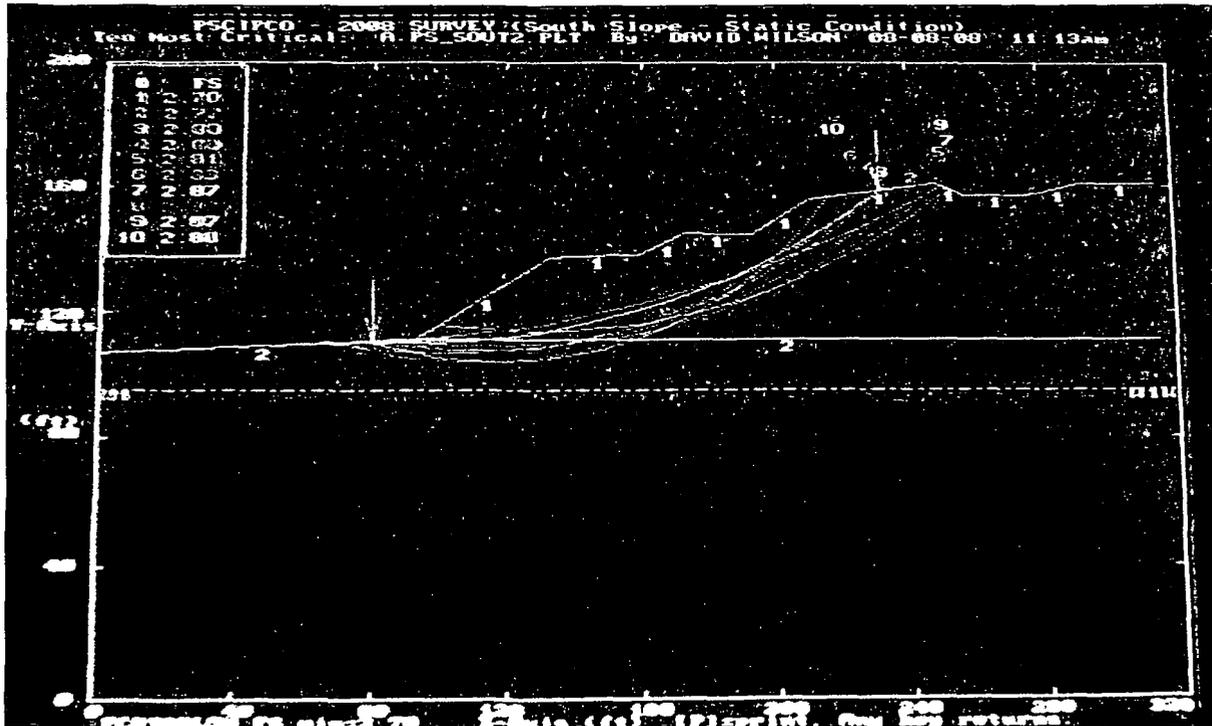
PS_SOUT1
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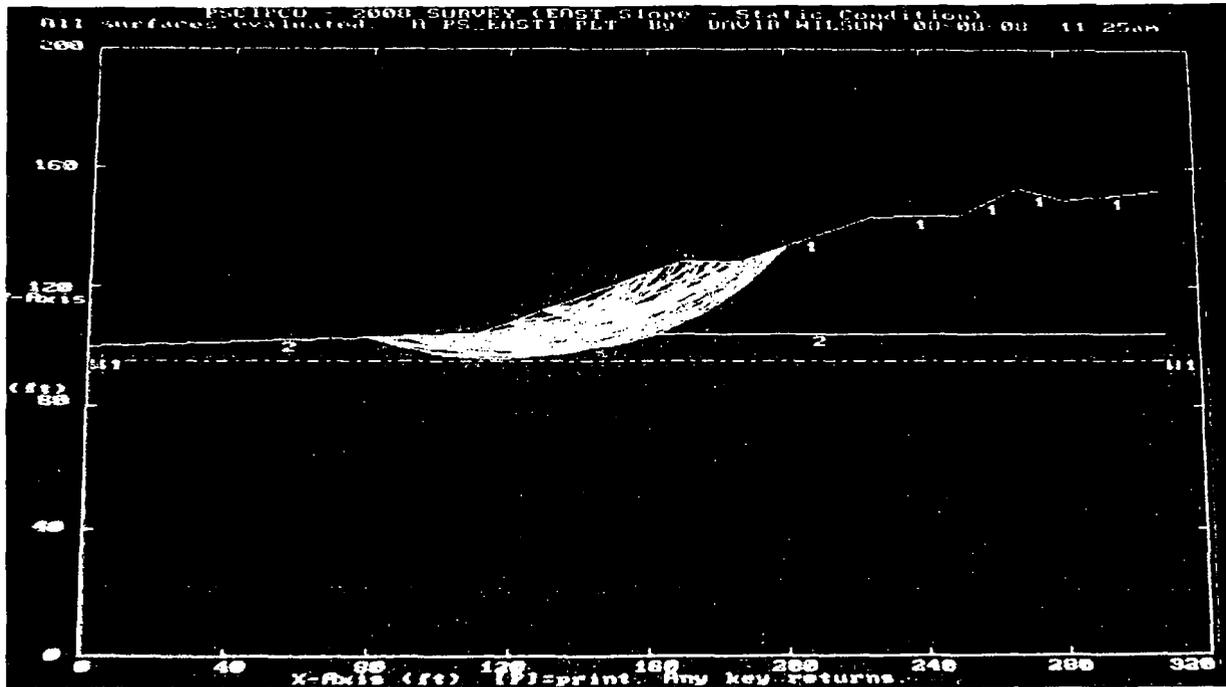
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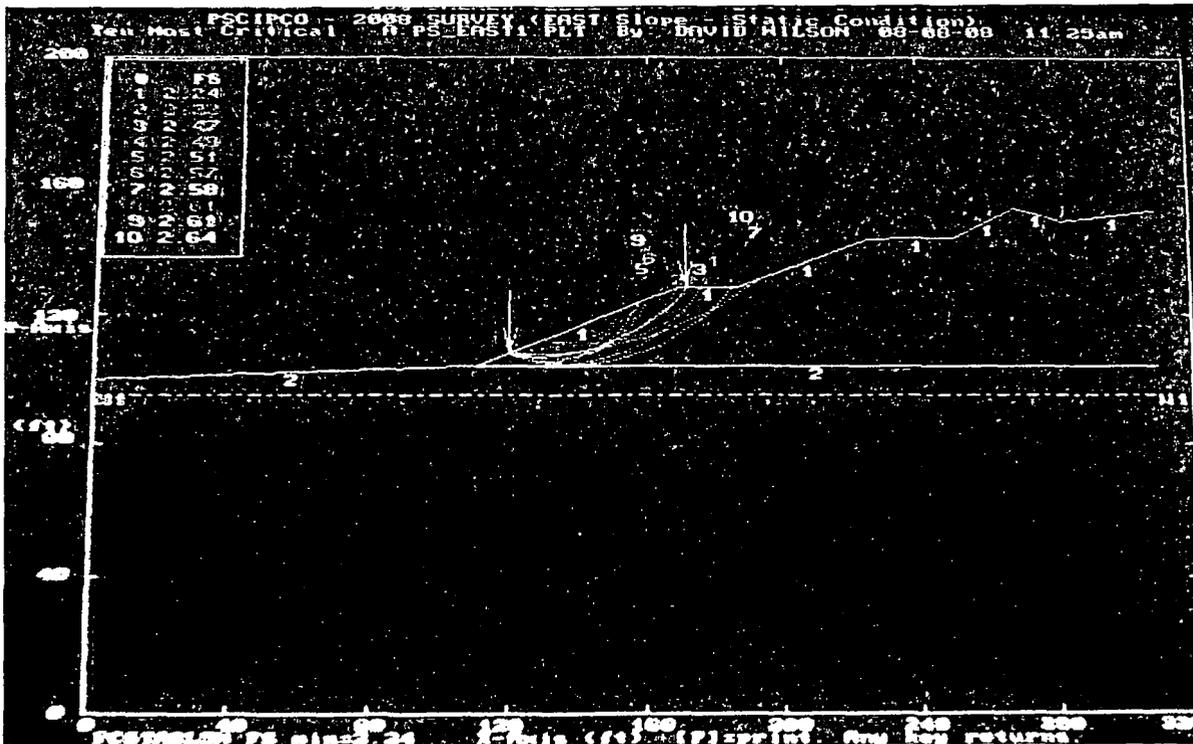
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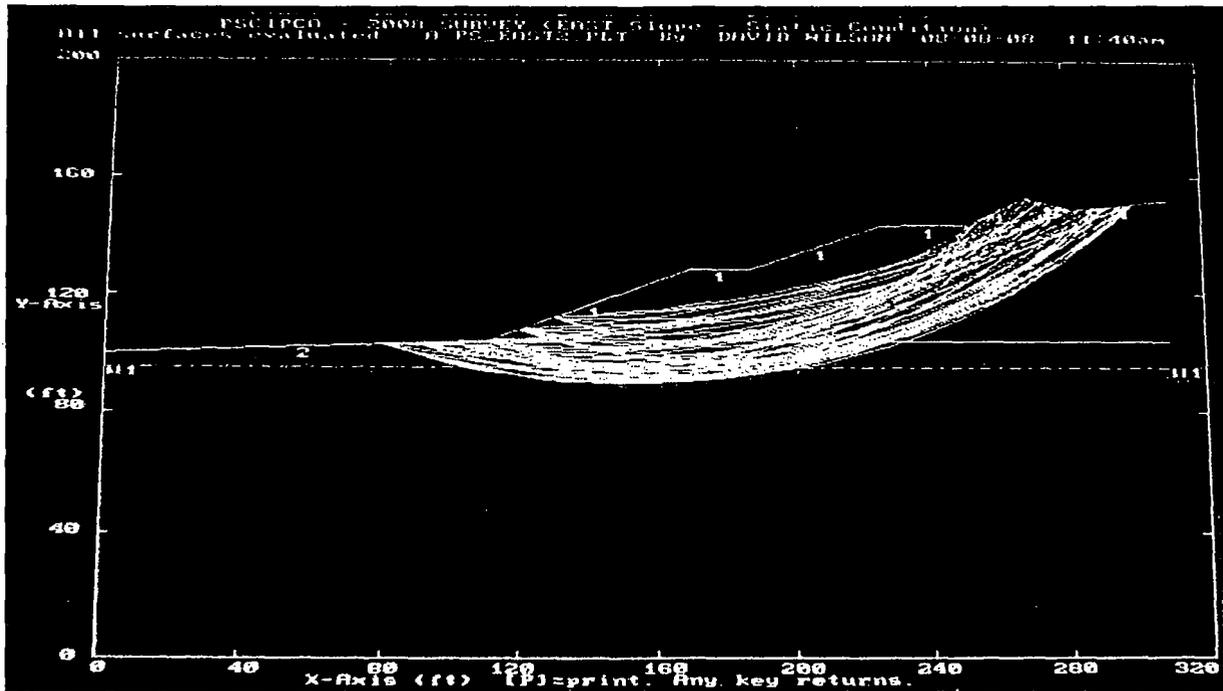
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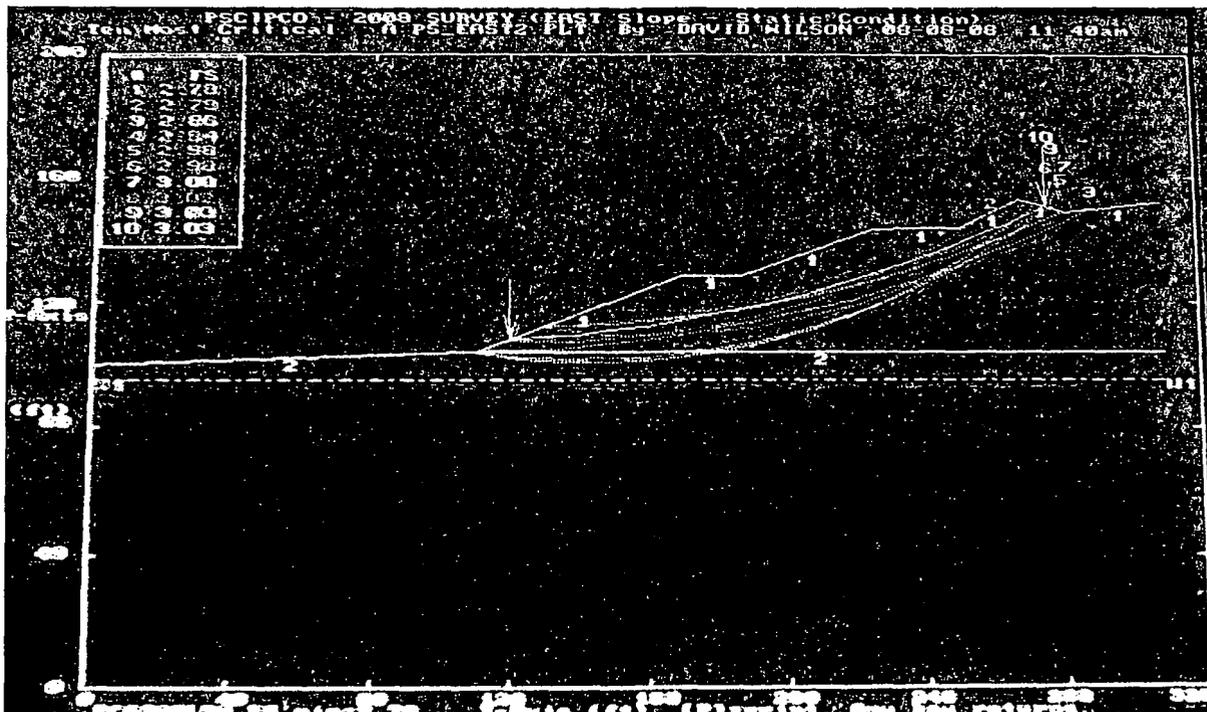
PS_EAST1
 2008 Survey East Slope



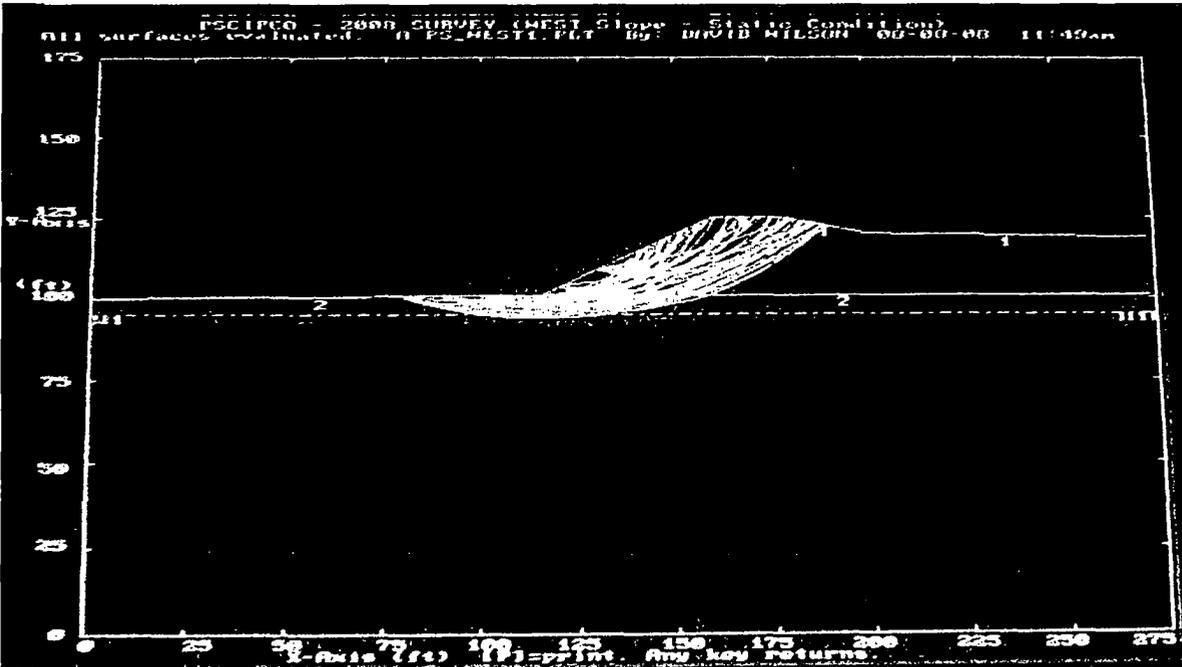
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 2008 Survey East Slope Static Condition



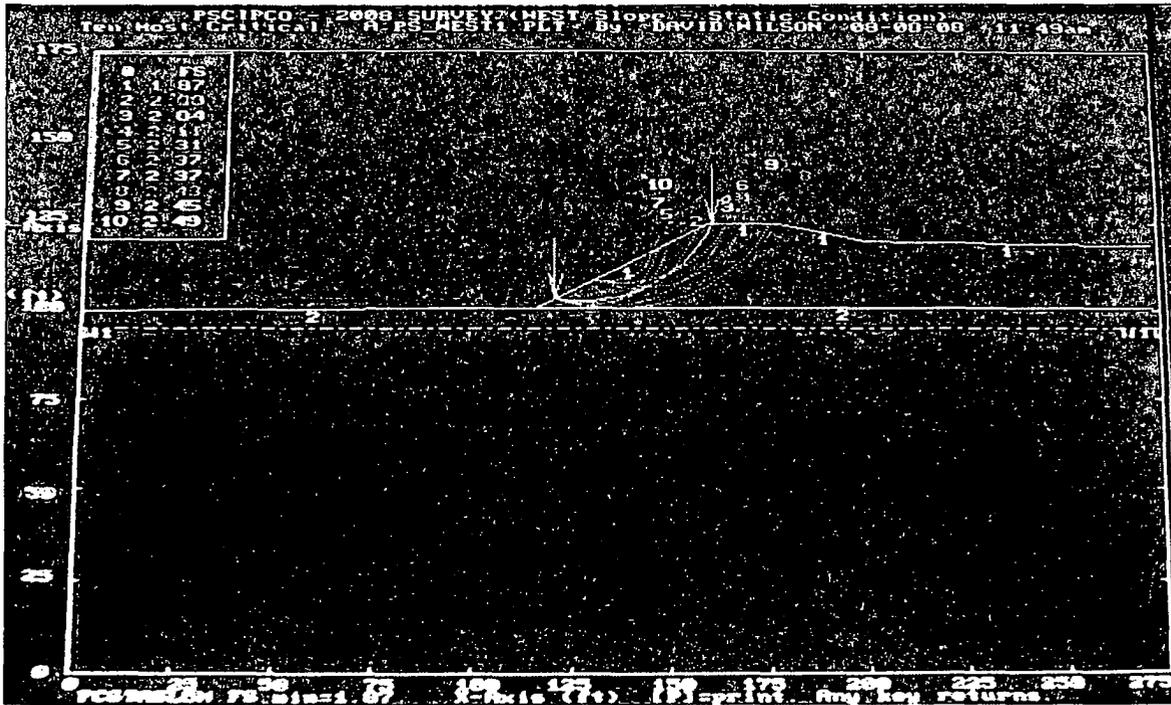
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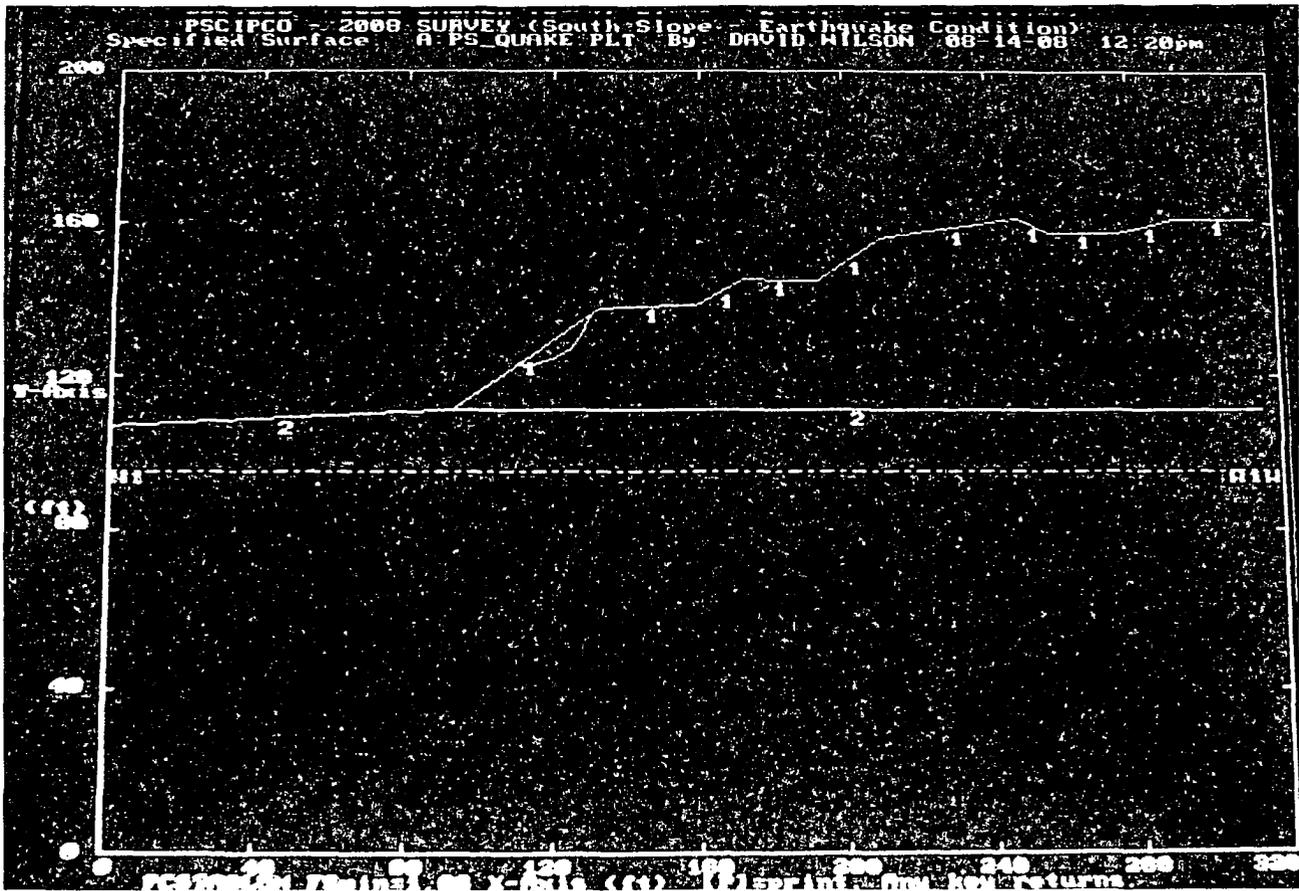
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 2008 Survey East Slope Static Condition



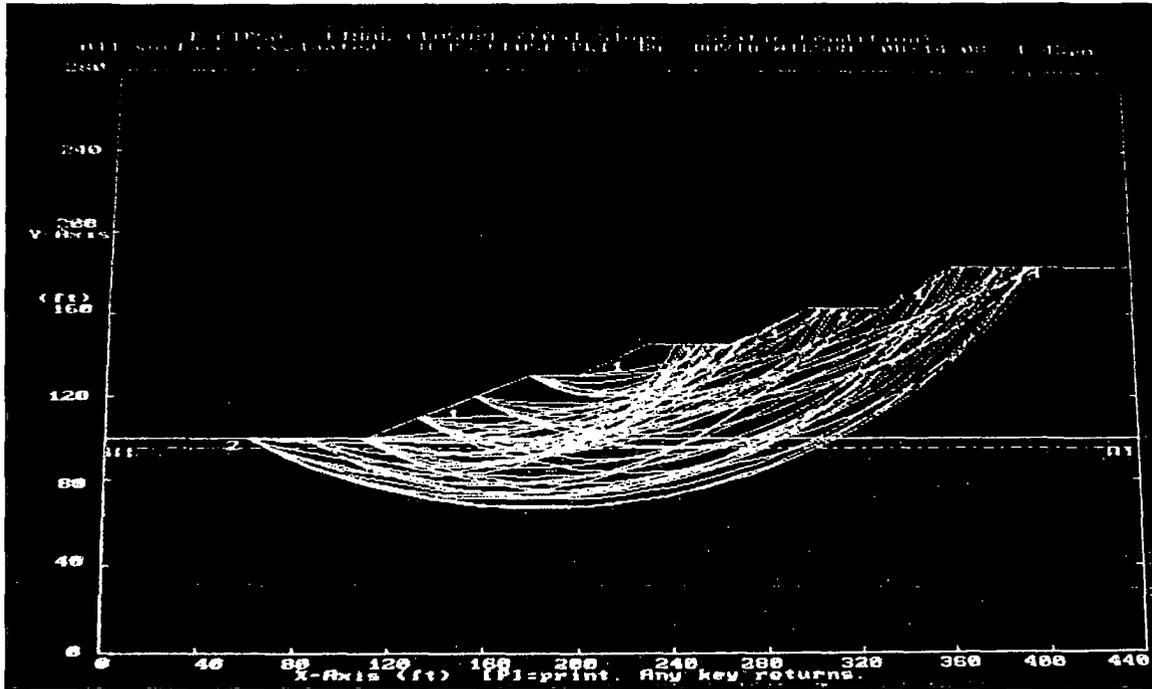
PS_WEST1
 2008 Survey West Slope



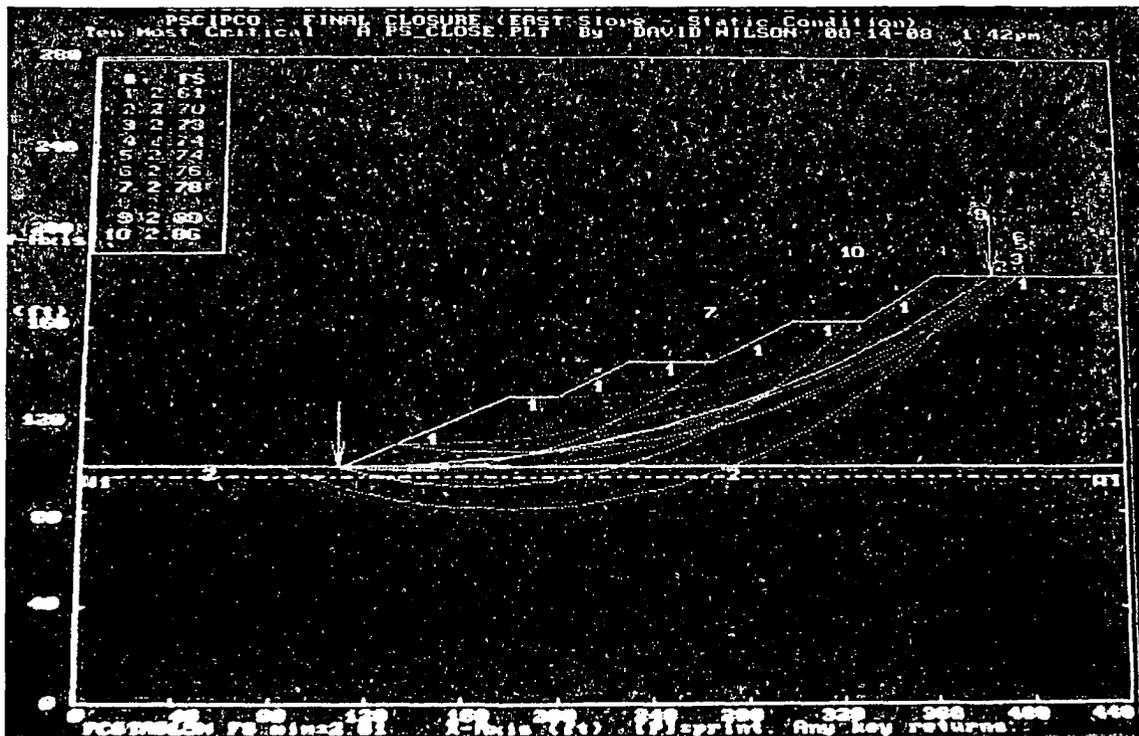
PS_WEST1
 2008 Survey West Slope Static Condition



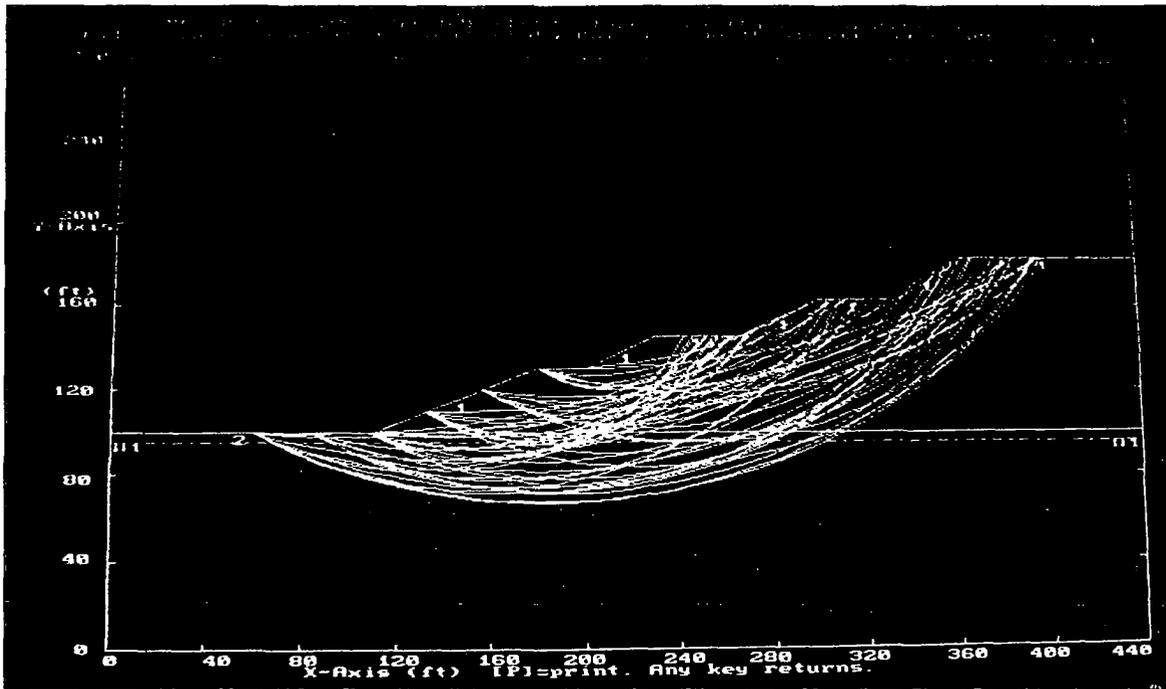
PS_QUAKE
 North Slope Earthquake Condition



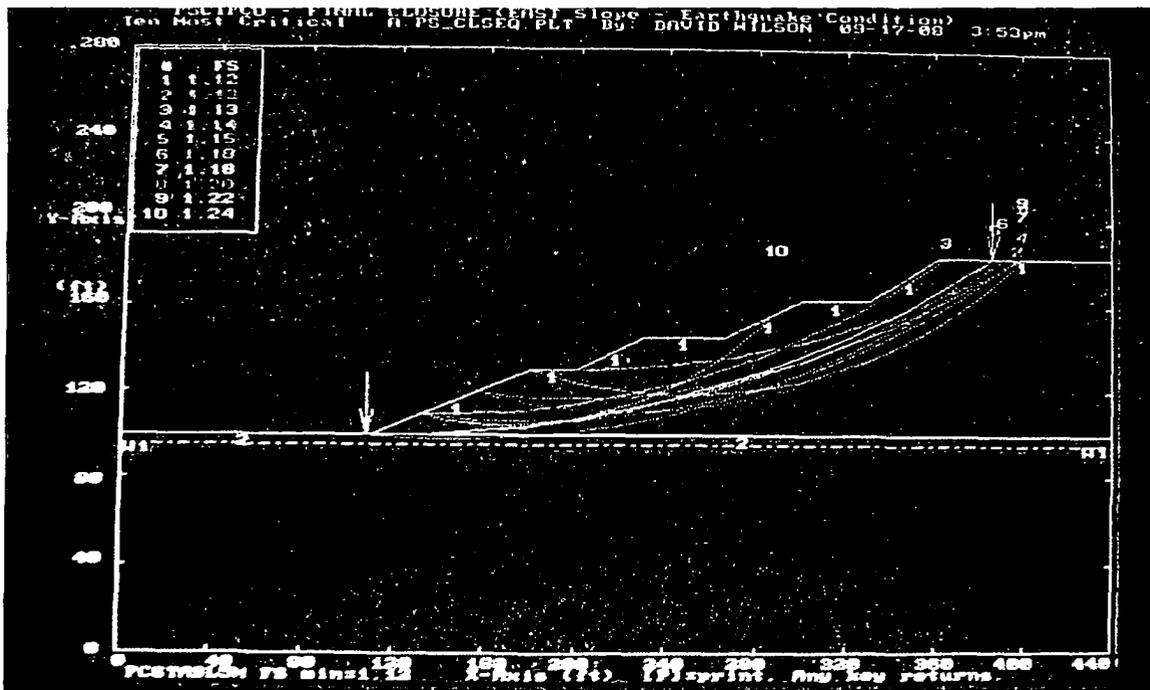
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Final Closure East Slope



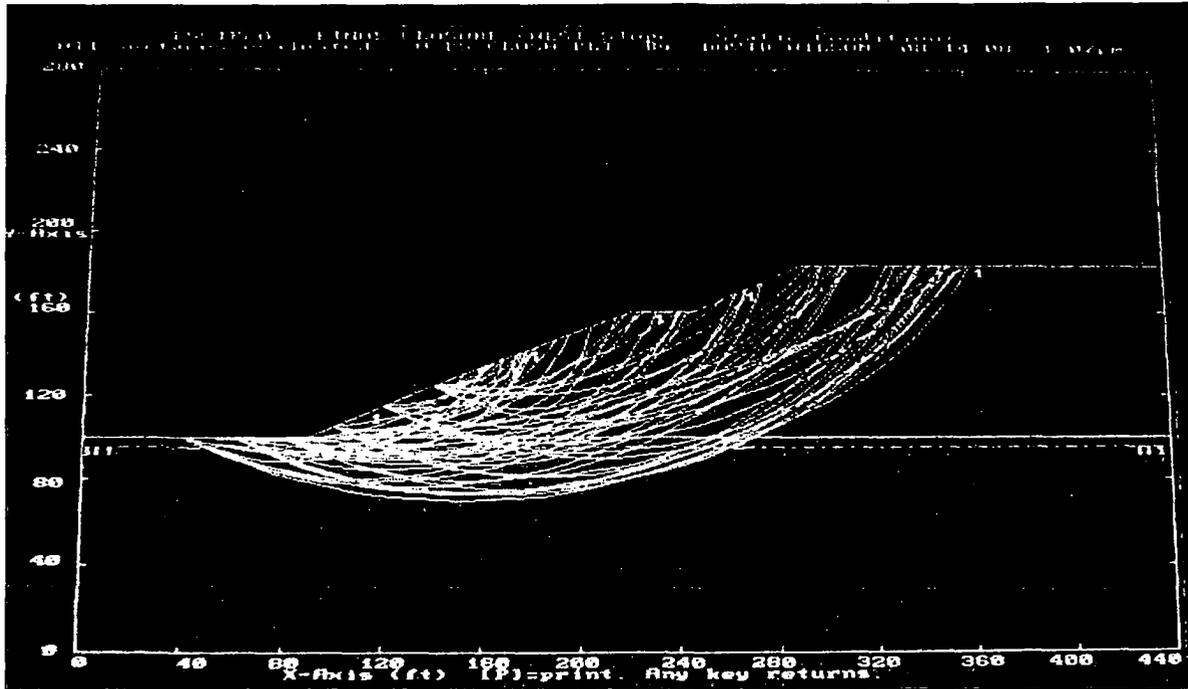
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Final Closure East Slope Static Condition



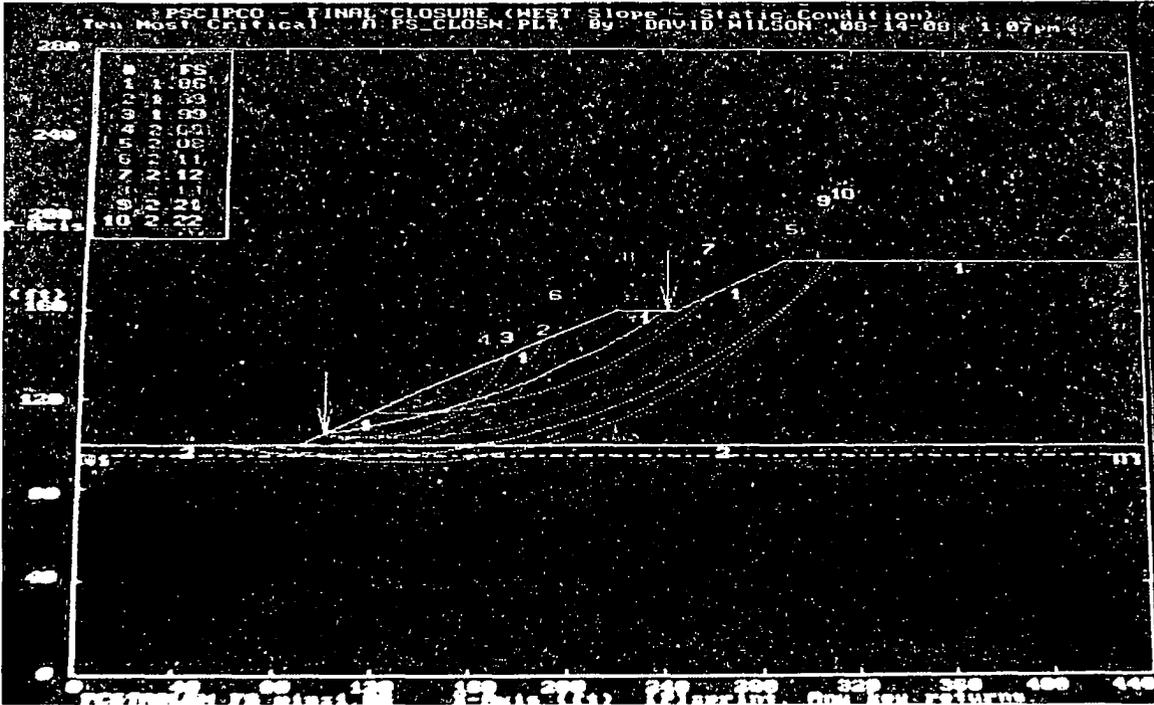
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 Final Closure East Slope Earthquake Condition



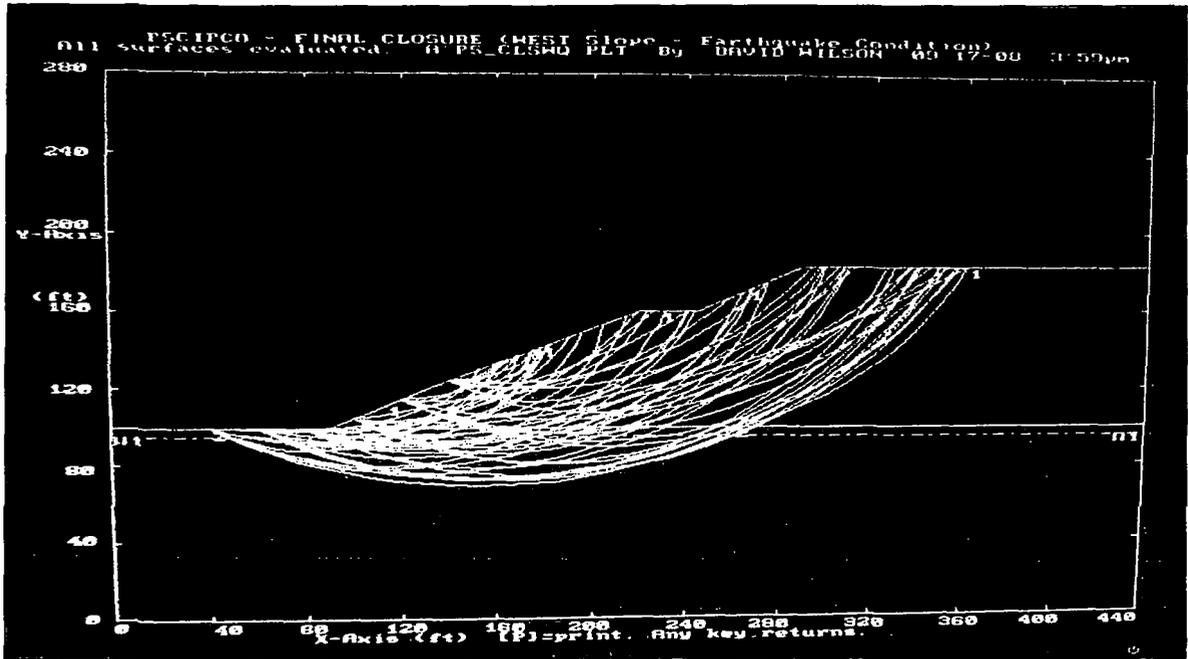
PS_CLSEQ



PS_CLOSW
Final Closure West Slope

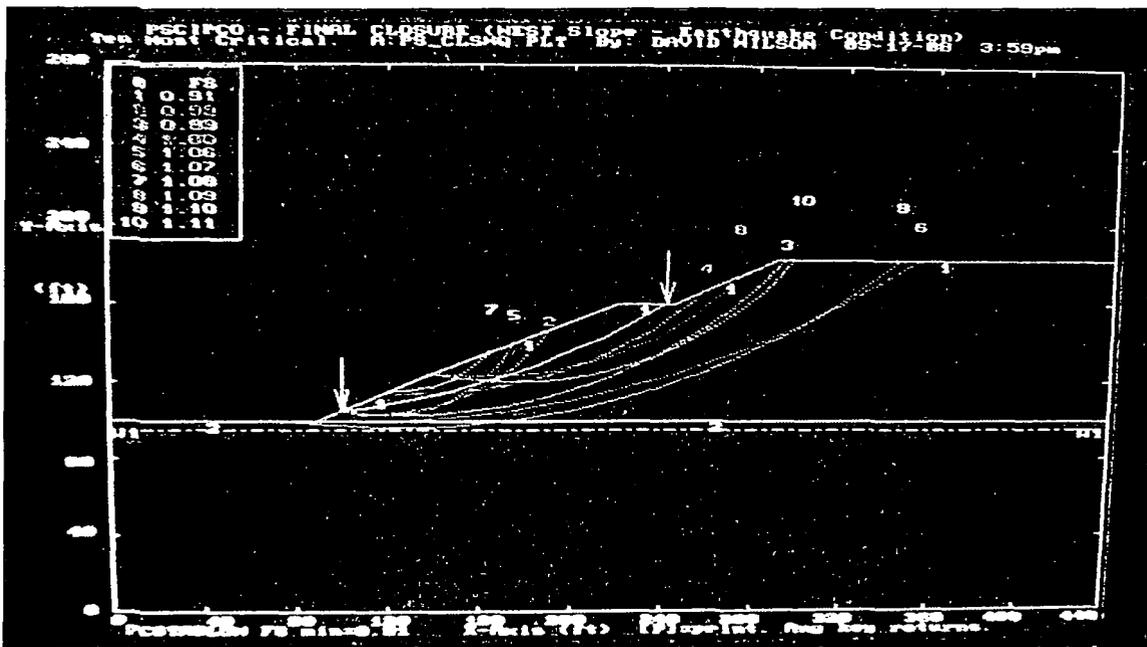


PS_CLOSW
Final Closure West Slope Static Condition



PS_CLSWQ

Final Closure West Slope Earthquake Condition (2% PE at 0.26g)



PS_CLSWQ (2% PE at 0.26g)

