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UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

# APPLICATION
for a
# PERMIT RENEWAL

# WHITE HILLS CLASS I LANDFILL

Sanpete Sanitary Landfill Cooperative
Mayfield, Utah

Submitted to:

**Dennis R. Downs, Director**
**Division of Solid and Hazardous Waste**
**Utah Department of Environmental Quality**

Prepared by:

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**Date: May 27, 2005**

**UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY**

**DIVISION OF SOLID AND HAZARDOUS WASTE**

APPLICATION FOR A PERMIT TO OPERATE A CLASS I LANDFILL

The applicant will submit, in duplicate, an original permit application, a general report, and a technical report to:

Dennis R. Downs, Director
Division of Solid and Hazardous Waste
Utah Department of Environmental Quality
PO Box 144880
Salt Lake City, Utah 84114-4880

## PART I - GENERAL DATA

1. Names of Facility: Sanpete Sanitary Landfill Cooperative Class I Landfill
2. Site Location: White Hills: Southern 1/2 of the Southeast 1/4 and northwest 1/4 of the Southeast 1/4 of Section 25, Township 19 South, Range 1 East.
3. Facility Owner: Sanpete Sanitary Landfill Cooperative
4. Facility Operator: Hansen Lumber, Incorporated
5. Contact Person: Doug Bjerregaard, Cooperative Chairman

   Address: 111 N 100 W
   P.O. Box 7
   Mayfield, UT 84643

   Telephone: (435) 528-3255

6. Type of Facility: This Landfill is operated as a "nonprofit" Landfill.

   (x) Class I Landfill ( ) Initial Application

   ( ) Class V Landfill (x) Permit Renewal
   Original Permit Number 9817
   Issued October 26, 2000

7. Property Ownership:

   (x) Presently owned by applicant

Property owner (if different from applicant):

Name: _____

Address: _____

_____

Telephone: _____

8. Certification of submitted information:

_____ _____

(Name of Official) (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 and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Signature: _____ Date 5/25/05

SUBSCRIBED AND SWORN to before this 25th day of May, 2005.

My commission expires on the 27th day of April, 2007.

_____

Notary Public in and for Far West Bank

(SEAL) _____ Sanpete County, Utah.

VALEAR B. JACKMAN
NOTARY PUBLIC - STATE OF UTAH
2 North Main, PO Box 705
Ephraim, UT 84627
My Comm. Exp. 04/27/2007

# SECTION ONE: GENERAL REPORT

## 1.1 APPLICANT INFORMATION

The applicant and owner of the Landfill property are:

Sanpete Sanitary Landfill Cooperative
Mr. Doug Bjerregaard, Chairman
P.O. Box 7
111 N 100 W
Mayfield, Utah 84643

The responsible party for the Landfill operation is:

Mr. Larry Hansen, Contractor
RR#1, Box 447
Fairview, Utah 84629

Proof of ownership is provided in Attachment 2.

## 1.2 GENERAL AND LEGAL DESCRIPTIONS OF THE FACILITY

Sanpete County, located in central Utah, is bordered on the north by Utah County, on the west by Juab and Millard Counties, on the east by Carbon and Emery Counties, and on the south by Sevier County.

The Sanpete Sanitary Landfill Cooperative (Coop) operates a nonprofit, Class I Landfill at the "White Hills Site." All funds generated by Landfill operations are retained by the Sanpete Sanitary Landfill Cooperative and used only to finance solid waste management services within Sanpete County.

The Landfill is located in the south ½ of the southeast ¼ of Section 25, and in the northwest ¼ of the southeast ¼ of section 25, Township 19 South, Range 1 East, Salt Lake Baseline and Meridian, four miles southeast of Gunnison, Utah. The Site is accessed from State Route 137 to the North.

The Site is approximately 5,440 feet above sea level, about 200 feet higher than Sevier Valley. The Landfill has been constructed in a broad, gently sloping amphitheater, on the western slope of the White Hills of Sanpete County. The area slopes downward to the west at an average slope of three to 5 percent. Surrounding hillside slopes exceed 30 percent. A location map is included as Attachment 3.

The Landfill unit was developed within a 400-acre parcel purchased from the U.S. Bureau of Land Management (BLM). The active facility is fenced and posted, with one gate house to control access.

The legal description of the property owned by the Cooperative is:

Parcel: 04-003-0010

Beginning at the South quarter corner of Section 25, Township 19 South, Range 1 East, Salt Lake Baseline and Meridian, running North 1,320 feet, thence West 1,320 feet, thence North 5,280 feet, thence East 2,640 feet, thence South 5,280 feet, thence East 1,320 feet, thence South 1,320 feet, then West 2640 feet to the point of beginning, containing 400 acres.

Consisting of: the Southeast 1/4 of the Southwest 1/4, and the Southwest 1/4 of the Southeast 1/4 of Section 24; the East 1/2 of the Northwest 1/4, the West 1/2 of the Northeast 1/4, the Northeast 1/4 of the Southwest 1/4, the Northwest 1/4 of the Southeast 1/4, and the South 1/2 of the Southeast 1/4 of Section 25, Township 19 South, Range 1 East, Salt Lake Baseline and Meridian.

Approximately 20 acres of the entire 400 acres have been developed as a Landfill during the lifetime of the initial permit.

## 1.3 HOW THE LANDFILL RELATES TO THE SWMP

Sanpete County's Solid Waste Management Plan (SWMP), dated July 1, 1993, states *"Sanpete County has chosen land filling as the solid waste management tool it will use for the next twenty years. We have chosen this method of solid waste management because of the availability of landfill space. Our communities are widely spread throughout the County and this method is by far the most economical and feasible method available at this time."*

Sanpete is currently closing a Class II facility. That Landfill, owned by the Cooperative, is located 5 miles north of Ephraim on Highway 89.

Because the Chester Class II Landfill sits over shallow ground water and because the County's population now generates waste that exceeds the Class II's capacity, the Coop decided to construct a new Class I facility. In March of 1998, the Coop contracted with Tahoma Companies, Incorporated, to prepare a permit to construct and operate a Class I Municipal Solid Waste Disposal Facility.

At the present time, Sanpete Sanitary Landfill Cooperative and Seven States Recycling Company, Inc. collect recyclable steel, iron, and aluminum paper to be processed for shipment to various steel mills. In addition, the Coop charges $2.00 a tire for used tires to be deposited at the White Hills facility. The Moroni Feed Company and others periodically bring several hundred tires to the Site. A tire disposal company then picks up the tires and hauls them away for recycling.

The Coop does not plan to start a more formal recycling program due to the high costs for processing and small market for recycled goods in the County.

The Coop set up a public education program that ran concurrently with the permitting process. The program informed citizens about changes being made in solid waste management, including:

- Opening the new Landfill,
- Informing people about prohibited wastes,
- Encouraging waste reduction, and
- Discouraging illegal dumping.

Examples of the public education materials developed by the County are available on request.

## 1.4 TYPES OF WASTE AND AREA SERVED

Sanpete, a rural agricultural county, contains approximately 24,000 people. The White Hills Class I facility receives waste from throughout the entire County.

Four commercial haulers currently provide curbside collection service to most of the County's businesses and homes. These four are:

North Sanpete Sanitation

White's Sanitation

Manti City Waste Collection

Snow College

The Coop states that 45.875 tons per day of solid waste (per 365 day year) were buried at the facility during 2004. This estimate includes municipal, commercial, yard, construction/demolition, and all nonhazardous industrial wastes.

The vast majority of the waste comes from households. Only a few large commercial or industrial enterprises operate in Sanpete County, including a State of Utah correctional facility east of Gunnison.

## 1.5 BASIS FOR CALCULATING FACILITY'S LIFE

Because of demographic changes throughout Utah, especially on and near the Wasatch front, population and waste generation in Sanpete County should continue to grow.

According to the Sanpete County Department of Economic Development, the growth rate for fiscal years 2000 through 2003 was 4.1 percent, or 1.37 percent per year. Based on the 2003 census estimates, population changes were projected through the year 2016.

An initial waste generation rate of 54.9 tons per day (per 305 days open per year) and a three percent (3%) per year increase in Landfill use formed the basis of projections for Landfill usage.

Fourteen or more, 14 to 30 feet deep trenches for municipal waste will eventually be excavated on about 17 acres of the White Hills Site. After the first two trenches are filled, area method cells of municipal waste will be built on top of them. Upon completion of these area method cells, the next two (2) adjacent trenches will be filled and then covered by area method cells. This process will repeat until all trenches have been filled and then covered with additional waste by the area method.

Projected waste tonnages and volumes are shown in Attachment 4.

## 1.6 STATE AND LOCAL REQUIREMENTS

Sanpete County has no local ordinances or requirements governing landfills.

The Cooperative (Coop) operates in compliance with all UDEQ regulations and administrative rules governing solid waste management facilities within the State. In addition, Utah Department of Air Quality requirements were met by the Coop through development of a Dust Control Plan before beginning construction and operations at White Hills.

## 1.7 PLAN OF OPERATION

This Plan of Operation was written to conform with the requirements of UAC R315-302-2(2) and briefly describes the operations of the Sanpete Sanitary Landfill Cooperative Class I Landfill.

### 1.7.1 Schedule of Construction

The White Hills Landfill has been open since July 5, of 2001.

### 1.7.2 Operating Hours

The Landfill operates during the summer, Monday through Saturday, from 10 a.m. to 6 p.m. During winter months, the Landfill opens at 10:00 a.m. and closes at 5:30 p.m. or dusk.

The Landfill is closed on Sundays and the following holidays:

- New Years Day
- Memorial Day
- Fourth of July
- Twenty-fourth of July
- Labor Day
- Thanksgiving Day
- Christmas Day

The following information is posted at the gate:

**WHITE HILLS LANDFILL**
**Property of Sanpete Sanitary Landfill Cooperative**

Hours of Operation:
Monday through Friday 10:00 a.m. to 6:00 p.m.
Saturday 10:00 a.m. to 6:00 p.m.
During Winter Months, 10:00 a.m. to 5:30 p.m. or dusk
Closed on Sundays and Holidays

- PLEASE OBEY ALL SIGNS
- DUMP ONLY IN DESIGNATED AREAS
- SCAVENGING IS STRICTLY FORBIDDEN
- LIQUIDS AND HAZARDOUS MATERIALS ARE PROHIBITED

IN CASE OF EMERGENCY, CONTACT:

Larry Hansen, Solid Waste Management Supervisor
Office: (435)427-3815 Home: (435) 427-3812
OR
Sanpete County Health Department (435) 462-2449

### 1.7.3 Personnel Requirements

#### 1.7.3.1 Job Description

The following persons are responsible for on-site operations:

- **Solid Waste Management Supervisor**. The SWM Supervisor manages overall operation of the SWM system. Through regular inspections and monitoring, the Supervisor also ensures the facility's compliance with the requirements of the permit issued by the DSHW. The Supervisor oversees the production of annual environmental and financial reports. All Equipment Operators and visitors report to the Supervisor.

To fulfill these responsibilities adequately, the SWM Supervisor should have 10+ years operating heavy equipment, with two (2) years' supervisory experience. Each year of college training or special training can equal two or more years of experience—at the discretion of the Coop.

- **Equipment Operators.** The Equipment Operators are responsible for all day-to-day activities of the Landfill. These responsibilities include waste acceptance and placement, traffic control, safe operation and maintenance of equipment, visual inspection of each incoming load, random waste screening operations, application of daily, intermediate, and final cover, and general maintenance of the facility—including litter control. The Supervisor may designate an Equipment Operator to act on his or her behalf during absences.

  To complete these tasks adequately, Equipment Operators should have at least two years experience operating heavy equipment.

A minimum of two employees staffs the Landfill at all times. Minimum on-site personnel required during operating hours include one person at the gate to inspect/supervise incoming loads and one person to operate equipment.

The Landfill contractor, Hansen Lumber, Inc., employs three full time and four part time people. Normal waste disposal operations consist of at least two people: one person at the gate to inspect/supervise incoming loads and/or act as a spotter at the face, and one person to operate equipment.

### 1.7.3.2 Personnel Training

All Landfill personnel must read the approved Permit and Plan of Operation before beginning work at the facility. Each employee will sign the Signature Log included in Attachment 5 after reading the approved Permit and Plan of Operation.

All personnel associated with the operation of the Landfill are required to complete the Solid Waste Association of North America (SWANA) training course titled "Sanitary Landfill Operator Training" or comparable training within one year of his or her date of hire. They must also attend annual refresher courses. Certificates of completion are kept on file with the personnel records.

Opportunities for personnel to attend training classes within the state are provided by the Cooperative when classes are available. Possible resources for local training include the Utah Division of Solid and Hazardous Waste, the Arid Region Committee of SWANA, and consultants within Utah.

## 1.7.4 Waste Acceptance Procedures

### 1.7.4.1 General Procedure

A Daily Log records:

- The license numbers of vehicles entering the Landfill,
- A description of the wastes,
- The packer truck or commercial hauler company name,
- Weighed amount of waste received, the time of entry, and
- The initials of the Equipment Operator filling out the form.

An example of this form can be found in Attachment 6.

Commercial haulers off-load at the work face. When necessary for safety reasons, private haulers are sent to an area separate from where commercial haulers are working. A spotter provides traffic control and watches for hazards at the work face. He or she ensures the safe operation of heavy equipment.

Each load is visually inspected. Waste screening is conducted according to the procedures outlined in "Section 1.7.11, Spotting and Waste Screening."

Open burning is prohibited. Smoking is not allowed on Landfill property, except in designated areas. Scavenging is prohibited.

### 1.7.4.2 Special Wastes

*1.7.4.2.1 Used Oil and Batteries*

Used oil is not accepted. A list of retailers who take used oil or antifreeze is provided to anyone bringing these prohibited wastes to the Landfill.

Used batteries are accepted and stockpiled on a wooden pallet. A recycler is contacted to pick-up batteries at appropriate intervals.

*1.7.4.2.2 Bulky Wastes*

Bulky items such as construction and demolition debris, tree trunks, or stumps and large timbers, may be pushed onto the working face near the bottom of the cell, or be placed in a separate disposal area.

White goods are accepted. White goods found to contain Freon are drained of Freon by a trained individual. White goods may be buried at the face or set aside for metals recyclers. Used cars are not accepted. However, Seven States Recycling Company, Inc. accepts used metals, such as car bodies, for recycling.

*1.7.4.2.3 Tires*

The Landfill accepts tires for storage in small piles in a designated area of the Landfill until a licensed tire recycler can pick them up. The first four tires in each load are free, while the Landfill fee for each additional tire is $2.00.

The number of tires received varies from time to time. The biggest hauler in the County is the Moroni Feed Company. They periodically need to dispose of several hundred tires and notify the Landfill Supervisor before bringing the tires to the Landfill.

Tires are removed from the Site at least once each year. Detailed records are kept showing the number of tires, the date of pick up, and the name and license number of the receiving tire recycler.

*1.7.4.2.4 Dead Animals*

Because the County is primarily agricultural, large numbers of dead animals are received. A separate dead animal pit may be designated adjacent to the trenches. This pit is limed after each delivery and covered with a minimum of six inches of soil on a daily basis.

The Coop has plans to develop a composting program which would use sawdust or wood chips with the dead animals. However, that program, when fully articulated, may be submitted as an addendum to this Permit Application.

*1.7.4.2.5 Asbestos Wastes*

Asbestos waste must be handled, transported, and disposed of in a manner that will not permit the release of asbestos fibers into the air and will comply with the requirements of UAC R315-51-2.

The Landfill does not accept asbestos or asbestos containing materials, except those designated by UDEQ as inert. Shingles, house siding, and etc. will be stored in a construction materials pile in an area designated for construction and demolition wastes. Future plans may involve developing a reuse area or a special C and D unit for such wastes; however, that unit is not part of this Permit Application.

*1.7.4.2.6 Yard Waste*

Wood, tree limbs, stumps, leaves, and branches are placed inside the fenced area, but are segregated from the active portion of the Class I facility. Yard waste may be burned once a year. A burn permit is obtained from the Sanpete County Fire Marshall before ignition of yard waste.

### 1.7.5 Waste Disposal Procedures

Wastes are dumped at the top of the work face and spread down the slope in one to two foot thick layers. The slope is kept no steeper than three to one (horizontal to vertical).

Work face dimensions are kept narrow enough to minimize blowing litter and reduce the amount of soil needed for daily cover. Dimensions are wide enough to safely accommodate vehicles bringing garbage into the Landfill. SWANA recommends that the width of the work face be no less than three times the width of the dozer blade.

Grade stakes may be used when necessary to control cell height and top surface grade. The top of the surface grade will range from two to 5 percent, and the cell height will range from three to 5 feet.

Wastes are compacted by making three (3) to five (5) passes up and down the slope. Compaction reduces litter, differential settlement, and the quantities of cover soil needed. Compaction also extends the life of the Site, reduces unit costs, and leaves fewer voids where vermin can breed. Care is taken that no holes are left in the compacted waste. Voids are filled with additional waste as they develop.

Six inches of daily cover soils are placed over the waste by the end of each day. The soils consist of slightly gravelly, silty sands and weathered clays excavated from the Landfill Site. Grade stakes are used when necessary to control cell height and top surface grade for proper drainage.

Intermediate cover is required to be placed when portions of a Class I unit are idle for more than 30 days to prevent water from contacting waste materials. Intermediate cover consists of an additional 12 inches of daily cover soil.

Daily cover and intermediate cover soils and placement procedures are described in more detail in section 2.3.3.

### 1.7.6 Equipment

The following pieces of equipment are on Site for routine operation of the Landfill:

- 816 Compactor (1)
- Rubber Tired Front-end Loader (1)
- 973 Caterpillar Front End Loader (1)

The facility is equipped with a telephone and two way radios for emergency use.

In addition, the County Road Department will lend water trucks and graders as needed.

### 1.7.7 Inspections, Monitoring, Record keeping, and Reporting

#### 1.7.7.1 Inspections

Routine inspections are necessary to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to release of wastes to the environment or a threat to human health.

Equipment Operators are responsible for conducting and recording routine inspections of the facilities according to the schedule outlined below:

1. Perform a pre-operating check and an end-of-shift shutdown check each day. A daily checklist is used to document these inspections.

2. Conduct daily and monthly inspections of all Landfill operations and equipment using the "Landfill Operation Checklist" and "Equipment Checklist" provided in Attachment 6. The inspection form is dated and signed by the Equipment Operator.

   The Equipment Operator also includes general observations and the date and nature of any repairs or corrective action.

3. Maintain and calibrate all operating equipment per the manufacturer's recommended schedule. Records of all routine equipment maintenance or repair are kept.

Samples of the forms used to document these inspections are included in Attachment 6. Inspection records are kept on file for three (3) years and will be made available to the Executive Secretary or an authorized representative upon request.

A complete inspection is done quarterly by the Supervisor. Anything not meeting with the Supervisor's approval is described in writing and is referred to the Equipment Operators to correct.

### 1.7.7.2 Methane Gas Monitoring

The facility is monitored quarterly for methane gas releases by means of a hand-held photo ionization detector (PID) or other equipment capable of detecting methane gas.

PID readings are recorded at each corner of the fence line and inside all buildings, or any place a detectable methane level has ever been registered. The readings are recorded on the form provided in Attachment 6.

No methane has been discovered during the first five years of Landfill operation.

If methane releases are detected in excess of 25 percent of the lower explosive limit (LEL) in a Landfill building or more than 100 percent LEL at the property boundary, the procedure outlined in "Section 1.7.8.4 Release of Explosive Gases" is followed.

### 1.7.7.3 Record keeping

An operating record is maintained as a permanent record of the following items:

1. Number of vehicles entering, amount of waste received, and the types of wastes received each day.
2. Deviations from the approved Plan of Operation.
3. Training and notification procedures.
4. Gas monitoring results.
5. Inspection log or summary.
6. Documentation of any exception to a location standard.

### 1.7.7.4 Reporting

An annual report is submitted to the Executive Secretary by March 1 of each year for the most recent calendar year of facility operation.

The Annual Reports include:

1. Facility's name and address.
2. Calendar year covered.
3. Quantity in tons or volume in cubic yards, and estimated in-place density in pounds per cubic yard of solid waste handled for the facility.
4. Annual update of the financial assurance mechanism.
5. Gas monitoring results.
6. Training programs or procedures completed.

A copy of the annual reporting form found in Appendix F of UAC, *Solid Waste Permitting and Management Rules*, is provided as Attachment 7, and may be used to submit the required information.

## 1.7.8 Contingency and Corrective Action Plans

The following sections outline procedures which are followed in case of fire, explosion, ground water contamination, release of explosive gases, or failure of the run-off containment system. The County's Hazardous Materials Response Team, supervised by Kevin Holman, County Hazardous Materials Officer, will be contacted in all cases where hazardous materials or materials contaminated with PCBs are suspected to be involved. Holman's telephone numbers are (435) 835 2191, and (435) 851 1539.

### 1.7.8.1 Fire

If a fire is detected onboard an incoming truck, the driver will be directed to a specified area where the load can be dumped and covered with soil. The load will be allowed to cool completely before being taken to the work face.

Unfortunately, many "hot" loads are not detected until after the load has been dumped at the face. If such a situation arises, all nonessential personnel will be evacuated from the area. Whenever possible, the burning material will be moved, isolated, and smothered with soil. The burned material will be allowed to cool completely before it is returned to the work face. If the fire still cannot be controlled, the Gunnison City Fire Department will be called at **911**. The County Fire Marshall may also be called at **(435) 835-2191.**

The fire department will also be called any time a fire burns below the soil cover and/or is difficult to reach or isolate. Since the use of large quantities of water to extinguish a fire could result in increased leachate generation, the fire department will be instructed to consider the use of fire fighting techniques that do not include large quantities of water.

In case of fire, the Supervisor will be notified immediately. A written report detailing the event will be placed in the operating record within seven days, including any corrective action taken.

### 1.7.8.2 Explosive Gases

If an explosion occurs or seems imminent, all personnel and customers will be accounted for and the Landfill will be evacuated. Corrective action will be evaluated and implemented as soon as practicable.

The Supervisor will be notified immediately and the fire department will be called. The Executive Secretary will also be notified immediately.

If the explosive gas results from a methane release, the following steps will be taken:

1. Detected gas levels will be described.

2. Mitigation procedures will be implemented.

The specific steps taken to protect human health will be placed in the operating record within seven days of the incident.

A remediation plan which has been approved by the Executive Secretary for the methane gas release will be implemented within 60 days of the incident, and the Executive Secretary will be notified that the plan has been implemented.

### 1.7.8.3 Failure of Run-Off/Run-On System

The purpose of the run-on/run-off control system is to prevent water from entering or leaving the Landfill. The run-on/run-off control system is inspected according to the schedule shown in Section 1.7.7.1 and repairs made as soon as practicable when needed.

If the run-on system fails, temporary measures such as berms, ditches, sandbags, or other methods will be used to divert water away from Landfill property. These same methods will be used to prevent water from leaving the Landfill if the run-off system is breached. The impact of any release will be assessed as soon as possible after the event.

Any temporary berms or other structures will be checked at least every two hours. Permanent improvements or repairs will be made as soon as practicable.

The Supervisor will be notified immediately if a breach of the run-on/run-off system is discovered. The event will be fully documented in the Operating Record, including corrective action, within 14 days.

### 1.7.8.4 Release of Explosive Gases

Methane gas is not expected to be produced in significant quantities at the White Hills Site. However, landfill gas production will be monitored quarterly. If a methane release is detected in excess of 25 percent of the LEL in a Landfill building, 100 percent LEL at the property boundary, or 100 parts per billion in an off-site building, the following procedure will be followed:

- Landfill operations will cease immediately. The Landfill will be evacuated if personnel or buildings may be threatened.
- If gas is detected in a building, the doors and windows will be opened to allow the gas to escape.
- If off-site buildings or structures appear to be threatened, the fire department will be called, the property evacuated, and the property owners notified.
- The Supervisor will be called. The release will be monitored and a temporary corrective action will be implemented as soon as possible. Permanent corrective action will be completed as soon as practicable.

The DSHW will be notified immediately and a written report submitted within 14 days of detecting the release.

The gas levels detected and a description of the steps taken to protect human health will be placed in the operating record within seven days of detection. A remediation plan for the methane gas release will be placed in the operating record within 60 days of detection and the Executive Secretary will be notified that the plan has been implemented.

### 1.7.8.5 Ground Water Contamination

Ground water at the Site is more than 300 feet below ground level (BGL) and very little leachate is expected. Leachate will probably never contaminate ground water.

However, if ground water contamination is ever suspected, studies to confirm contamination will be conducted, and the extent of contamination will be documented. This program may include the installation of vadose zone or ground water monitoring wells. A ground water monitoring program would be developed and corrective action taken as deemed necessary, with the approval of the Executive Secretary.

### 1.7.8.6 Alternative Waste Handling/Disposal System

Closing the Landfill may be necessary during inclement weather, such as winds greater than 60 mph, heavy rain or snow, flooding, or any other condition that would make travel dangerous. The Landfill will reopen when conditions improve.

If the Landfill must close temporarily, waste will be directed to the Sevier County Landfill near Sigurd, Utah. A reciprocal agreement with Sevier County is included as Attachment 26.

In case of equipment failure, the County Road Department will lend equipment until repairs are made. If the Landfill is not operational for any other unforseen reasons, the commercial waste haulers serving Sanpete County will be notified as follows:

| COMMERCIAL WASTE HAULERS AVAILABLE | |
|---|---|
| **Haulers** | **Phone Number** |
| North Sanpete Disposal Service | 462 - 3173 |
| White's Sanitation | 896 - 1212 |
| Snow College | 283 - 7000 |
| Manti City Waste Collection | 835 - 2401 |

## 1.7.9 System Maintenance

### 1.7.9.1 Leachate Collection System

A leachate collection system has not been installed because the amount of leachate produced should be small, assuming operating procedures are followed. Also, the threat of ground water contamination from leachate is very slight because the ground water is at least 300 feet BGL.

Should the Landfill have a demonstrated need for a leachate collection system, one will be designed.

### 1.7.9.2 Gas Collection System

The White Hills Landfill is not expected to produce significant amounts of landfill gas and no gas collection system has been designed. Quarterly gas monitoring will be conducted using a hand-held photo ionization detector (PID).

Gas monitoring locations will be maintained on at least a quarterly basis and kept free from debris.

Should the Landfill have a demonstrated need for a gas collection system, one will be designed.

## 1.7.10 Procedures for Nuisance Control

### 1.7.10.1 Vector Control

The disease vectors most likely to be encountered at the Landfill are flies, mosquitos, rodents, and birds. A program for controlling these vectors is carried out as described in the following section.

#### *1.7.10.1.1 Insects*

Eliminating food, shelter, and breeding areas by applying daily cover is the most effective way to control insects. If flies become a problem around buildings, fly bait may be used. Mosquitos are controlled by eliminating ponding and standing water.

#### *1.7.10.1.2 Rodents*

Rodent populations are discouraged by eliminating food sources and breeding sites. Daily cover and proper compaction are the primary methods of control. Equipment Operators will look for tooth marks or other signs of gnawing and holes, droppings, burrows, or nests.

The Supervisor will be notified of any rodent sightings or problems.

Should the need arise, a professional exterminator will be called who will establish a protocol for pest control in accordance with all county, state, or federal regulations that may apply.

*1.7.10.1.3 Birds*

Seagulls or other bird populations that may pose health or safety problems can be discouraged by minimizing the size of the work face and through daily cover. If birds become a problem, a control program will be set up using loud noises or monofilament lines strung over places birds congregate.

If more drastic measures need to be taken to control bird populations, such as poisoning, trapping, or chemical irritants, a professional exterminator will be called who will establish a protocol for pest control in accordance with all county, state, or federal regulations that may apply.

**1.7.10.2 Fugitive Dust Emissions**

Dust is caused by construction activities and by traffic on unpaved roads, heavy equipment operation, and wind. If fugitive dusts become a problem, a water truck will spray all unpaved or problem areas. A Dust Control Plan has been drafted to control fugitive dust emissions during construction and operation in accordance with Utah Department of Air Quality requirements.

**1.7.10.3 Litter Control**

Litter is unsightly, can clog machinery, and causes public relation problems. Landfill personnel will perform routine maintenance to keep litter under control and cleaned up.

Trenches are oriented perpendicular to prevailing winds.

The area method work face will be placed downwind where possible so that the wind will blow loose litter back onto the work face. Prompt compaction also reduces litter.

If necessary, litter fences are used to keep blowing litter under control at the work face or to prevent litter from leaving the Landfill Site. Fences are placed downwind, as close as possible to the work face.

## 1.7.11 Spotting and Waste Screening

**1.7.11.1 General Description**

Identification and exclusion of prohibited and hazardous waste are necessary for the safe operation of the Landfill.

The Equipment Operators are required to receive periodic training in waste screening. This training consists of initial training and annual refresher courses. Certificates of completion are kept on file with personnel records.

Hazardous wastes have either physical or chemical characteristics that could harm human health or the environment. A waste is considered hazardous if it falls into either of two categories: 1) a listed waste, or 2) a characteristic waste. These wastes are banned from the White Hills Landfill.

Small quantity generators (<100 kg/mo.) and household quantities are exempt from hazardous waste regulations. However, hazardous materials are most likely to enter the Landfill mixed in with common household waste. Public education and periodic waste screening are the tools used to remove these health threats from the waste stream.

Random inspections of incoming loads are conducted according to the schedule determined by the Supervisor. The volume of waste entering the Landfill may vary with time. For that reason, the random inspection program will based on inspecting one percent of the volume of waste entering the Landfill rather than a set frequency.

All haulers are targeted for random waste screening. If frequent violations are detected, additional random checks are scheduled at the discretion of the Supervisor.

If a suspicious waste or container is found, the Equipment Operator will proceed cautiously as described below or refuse to accept the load. Wherever possible, positive identification of the material and its source are obtained from the driver or manifest.

**1.7.11.2 Procedures for Routine Waste Screening**

Every vehicle that brings waste to the Landfill must be logged at the gate house. The identities of all commercial and private haulers are entered into the Daily Log.

The Equipment Operator must:

1. Record the hauler's company name and license number, a description of the waste, an estimate of the weight, and the time of entry.
2. Remove tarpaulins and visually inspect each load.
3. Direct the commercial haulers to the work face for offloading.
4. Send private haulers to the work face or a designated area of the Landfill.
5. Keep a record, including the hauler's name and vehicle license number, of all rejected loads.

For additional details on routine spotting and waste screening procedures, the Equipment Operator shall refer to the Operator's Manual. A copy of that Manual shall be kept at the gate house at all times.

### 1.7.11.3 Procedures for Random Waste Screening

When conducting waste screening, the Equipment Operators will proceed as follows:

1. The driver will be directed to the waste screening area. Unauthorized personnel will not be allowed to enter the area.

2. The waste screening form will be completed (see Attachment 6 for Random Load Inspection Record).

3. Protective gear will be worn (leather gloves, steel-toed boots, goggles, coveralls, hard hat, and etc.).

4. The material will be spread with the dozer or hand tools and examined visually. Suspicious markings or materials, like the ones listed below, will be investigated further:

    - Containers labeled hazardous
    - Excessive or unusual moisture
    - Biomedical (red bag) waste
    - Unidentified powders, dusts, smoke, or vapor
    - Liquids, sludges, pastes, or slurries
    - Asbestos or asbestos contaminated materials, unless clearly marked and bagged for disposal in a segregated area
    - Batteries
    - Wastes that may be contaminated with PCBs
    - Other wastes not accepted by the Landfill

5. If the materials pass the inspection, the load will be incorporated into the work face. If not, the load will be refused.

6. The Supervisor will be called if unstable or radioactive wastes are discovered or suspected. Proper notifications as outlined in "Section 1.7.11.5 Notification Procedures" will be made if any hazardous wastes are discovered.

### 1.7.11.4 Hazardous Wastes Discovered After the Fact

If hazardous wastes or wastes containing PCBs are discovered to have been inadvertently accepted (i.e., during the application of daily cover), the procedure to remove them is as follows:

1. Access to the area will be restricted.

2. The situation will be carefully assessed.

3. If the waste can be safely removed from the working face, the Equipment Operator will transport it to a secure zone.

4. If the wastes appear unstable or pose an immediate danger, the County's Hazardous Materials Response Team will be called.

5. The Supervisor will be contacted for further disposition of the waste.

The Utah DSHW, the hauler, and the generator (if known) will be notified within 24 hours of the discovery.

The generator will be responsible for proper cleanup, transport, and disposal of the waste.

**1.7.11.5 Removal of Prohibited Wastes**

Should nonhazardous prohibited wastes be discovered either during random waste screening or during placement in a cell, the following options will be used to remove these wastes:

1. Wastes can be loaded back on the hauler's vehicle. The hauler will be informed of proper disposal options;

2. If the hauler or generator is no longer on the premises and is known, he or she will be asked to retrieve the waste and will be given information on proper disposal; or

3. The Supervisor will arrange to have the waste transported to an appropriate site. The original hauler/generator will be billed for the costs incurred.

The final disposition of all prohibited wastes will be noted in the log book.

**1.7.11.6 Notification Procedures**

The following agencies and people must be notified within 24 hours if any type of hazardous material is discovered during a random waste screening procedure:

| AGENCY NUMBERS | |
|---|---|
| **Contact** | **Number** |
| Larry Hansen, SWM Supervisor | (435) 427-3812 (Home)<br>(435) 427-3815 (Office) |
| Landfill Cell Phone | (435) 851 0078 |
| Executive Secretary of the Utah Solid and Hazardous Waste Control Board | (801) 538-6170 (Office)<br>(801) 538-6715 (Fax) |
| George Johansen, Health Department | (435) 462-2449 |
| Kevin Holman, Sanpete County Hazardous Materials Officer | (435) 835-2191, or<br>(435) 851 1539 |
| Fred Johnson, County Fire Marshall | (435) 835-2117, or<br>(435) 851 1546 |

The persons or agencies contacted with the dates will be noted on the Random Load Inspection Record.

## 1.7.12 Safety

### 1.7.12.1 Safety Equipment

Each building and each piece of heavy equipment is provided with a fire extinguisher. All personnel must know where safety equipment is located and how to use it properly. The following protective gear is kept on the Site:

- Earplugs
- Safety glasses
- Leather work gloves
- Hard hats
- Two-way radios
- Safety shoes
- Coveralls or long-sleeved shirt and full length pants
- Respirators and dust masks
- Fluorescent vests or jackets

### 1.7.12.2 Safety Program

Landfill personnel are required to participate in an ongoing safety program. This program will comply with Occupational Safety and Health Administration (OSHA), National Institute

of Occupational Safety and Health (NIOSH), and Mine Safety and Health Administration (MSHA) regulations, as applicable.

This program is designed to make the Site and equipment as secure as possible and to educate personnel about safe practices.

At least one Landfill employee will have a first aid certificate from the U.S. Bureau of Mines or the Red Cross. The name of each person holding a first aid certificate is posted beside the telephone numbers. At least one person with this certification is at the Site during normal operating hours.

### 1.7.12.3 Emergency Procedures

If an accident occurs, the Equipment Operators will immediately contact the Supervisor and then proceed as directed. The following emergency numbers are posted by the telephone:

| EMERGENCY NUMBERS | |
|---|---|
| **Facility** | **Number** |
| **EMERGENCY FIRE AND RESCUE** | **911** |
| Gunnison City Fire Department | Various Volunteers; Call 911 |
| Sheriff's Office | (435) 835-2191 |
| County Fire Marshall | (435) 835-2191 |
| Gunnison Valley Hospital<br><br>Sanpete Community Hospital | (435) 528-7246<br>(800) 324-1801<br>(435) 462-2441<br>(800) 870-0346 |
| Larry Hansen, SWM Supervisor | (435) 427-3812 (Home) |

## 1.8 FINANCIAL ASSURANCE PLAN

### 1.8.1 Closure and Post-Closure Cost Estimates

Cost estimates for closure and post-closure care are based on a third party performing closure and post-closure care:

- The closure cost estimate is for the cost to close the largest area of the disposal facility or unit requiring a final cover.
- The post-closure estimate is the cost for completing care reasonably expected during the required period.

A third party quote for placing final cover is provided as Attachment 8 and includes the cost of obtaining, moving and placing the cover material, final grading, placing topsoil, and fertilizing and seeding.

The unit, or cells will be capped incrementally. The maximum area to be closed will be approximately 3.33 acres, or 16,133 square yards. Final cover over compacted municipal waste will consist of an evapotranspiration cover consisting of a minimum of 36 inches ( 3 feet, or 1 yard) of loosely compacted soil. The uppermost six inches of soil placed in the evapotranspiration cover will be capable of sustaining vegetation. The actual thickness of the evapotranspiration cover will be agreed upon by Sanpete Sanitary Landfill Cooperative and the DSHW before placement of final cover.

#### 1.8.1.1 Partial Final Cover

The Coop shall notify the Executive Secretary of any proposed incremental closure or placement of any part of the final cover. Construction of any portion of the final cover shall be considered as a separate construction event and shall be approved separately from any other construction or expansion of the Landfill. Design approval must be received from the Executive Secretary prior to construction and must be accompanied by the CQC/CQA Plan, for each construction season where incremental closure is performed.

**Table 2: Cost Estimate for Closure**

| ITEM | | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|---|
| 1.0 | Engineering | | | | |
| 1.1 | Topographic Survey | Hours | 65.00 | 8 | 520.00 |
| 1.2 | Boundary Survey for Affidavit | Hours | 65.00 | 8 | 520.00 |
| 1.3 | Site Evaluation | Hours | 65.00 | 4 | 260.00 |
| 1.4 | Development of Plans | Hours | 65.00 | 24 | 1,560.00 |
| 1.5 | Contract Administration, Bidding and Award | Hours | 30.00 | 24 | 720.00 |
| 1.6 | Administrative Cost for the Certification of Final Cover and Affidavit to the Public | Hours | 65.00 | 8 | 520.00 |
| 1.7 | Project Management; Construction Observation | Hours | 30.00 | 40 | 1,200.00 |

| ITEM | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|
| 1.8 Monitor Well Construction Cost | | | | N/A |
| 1.9 UDEQ Construction Storm Water Permit, and other Permits | | | | N/A |
| **SUBTOTAL** | | | | 5,300.00 |
| **10% CONTINGENCY** | | | | 530.00 |
| **ENGINEERING TOTAL** | | | | **5,830.00** |

| ITEM | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|
| 2.0 Construction | | | | |
| 2.1 Final Cover System | | | | |
| 2.1.1 Completion of Sidewall Liner | N/A | -- | -- | N/A |
| 2.1.1a Soil Placement | N/A | -- | -- | N/A |
| 2.1.1b Soil Processing | N/A | -- | -- | N/A |
| 2.1.1c Soil Amendment | N/A | -- | -- | N/A |
| 2.1.1d Soil Purchase | N/A | -- | -- | N/A |
| 2.1.1e Transportation | N/A | -- | -- | N/A |
| 2.1.2 Drainage Layer on Sidewall | N/A | -- | -- | N/A |
| 2.1.2a Geotextile Filter Fabric | N/A | -- | -- | N/A |
| 2.1.2b Gained/Geotextile Composite | N/A | -- | -- | N/A |
| 2.1.2c Geomembrane Sidewall Liner | N/A | -- | -- | N/A |

| ITEM | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|
| 2.2 Completion of Top Cover | | | | |
| 2.2.1 Infiltration Layer | | | | |
| 2.2.1a Soil Placement | cu yards | 2.5 | 16,133 | 40,333.33 |
| 2.2.1b Soil Processing | N/A | -- | -- | N/A |
| 2.2.1c Soil Amendment | N/A | -- | -- | N/A |
| 2.2.1d Soil Purchase | N/A | -- | -- | N/A |
| 2.2.1e Transportation | N/A | -- | -- | N/A |
| 2.2.2 Flexible Membrane Cover | N/A | -- | -- | N/A |
| 2.2.2 Drainage Layer in Top | N/A | -- | -- | N/A |
| 2.2.2a Sand Layer | N/A | -- | -- | N/A |
| 2.2.2b Geotextile Filter Fabric | N/A | -- | -- | N/A |
| 2.2.2c Gained/Geotextile Composite | N/A | -- | -- | N/A |
| 2.3 Erosion Layer Placement | cu yards | N/A | N/A | 0.00 |
| 2.4 Native Revegetation | included | N/A | N/A | 0.00 |
| 2.5 Site Grading and Drainage | included | N/A | N/A | 0.00 |
| 2.6 Site Fencing and Security | N/A | -- | -- | 0.00 |
| 2.7 Leachate Collection System Completion | N/A | -- | -- | N/A |
| 2.8 Completion of Gas Monitoring System | N/A | -- | -- | N/A |
| **SUBTOTAL** | | | | 40,333.32 |
| **10% CONTINGENCY** | | | | 4,033.33 |
| **CONSTRUCTION TOTAL** | | | | **44,366.65** |

| ITEM | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|
| 3.0 Ground-water Characterization Cost | | | | |
| 4.0 Monitor Well Installation Costs | | | | |
| 4.1 Monitoring Well Installation | N/A | -- | -- | N/A |
| 4.2 Piezometer and Monitor Well Plugging | N/A | -- | -- | N/A |
| **SUBTOTAL** | | | | 0.00 |
| **10% CONTINGENCY** | | | | 0.00 |
| **GROUND-WATER INSTALLATION TOTAL** | | | | 0.00 |

**Calculation of Total Closure Costs**

| | |
|---|---|
| Engineering Total: | $5,830.00 |
| Ground Water Total: | 0.00 |
| Construction Total: | 44,366.65 |
| ___% Contract Performance Bond: | included |
| Subtotal: | $50,196.65 |
| Legal Fees (25% of Subtotal): | 12,549.16 |
| **TOTAL CLOSURE COSTS:** | **$62,745.81** |

**Table 3: Cost Estimates for Post-Closure Care**

| ITEM | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|
| 1.0 Engineering Costs | | | | |
| 1.1 Post-Closure Plan | N/A | -- | -- | N/A |

| ITEM | | UNIT MEASURE | COST/UNIT | NO. UNITS | TOTAL COST |
|---|---|---|---|---|---|
| 1.2 | Site Inspection and Record keeping (Quarterly for five years, semiannual thereafter) | Per Inspection | 100.00 | 70 | 7,000.00 |
| 1.3 | Correctional Plans and Specifications | Hours | 65.00 | 24 | 1,560.00 |
| 1.4 | Site Monitoring (semiannual) | N/A | -- | -- | N/A |
| 2.0 | Construction Cost | Lump Sum | 8,500 | 3 | 25,500 |
| 3.0 | Leachate Disposal | N/A | -- | -- | N/A |
| **SUBTOTAL** | | | | | 34,060.00 |
| **10% CONTINGENCY** | | | | | 3,406.00 |
| **TOTAL** | | | | | 37,466.00 |

**Financial Assurance Costs**

| | |
|---|---|
| Closure Cost Total: | $62,745.81 |
| Post-Closure Total: | 37,466.00 |
| **TOTAL FINANCIAL ASSURANCE:** | **$100,211.81** |

### 1.8.2 Financial Assurance Mechanism

The Sanpete Sanitary Landfill Cooperative has put money aside in the Utah Public Treasurer's pool to meet the Financial Assurance requirements. That account, Number 6125, now contains $75,179.69. The balance necessary to reach $100,211.81 will be deposited within five years of issuance of the renewed Permit.

Money deposited in the trust fund will be used exclusively for closure, post-closure care, and corrective action. Guidelines for reimbursements, found in UAC R315-309-2(iv), state:

*The owner or operator, or other person authorized to conduct closure, post-closure, or corrective action may request reimbursement from the trustee for closure, post-closure, or corrective action costs.*

1. *The request for reimbursement may be granted by the trustee only if sufficient funds are remaining to cover the remaining costs and if justification and documentation of the costs are placed in the operating record.*

2. *The owner or operator shall notify the Executive Secretary that documentation for the reimbursement has been placed in the operating record and that the reimbursement has been received.*

The fund is evaluated annually and may be adjusted as needed.

# SECTION TWO: TECHNICAL DATA

## 2.1 TOPOGRAPHIC MAPS

### 2.1.1 U.S. Geological Survey Topographic Maps

The Landfill lies at the adjoining corners of the Gunnison, Sterling, Mayfield, and Redmond, Utah United States Geologic Survey (USGS) 7.5 Minute Quadrangles. Property purchased from the U.S. Bureau of Land Management by Sanpete County consists of 400 acres in Sections 24 and 25, T. 19 S., R. 1 E., Salt Lake Baseline and Meridian.

A topographic map of the Landfill Site and surrounding area at a scale of 1 inch equals 2,000 feet was created by color scanning the four (4) adjoining USGS 7.5 Minute Quadrangle maps at 100 percent scale. The scanned topographic map is included as Attachment 9.

The facility boundary, property boundary, land use of the surrounding area, surface drainage channels and the direction of prevailing winds are shown on the scanned image map.

The land use of the surrounding area is primarily agricultural or grassland, and the Site is zoned GA-10.

The prevailing winds are from the southwest to the northeast. No utilities or structures, other than a power line and other facilities constructed inside the Landfill fence exist within one quarter mile of the Site.

Latitude and longitude coordinates of the front gate as measured with a hand held Garmin Etrex Legend GPS are:

| |
|---|
| Latitude 39° 07' 23.5" North; Longitude 111° 44' 56.5" West |

### 2.1.2 Topographic Map of the Landfill Unit

A topographic map of the undisturbed Landfill Site drawn to a scale of 1 inch equals 200 feet is included as Attachment 10. The base map was prepared from aerial photography obtained by Olympus Aerial Surveys and drawn with a contour interval of two feet.

Ground water monitoring wells and fixed gas monitoring points were not constructed at the Landfill and are, therefore, not shown.

A Landfill plan view map that shows the as-built location of the Landfill trenches, topography, property/fence line and 40-foot buffer zone, gas monitoring points, tire storage area, equipment storage area, soil storage areas, and dead animal pit has been provided as Attachment 11.

## 2.2 HYDRO GEOLOGICAL ASSESSMENT REPORT

### 2.2.1 Regional Geology

Sanpete County, located in Central Utah, borders Utah County on the north, Juab and Millard Counties on the west, Carbon and Emery Counties on the east, and Sevier County on the south. It has a land area of 1,597 square miles or about 1,022,080 acres. See Attachment 12, Sanpete County Location Map.

Elevations in Sanpete County range from a low of 5,100 feet in Sevier Valley to a maximum of 11,100 feet atop the crest of the Wasatch Plateau in the eastern portion of the County.

The southeast portion of the San Pitch Mountains (Gunnison Plateau), located in the center of the County, ranges in elevation from 5,200 feet to 8,500 feet. The Valley Mountains in the southeast portion of the County reach 8,189 feet in elevation.

Three contrasting land form types occur:

1. Broad valleys,
2. Mountain ranges, and
3. Broad slopes intermediate between the mountain ranges and the valleys.

Sanpete Valley, Arapien Valley and Sevier Valley derive their sediment from the adjacent mountain ranges. These valleys contain thick deposits (up to 600 feet) of Quaternary valley fill consisting of boulders, cobbles, gravel, sand, silt, and clay (Robinson, 1971). Surficial soils consist of silty sands (SM), clays (CL) and silts (ML).

The water table is shallow in the center of each valley (generally less than 10 feet below ground level), but becomes deeper near the broad slopes at the base of the mountains (approximately 80 to 90 feet below ground level). Extensive salt beds throughout the area make some local soils and water highly saline.

Mountainous lands consist of bedrock with a thin veneer of coarse, mechanically weathered and eroded soils. Typical rock types are shale, siltstone, sandstone, limestone, dolomite, rock salt, and gypsum.

Most of the mountain ranges trend north to south. Faulting and folding are extensive throughout the mountains of Sanpete County.

Broad slopes intermediate between the mountains and the valleys are formed on coarse granular soils (sand, gravel, cobbles, and boulders) eroded off the adjacent mountain ranges. These soils have been moved about by rivers, streams and lakes to form alluvial fans, lake terraces and other depositional features. From a distance the slopes appear relatively smooth, but they are cut locally by minor drainages and washes.

### 2.2.2 Local Geology

The Site is located in the south central portion of Sanpete County, on the western slopes of the White Hills, at an elevation about 200 feet above Sevier Valley. The bedrock and soil units near the Site are designated on the Regional Geology Map shown in Attachment 13.

The White Hills rocks, comprised almost entirely of the Arapien Formation, are of Jurassic age and consist mostly of clay shale and siltstone with some limestone, sandstone, gypsum and salt (Stokes, Madden, and Hintze, 1961-1963).

The younger Twist Gulch Formation may be present in the subsurface, overlain by Quaternary sediments, in westernmost portions of the White Hills. The Tertiary Green River and Crazy Hollow Formations are also present nearby, along with Quaternary alluvial deposits.

#### 2.2.2.1 Fault Areas

A new landfill may not be located within 200 feet of an active (Holocene) fault.

Suzanne Hecker (1993) completed an inventory of active faults in Utah for the Utah Geological Survey. Her map shows that the closest active faults to the Landfill Site occur at the southwestern edge of the San Pitch Mountains, north of Fayette, and approximately 10 miles from White Hills.

The Landfill, therefore, is far away from any known active fault.

#### 2.2.2.2 Unstable Slopes and Subsidence Areas

The owner or operator must consider several factors when determining whether an area is unstable. Among them are soil conditions, geologic or geomorphologic features, and human-made features or events at the surface and in the subsurface.

Soils conditions at the Site are ideal for construction of a landfill. Slightly silty, poorly graded, generally fine-grained sands with a little gravel are present from the surface to about 12 feet to 15 feet below ground level (BGL).

The soils are loose and easily excavated. They fill irregularities in the underlying bedrock surface. Slopes on the soils are gentle (about three to five percent) and stable.

Local and onsite geologic and geomorphic features are stable.

No man-made surface or subsurface features have created unstable conditions at the Site. After drilling, the test boring was plugged with impermeable bentonite clay. This plug eliminated the possibility of surface waters being conducted into the underlying soils and rocks.

### 2.2.3 Description of Bedrock and Soil Types

Bedrock is covered at the Site by about 15 feet of slightly gravelly, silty sand eroded off of the hillsides from the east. Bedrock is exposed only in the eastern hills and at small, isolated knobs of reddish brown shale.

Test pits and a test boring excavated through the overlying silt, sand, and gravel showed that all bedrock units within 300 feet of the surface at the Landfill Site are included in the Arapien Formation. A north-south trending ridge line one half mile west of the Site consists of gently dipping sandstones of the Crazy Hollow Formation.

Soils at the Site were originally explored by nine (9) test pits excavated to an average depth of 14 feet. Soils were visually described in the field and classified utilizing the Unified Soils Classification System (USCS). Construction of the first three Landfill trenches has confirmed the nature of the soils exposed in the test pits.

#### 2.2.3.1 Test Pits

Eight test pits were excavated on an approximately 500 foot by 500 foot grid in the southwest quarter of the southeast quarter of section 25. A ninth test pit was excavated approximately 900 feet north of the grid, in the northwest quarter of the southeast quarter of section 25.

Attachment 14 is a Map of the Test Pits and Test Boring.

Soils encountered in the test pits are described on Attachment 15. Laboratory analyses of soils sampled from soils storage areas are also included in Attachment 15.

#### 2.2.3.2 Test Boring

One test boring was drilled to a total depth of 300 feet. The test boring encountered 15 feet of sandy soils, and 285 feet of interbedded claystone, siltstone, and thin, salt-bearing claystone beds of the Arapien Formation. Ground water was not encountered.

A Log of the Test Boring is provided as Attachment 16.

#### 2.2.3.3 Soil Properties

*2.2.3.3.1 White Hills*

Soils at the Site have been explored by nine (9) test pits excavated to an average depth of 14 feet. Soils were visually described in the field and classified utilizing the Unified Soils

Classification System (USCS). Samples were collected from the test pits for analysis of gradation and moisture content.

Table 4, below, summarizes the results of soil samples and tests.

**TABLE 4: SUMMARY OF SITE SOILS PROPERTIES**

| Sample Location | Sample Depth (feet) | USCS Name | Moisture Content (%) |
|---|---|---|---|
| Test Pit 2 | 0 - 6' (composite) | SW (1 % silt) | 9.76 |
| Test Pit 2 | 10.5' - 14' | CL (weathered claystone) | 7.8 |
| Test Pit 9 | 0 -14' (composite) | SP (no silt) | 11.1 |
| Test Pit 9 | 14' - 16' | CL (weathered claystone) | 12.3 |

After inspection of the nine (9) test pits, Tahoma geologists concluded that soils at the White Hills Site are uniform. Well graded silty sands, poorly graded fine sands, and weathered Arapien Formation bedrock were the only soils encountered throughout the investigation. The soil properties listed for two (2) test pits (above) are representative of soils from all nine (9) test pits.

Representative bulk samples of stockpiled cover materials have been sampled for determination of soil water characteristic curves. These values will be used for design of the evapotranspiration (ET) final cover.

## 2.2.4 Hydrology

### 2.2.4.1 Ground Water

The White Hills are an isolated structural and topographic highland surrounded by the lowlands of Sevier Valley and Arapien Valley. Rocks that are present in the mountains are mostly shale, siltstone, calcareous mudstone, gypsiferous shale, fine-grained sandstone and sparse limestone of the Arapien Formation (Witkind, 1994).

Precipitation that falls on the White Hills either runs off the hillsides to the valleys, or infiltrates slowly through the soils into the low permeability bedrock below. Any minor quantity of water that infiltrates into the Arapien Formation will percolate downward under the influence of gravity until it reaches a zone of saturation.

The only known zone of saturation near the White Hills occurs in the Quaternary sand and gravel alluvium of Sevier Valley and Arapien Valley. Water levels in the valleys are approximately 200 feet below the surface elevation of the Landfill Site.

No line of springs is present at or near the base of the White Hills. Therefore, it is unlikely that a significant bedrock aquifer occurs within these hills.

G.B. Robinson (1971) wrote that the Arapien Formation has extremely low permeability and is not known to yield water to wells or springs. He also stated that the rocks of the Arapien Formation act as a barrier to ground-water movement.

#### 2.2.4.2 Surface Water

No surface water is present at the Landfill Site. Minor intermittent drainages crossed the undeveloped Site from east to west. All up-gradient surface water is now diverted around the Landfill by appropriately sized berms or ditches.

### 2.2.5 Water Rights

Records of the Utah Division of Water Rights have been reviewed for information on points of diversion, water use classifications and depths of wells near the White Hills. No water rights have been claimed within one mile of the Site, and no water wells have been drilled there.

Twelve water use claims are valid in the valleys northwest and northeast of the Site. Six of these are from wells while the remainder are from surface sources.

The closest known point of diversion is a six (6) inch diameter well drilled to a total depth of between 150 - 300 feet BGL. The well was drilled at a location 5,800 feet northeast of the Landfill Site, near the southeast corner of section 19, T. 19 S., R. 2 E., along the banks of Twelve Mile Creek in Arapien Valley.

The surface elevation of approximately 5,400 feet would place the bottom of the well somewhere between 5,250 to 5,100 feet. That elevation is at least 200 feet below the level of the Landfill.

### 2.2.6 Ground Water Chemistry

No ground water was encountered in the test boring. Published information states that the Arapien Formation does not yield water to wells anywhere in Sanpete County. Gypsum and readily soluble salt beds in the rocks are sources of sulfate and chloride ions in surface waters in the San Pitch River drainage basin.

### 2.2.7 Sole Source Aquifers

The Landfill is not underlain by a Sole Source Aquifer.

### 2.2.8 Ground Water Classification

Ground water under the Landfill Site has not been developed and has not been classified.

### 2.2.9 Water Balance

The annual water budget balance for the Landfill Site has been studied by means of the Hydrologic Evaluation of Landfill Performance (HELP3) model. The best available climatological data for nearby weather stations were used.

Results of these studies are explained in detail in a report by Tahoma Companies, Inc., entitled *Request for Exemption from Liner, Leachate Control and Ground Water Monitoring, Proposed Sanpete County Class I Landfill, White Hills Site,* dated May 10, 1998, Revised July 31, 1998. The *Request for Exemption* is referenced in Attachment 1. Copies of the *Request* are on file with the Division of Solid and Hazardous Waste in Salt Lake City, Utah.

The climate at White Hills is semi-arid, with average precipitation about nine (9) inches. Evapotranspiration at nearby Gunnison is 51.22 inches, about five and one half (5.5) times annual precipitation. Average annual pan evaporation at Gunnison is 50.07 inches, about five and one half (5.5) times annual precipitation.

The conventional water balance equation can be written as:

$$E = P - Q + \Delta S$$

where E, P, Q, and $\Delta S$ refer to evaporation, precipitation, run-off and storage change, respectively (Maidment, 1993). Over time, storage change becomes insignificant compared with the other terms and the equation reduces to:

$$E = P - Q$$

or

$$Q = P - E$$

Substituting known values for precipitation and evaporation:

Q = 9 - 50.07 inches
or
Q = - 41.07 inches

The great excess of evaporation over precipitation at White Hills suggests that runoff (Q) from the Site is insignificant.

### 2.2.10 Ground Water Monitoring

Sanpete County does not monitor ground water at the Site. The first step of the Site evaluation was a hydro geological assessment incorporated in the Coop's *Request for Exemption from Liner, Leachate Control and Ground Water Monitoring.*

The basis for obtaining a waiver from ground water monitoring is found in UAC R315-308. The rule states that the requirements "may be suspended by the Executive Secretary if the owner or operator of a solid waste disposal facility can demonstrate that there is no potential for migration of hazardous constituents from the facility to the ground water during the active life of the facility and the post-closure care period."

Drilling at the Landfill Site proved that ground water is not present from the surface to a depth of at least 300 feet BGL, which is the total depth explored through drilling. HELP3 modeling showed that the average percolation rate of leachate through the bottom of the Landfill would be 0.0203 inches per year, or 1.64 X $10^{-9}$ centimeters per second.

Calculations shown in the *Request for Exemption* demonstrate that the travel time for leachate to reach 300 feet (the maximum depth of the test boring, and therefore, the minimum proven depth to ground water) would be 32,000 years. This period greatly exceeds the length of time for the active life of the facility plus post-closure care.

## 2.3 ENGINEERING REPORT, PLANS, AND SPECIFICATIONS

The engineering report includes:

1. How the facility will meet the location standards (including land use compatibility, geology, surface water, and ground water);

2. A discussion of the Landfill unit design, and sources for daily and final cover;

3. A discussion of the design, location, operation, and maintenance of any run-on and run-off control systems; and

4. Closure and post-closure design, plans, construction, maintenance, costs, and land use.

## 2.3.1 Location Standards

### 2.3.1.1 Land Use Compatibility

The Landfill meets all criteria outlined in UAC R315-302-1(2)(a) as shown below. Documentation of the items listed below is found in Attachment 17. Land use compatibility criteria at White Hills have not changed since the following references were obtained.

- The facility is not within 1,000 feet of a national, state or county park, monument, or recreation area; designated wilderness or wilderness study area; or wild and scenic river area.

  *Source: Erickson, Ronald K., U.S. Bureau of Land Management, Richfield District Office, Richfield, Utah. See letter dated March 25, 1998.*

- The facility is not within ecologically and scientifically significant natural areas, including wildlife management areas and habitat for threatened or endangered species as designated pursuant to the Endangered Species Act of 1982.

  *Source: McGillivary, David, Assistant Field Supervisor, U.S. Fish and Wildlife Service, Salt Lake City, Utah. See letter dated April 22, 1998.*

- The facility is not located on farmland classified as "prime" or "unique" or of "statewide importance" by the U.S. Department of Agriculture Soil Conservation Service under the Prime Farmland Protection Act.

  *Source: Parslow, Victor, Utah Department of Agriculture, Natural Resources Conservation Service, Richfield, Utah. See letters dated March 27, 1998.*

- The facility is not within one-fourth mile of:

  1. Existing permanent dwellings, residential areas, and other incompatible structures such as schools or churches.

  *Source: Field investigation by Gary F. Player, Principal Geologist, Tahoma Companies, Inc., April 7-8, 1998. See memorandum dated April 9, 1998.*

2. Historic structures or properties listed or eligible to be listed in the State or National Register of Historic Places.

*Source: Dykmann, James L., State of Utah, Utah State Historical Society. See letter dated April 3, 1998.*

- The facility is not within 10,000 feet of any airport runway end used by turbojet aircraft or within 5,000 feet of any airport runway end used only by piston-type aircraft.

  *Source: Fredrickson, Scott, U.S. Federal Aviation Agency, Denver, CO. See letter dated April 1, 1998.*

- The facility is not within an archaeological site that would violate Section 9-8-404.

  *Source: Dykmann, James L., State of Utah, Utah State Historical Society. See letter dated April 3, 1998.*

- The facility is not within an area that is at a variance with the Sanpete County land use planning or zoning requirements.

  *Source: Nicholls, Dale, Building Official/Zoning Administrator. See letter from Tahoma to him dated May 4, 1998.*

### 2.3.1.2 Geology

The Landfill Site is not adjacent to geologic features that could compromise the structural integrity of the facility. The Site is not in a subsidence area, a dam failure flood area, an underground mine, a salt dome, or a near-surface salt bed.

### 2.3.1.3 Fault Areas

A new landfill may not be located within 200 feet of an active (Holocene) fault.

Suzanne Hecker (1993) completed an inventory of active faults in Utah for the Utah Geological Survey. Her map shows that the closest active faults to the Landfill Site occur at the southwestern edge of the San Pitch Mountains, north of Fayette, and approximately 10 miles from White Hills.

### 2.3.1.4 Seismic Impact Zones

A new facility may not be located in seismic impact zones unless the owner or operator demonstrates that all containment structures are designed to resist the maximum horizontal acceleration in lithified earth material (rock) for the Site.

A seismic impact zone has been defined as an area with a 10 percent or greater probability that the maximum horizontal acceleration in lithified earth material, expressed as a proportion of the earth's gravitational pull, will exceed 0.10 g in 250 years. Most of western Utah, including all of Sanpete County, occupies a seismic impact zone. Attachment 18 is a map of seismic impact zones in Utah showing the probable horizontal accelerations due to earthquake.

The U.S. Geological Survey maintains a web site where ground motion hazards associated with earthquakes can be reviewed by zipcode. Ground motion values are expressed as a percent of the acceleration of gravity (%g). Values presented are Peak Ground Acceleration (PGA), 0.2 second period spectral acceleration (SA), 0.3 second period SA, and 1.0 second period SA for 10%, 5%, and 2% probability exceedance (PE) in 50 years.

Landfill seismic risk is assessed for the 10% probability of PGA exceedance in 250 years. That is equivalent to the 2% PE for 50 years. For Mayfield, Utah (zipcode 84643) the Peak Ground Acceleration with 10% probability of exceedance in 250 years is .324 g.

The web site is: http://eqint.cr.usgs.gov/eq/html/zipcode.html

A seismic study of the Landfill Site was done by Tahoma Companies, Inc., and is provided as Attachment 19. That study used a PGA of .5g derived from earlier USGS studies. The seismic review, therefore, was conservative, and is retained with this Permit Renewal Application.

**2.3.1.5 Unstable Areas**

The owner or operator must consider several factors when determining whether an area is unstable. Among them are soil conditions, geologic or geomorphic features, and human-made features or events at the surface and in the subsurface.

Soil conditions at the Site are well suited for construction of a landfill. The soils are loose to moderately cohesive, slightly silty sands with a little gravel. They fill irregularities in the underlying bedrock surface. Slopes on the soils are gentle (about five percent or less) and stable.

Ground water levels have been proven by drilling to be at least 300 feet below the level of the Landfill, and may be much greater:

1. The Landfill Site is about 200 feet above the level of the San Pitch River Valley.

2. Fresh water springs are not present along the base of the White Hills, suggesting that little if any ground water occurs in the bedrock of White Hills.

No manmade surface or subsurface features have created unstable conditions at the Site.

*2.3.1.5.1 On-Site or Local Soil Conditions*
Soils at the Site have been explored by nine (9) test pits to an average depth of 14 feet. Soils were visually described in the field and classified utilizing the Unified Soils Classification System (USCS).

Samples were collected from the test pits for analysis of gradation and moisture content. All of the soils are loose to moderately cohesive, slightly silty sands with a little gravel (Unified Soils Classification System Names SW and SP). The location map and log of the test pits are provided in Attachment 14 and 15.

*2.3.1.5.2 On-Site or Local Geologic or Geomorphologic Features*
**Geologic Features**
Bedrock is covered at the Landfill Site by approximately 12 to 15 feet of slightly silty, gravelly sand eroded off of the nearby White Hills. Bedrock is exposed in the hillsides to the east and north of the Landfill Site. All of the bedrock consists of shale and siltstone of the Arapien Formation.

**Geomorphic Features**
Bedrock formations in the White Hills are very old. The rocks were faulted and folded during several intervals of active compression caused by collisions between the North American and Pacific tectonic plates along the Pacific coast.

Ridges to the east of the Landfill Site trend north to south. The drainage divide between San Pitch River and Arapien Valley occurs approximately one half mile east of the Site.

*2.3.1.5.3 On-Site or Local Human-Made Features or Events; Surface and Subsurface*
The only human-made surface features originally present at the Site were graded dirt roads and a few "two track" trails. Items now constructed for Landfill use include gravel roads, waste disposal trenches, a scale and gate house, and an equipment storage building with sanitary facilities.

One test boring was drilled to a total depth of 300 feet BGL. After completion, the boring was plugged with bentonite clay to eliminate any potential for transmitting surface waters through the soils to the underlying Arapien Formation bedrock.

**2.3.1.6 Surface Water**
No permanent impoundments of surface water or perennial streams are present within a one mile radius of the Site.

### 2.3.1.7 Public Water Systems or Surface Impoundments

No public water systems or impoundments are present at the Landfill. The land to be used by the Landfill is not part of a water shed used for municipal drinking water, nor is it in a location that could cause contamination to a lake, reservoir, or pond.

The Highland Canal carries irrigation water from northeast to southwest along the western margin of the White Hills. At its closest meander, the canal is approximately 3,000 feet west of the Landfill Site.

### 2.3.1.8 Floodplains

The Sanpete Sanitary Landfill Cooperative Site is not within a floodplain. Two poorly developed drainages traverse the southern half of Section 25.

The drainages are intermittent, carrying only water from snow melt or run-off from occasional thunder storms. All potential run-on water from the drainages is now diverted around the Landfill Site by berms.

### 2.3.1.9 Wetlands

The White Hills Site is not in a wetland.

### 2.3.1.10 Ground Water

The Landfill is designed to operate without a liner. The following ground water location standard requirements are met at the Site:

1. The test boring showed that the lowest level of waste in excavated trenches will be at least 270 feet above ground water.

2. No sole source aquifer is present beneath the Site.

3. Ground water has never been developed at the Site and none has been classified.

The minimum allowable depth to ground water beneath a municipal landfill is determined by the chemical quality of water present in underground aquifers. Water with TDS content less than 1,000 mg/L must be greater than 100 feet BGL.

The test boring drilled at the Site showed that the minimum depth to ground water is greater than 300 feet BGL. Therefore, the minimum separation distances between the Landfill and fresh ground water, if present, would be almost three times that required by regulation.

## 2.3.2 Landfill Unit Design

### 2.3.2.1 Relationship to Geological Materials

Initial units at the Landfill were constructed by excavating trenches through surficial slightly silty, gravelly sands into the underlying weathered Arapien bedrock clays.

Average thickness of the sandy soils, as determined from backhoe-excavated test pits, is 12 to 15 feet. The weathered zone at the top of the Arapien bedrock is about 10 feet thick.

### 2.3.2.2 Summary of Design Features

The Landfill has been designed to best utilize existing Site soils, topography, and drainage. The Site slopes gently (less than five percent) to the west.

Fourteen or more trenches will be constructed during the initial phase of Landfill operation. Long dimensions of the trenches are oriented east to west, with the floor of each trench sloping to the west--parallel to the existing topography. Each trench will be 14 to 30 feet deep, with lengths ranging from approximately 660 feet to 900 feet, and 66 feet wide at the top of the trench.

Sheet flow from surrounding hillsides is collected behind perimeter berms and conducted away from the Landfill.

Precipitation falling within undeveloped portions of the Landfill is collected behind berms up gradient from active trenches and conducted to the western and southern landfill boundaries.

Precipitation falling directly into active trenches infiltrates the waste and soils and eventually evaporates.

Compacted waste is covered daily with six inches of natural soils or an approved alternative cover system. Areas of compacted waste and daily cover to be left inactive for more than 30 days are protected with an additional 12 inches of compacted intermediate cover soils.

### 2.3.2.3 Schedule of Excavation, Filling and Cover

The first trench was constructed in the southern half of the southwest quarter of the southeast quarter of Section 25, T. 19 S., R. 1 E. Soils excavated from the trench were stored in berms along the northern, southern, and eastern boundaries of the Landfill for run-on control.

Uncompacted municipal waste is placed in thin layers (no thicker than two feet) and compacted to an average density of 900 pounds per cubic yard. Additional thin layers of waste are then placed and compacted until a layer of compacted waste no greater than 48 inches thick is constructed, after which six inches of daily cover are applied to enclose a cell.

Daily and intermediate cover materials are excavated from the adjacent trench or soil storage piles.

Trenches used through March of 2005 are shown on the "White Hills Landfill As-Built Map," Attachment 11.

A conceptual map showing a proposed sequencing of area method fill units is included in Attachment 20.

The following list describes the completed and proposed sequence of land filling operations:

1. Excavated Trench One. Placed excavated soils in berms to the north, south, and east of Trench One.

2. Constructed Landfill cells in Trench One, beginning at the east end.

   Constructed one lift of cells, containing four (4) feet of compacted waste and six (6) inches of daily cover soil, across the full width of the trench and approximately one hundred feet long from east to west.

   Began excavation of Trench Two and used excavated soils for daily and intermediate cover materials in Trench One. Placed surplus soils from Trench Two on the berms to the east of Trenches One and Two.

3. Completed the construction of three vertical lifts of cells of compacted waste and daily cover in the first one hundred linear feet of Trench One.

4. After three lifts of cells in the first one hundred lineal feet of Trench One were completed, placed an additional, twelve inch thick, layer of soil over the daily cover soils to create an intermediate cover layer at least eighteen inches thick. The intermediate cover layer is crowned along the center of the trench so that precipitation falling onto the intermediate cover will drain to the north and south, away from the waste.

5. Constructed additional cells in Trench One to the west of the first one hundred lineal feet of compacted waste and cover materials.

   Placed intermediate cover over three completed lifts of cells every thirty days.

6. After land filling in Trench One was completed, began land filling at area A, west of the equipment storage building.

Continued excavation of Trench Two and stored excavated soils for daily and intermediate cover materials south of Trench Two.

7. After completion of land filling in Trench One, began construction of an area method fill over the top of Trench One. Started at the north east end of Trench One and worked to the west and south.

The area method fill (including daily cover soils, but not including the final cover) will be constructed to a maximum thickness of 21 feet above the tops of the filled Landfill trenches. That thickness will allow a vertical sequence of six cells, each consisting of three (3) feet of compacted waste and six (6) inches of daily cover soils.

The area method of disposal is used almost exclusively in larger landfills, because compaction can be so efficient. The White Hills Landfill will use both methods, because cover materials are excavated from the trenches, and the filled trenches will provide the base for further disposal.

Construct the area method fill as follows:

Each day pile waste into three (3) lifts, each lift with a compacted thickness of about one foot, then place six (6) inches of daily cover. Restrict the size of the area where you place waste if necessary to achieve this thickness.

Dump wastes at the toe of the work face and spread them up the slope in loose layers one (1) to two (2) feet thick. Keep the slope at 3:1 (horizontal to vertical).

Keep work face dimensions narrow enough to minimize blowing litter and reduce the amount of cover soil needed. However, dimensions should be wide enough to accommodate vehicles bringing garbage into the Landfill safely. SWANA recommends that the width of the work face be no less than three times the width of your dozer blade.

Operate the dozer with the blade facing uphill as you spread and compact wastes. Avoid sidehill compaction due to a chance of roll over. In addition, an uphill orientation provides the following benefits:

- Litter blows onto the face—reducing litter problems.
- You will have better visibility for waste placement and compaction.
- Loaded equipment moves up the face more easily.

Compact wastes by making three (3) to five (5) passes up and down the slope. Compaction reduces litter, differential settlement, and the quantities of cover soil needed. Compaction also extends the life of the Site, reduces unit costs, and leaves fewer voids where vermin can breed. Take care that no holes are left in the compacted waste; fill these with additional waste as they develop.

In the area method fill, use grade stakes when necessary to control cell height and top surface grade. The top of the surface grade should be three to five percent (3-5%) to the west, while your daily cell height is three (3) feet.

8. Construct side slopes along all the boundaries of the area method fill at 3:1 (horizontal:vertical), in accordance with the Landfill drawings.

9. Place three feet of final cover materials over the existing eighteen inches of intermediate cover on the top, northern, and eastern 3:1 side slopes of the area method fill constructed over Trench One. Use select soils excavated from Trench Two for final cover.

   Cover the 3:1 side slopes along the edges of the area method fill over Trenches One and Area A with intermediate cover, only.

10. Continue land filling in Trenches Two and Three, as described above for Trench One.

11. After completion of land filling in Trench Two, resume construction of the area method fill over the top of the trenches. Start at the north east end of Trench Two and work to the west and south.

    Fill in the 3:1 side slope along the western edge of the area method over Trenches One and Two and Area A with cells of compacted waste and daily cover.

12. Place final cover on the northern and western 3:1 side slopes of the area method fill constructed over Trenches One and Two and Area A.

    Cover the 3:1 side slope along the southern edge of the area method over Trench Two with intermediate cover, only.

13. Continue land filling in Trenches Three, Four, Five and Six, followed by construction of the area fill as described above.

14. Place final cover on the eastern 3:1 side slopes of the area method fill constructed over Trenches Three, Four, Five and Six.

    Place final cover on the top of the area method fill constructed over Trenches Three, Four, Five and Six. The top should slope about four (4) percent to the west, roughly parallel to the natural topography.

Cover the 3:1 side slope along the western and southern edges of the area method fill over Trenches Five and Six with intermediate cover, only.

15. Continue land filling in Trenches Seven and Eight, followed by construction of the area fill as described above.

16. Place final cover on the western 3:1 side slopes of the area method fill constructed over Trenches Seven and Eight.

    Place final cover on the top of the area method fill constructed over Trenches Seven and Eight. The top should slope about four (4) percent to the west, roughly parallel to the natural topography.

    Cover the 3:1 side slope along the southern edge of the area method fill over Trench Eight with intermediate cover, only.

17. Continue land filling in Trenches Nine through Fourteen, along with sequential construction of the area fill as described above.

18. Place final cover on the southern 3:1 side slope of the area fill over Trenches Thirteen and Fourteen.

Scheduling of Landfill unit excavations and fill sequencing are based on the requirement to leave intermediate cover materials exposed for no more than four years.

Specifications for intermediate cover are discussed in **Section 2.3.3.2 Intermediate Cover**. Specifications for final cover are discussed in **Section 2.3.3.3 Final Cover**.

### 2.3.2.4 Class I Landfill Capacity

Trenches One through Fourteen will hold at least 123,000 tons of municipal waste compacted to 900 pounds per cubic yard. The first fourteen trenches alone have enough capacity to accommodate Sanpete County disposal requirements for about 8 years, allowing for a three (3) percent annual increase in waste generation.

The area fill to be placed incrementally over the 15 acres of trenches will have sufficient volume for an additional 155,000 tons of municipal waste compacted to 900 pounds per cubic yard.

The total capacity of the fourteen initial trenches and the area fill are approximately 278,000 tons of compacted waste, allowing the initial portion of the Landfill to be utilized for approximately 15 years. This number assumes a three (3) percent annual increase in waste generation. Use of Area A will add at least six months to the Landfill life.

## 2.3.3 Cover Requirements and Sources

### 2.3.3.1 Daily Cover

At least six (6) inches of soil are placed over the work face by the end of each day. Grade stakes are used when necessary to control cell height and top surface grade for proper drainage.

Daily cover material is obtained from soils stockpiled during the excavation of each trench, or salvaged from intermediate cover placed over filled trenches during construction of the area method fill.

These on Site soils are loose to slightly cohesive, slightly silty sands with minor admixtures of fine gravel. Daily and intermediate cover material will make up about 15 percent of the total Landfill volume.

### 2.3.3.2 Intermediate Cover

Intermediate cover is applied over daily cover whenever an area of the Landfill is inactive for longer than 30 days.

Intermediate cover will consist of an additional 12 inches of soil over the 6 inches of daily cover, for a total thickness of 18 inches. The intermediate cover is compacted with rubber tired vehicles or roller compactors.

Compacted intermediate cover will remain exposed to atmospheric conditions for no more than four years before being covered with additional waste or final cover soils. Areas with intermediate cover are inspected for erosion or settlement each month. Damaged areas of the intermediate cover are regraded and recompacted when necessary to restore the intermediate cover.

Sufficient surplus excavated soil is available on the Site to serve as a source for intermediate cover.

### 2.3.3.3 Final Cover

Recent research on final cover materials for municipal solid waste landfills in arid areas has shown that some alternatives to Subtitle D final cover designs perform satisfactorily. Two promising designs are "evapotranspiration covers," and evapotranspiration covers underlain by a "capillary break."

Evapotranspiration covers are merely thick layers of loosely compacted, porous, dry soils with sufficient thickness and porosity to store anticipated precipitation without transmitting much water to the underlying waste. Capillary breaks are layers of gravel or geomembranes designed to intercept and redirect the downward percolation of water from overlying cover materials.

The Coop proposes to construct an evapotranspiration final cover consisting of 36 inches of loosely compacted, porous, dry soils with an average moisture holding capacity of fourteen percent. This thickness shall be attained by placing at least three feet (36") of final cover soils over existing intermediate cover soils.

The final cover materials will come from surplus soils excavated from Area A and Trenches One through Fourteen. These soils will have been stored above ground in run-on control berms or soil storage piles for the life of the Landfill operation. Therefore, they will be well drained and dry.

Sufficient soil will be left in the perimeter berms to deflect potential run-on from upgradient storms. However, if all of the stored soil is depleted by construction of the final cover or other uses, appropriately sized ditches may be constructed to deflect and transport potential run-on.

Mass balance studies show that more than enough soil is present in the fourteen trenches for all projected Landfill uses (see Attachment 25). However, if more soil is needed for final cover than is available from the berms and soil storage piles, it will be obtained from equivalent sources on adjacent Sanpete County property as future Landfill units are excavated.

See Attachment 22 for a North to South cross sectional view of the partially closed Landfill.

### 2.3.4 Liners and Leachate Control

Due to the great depth to ground water, semiarid climate, and high evaporation rate, the Landfill has been exempted from the liner and leachate control requirements. With the approval of the Executive Secretary, the Coop will not construct liners or a leachate collection system.

### 2.3.5 Run-On and Run-Off Control

The following discussion of run-on and run-off control is based on the Drainage Study for the Sanpete Sanitary Landfill Cooperative, which has been provided as Attachment 23. The Drainage Study shows that the flooding potential for the Site is low.

#### 2.3.5.1 Run-On Control

Berms have been constructed around the up-gradient perimeter of the Landfill Site. Water draining toward the Site from the surrounding ridges and slopes is routed into natural drainages outside the Landfill.

The locations and a typical cross section of the perimeter berms are shown on Attachment 24.

#### 2.3.5.2 Run-Off Control

The Landfill trenches will be excavated to an average depth of 20 feet BGL. Berms uphill from the developed portion of the Landfill stop up-gradient rain water or snow melt from flowing down slope into the active Landfill.

Since run-on is minimized by the perimeter berm system, run-off control from active Landfill trenches is not necessary. Precipitation falling directly onto the active trenches will evaporate or percolate into the waste and daily cover materials.

Run-off from the active trenches could occur only if an unanticipated record storm (greater than 42 inches in 24 hours) dropped enough rainfall directly into a cell to saturate the waste and cover material, filling any remaining unused space.

In contrast, the record 24-hour storm recorded at the nearest weather station (Gunnison, Utah) is only 1.33 inches. Record monthly precipitation at the same station is 3.72 inches. The period of record for Gunnison is from 1956 to 1990.

### 2.3.6 Closure and Post-Closure Design

The Coop will close its Landfill in a way that reduces the need for further maintenance and minimizes or eliminates threats to human health and the environment. The Closure Plan will also provide guidance to prepare the Landfill for the post-closure period.

Installation of the final cover, seeding, landscaping, and contouring will proceed as follows:

1. Once the Landfill is full, or after a decision is made to close it, the operator will sell all recyclable materials to independent contractors, and bury all remaining waste.

2. Any excess borrow material from previously excavated Landfill units will then be graded to a level or convex upward surface.

   Side slopes will be graded at 3:1 (horizontal:vertical). In no case shall slopes be less than two percent (convex upward).

3. Final cover over wastes will be an "evapotranspiration cover" at least 36 inches thick.

4. The 36 inches of final cover material will be constructed of naturally occurring sandy clay soils or mixtures of soil and weathered Arapien clays with a moisture holding capacity of at least 14 percent.

5. The final cover will be seeded with a mix of native grasses, brush, and shrubbery. The seed mix and planting schedule will be chosen by the Coop after reference to publications of the United States Department of Agriculture and other appropriate

agencies or vendors. The DSHW shall approve the seed mix before it is applied to the final cover.

The results of current alternative landfill cover research will be utilized before final cover is applied. The Utah DSHW reserves the right to specify the thickness and properties of final cover soils. The final design will reflect their requirements.

### 2.3.7 Closure Plan

#### 2.3.7.1 Capacity

As shown in "Section 2.3.2 Landfill Unit Design", the fourteen initial Landfill trenches and area method fill sequences to be constructed have sufficient volume for approximately 278,000 tons of waste compacted to 900 pounds per cubic yard.

Waste of all types accepted during 2004 at White Hills was 16,744.4 tons, for an annualized average of about 46 tons per day (annualized usage at 365 days per year). Since the Landfill is open 305 days per year, actual average usage per day of operation is 54.9 tons per day.

The total amount of waste accepted at White Hills since it opened in 2001 is shown in the following Table:

| YEAR | TOTAL WASTE RECEIVED (TONS) | ANNUALIZED DAILY RATE | CUMULATIVE WASTE RECEIVED (TONS) |
|---|---|---|---|
| 2001 | 5,005 | 28 (180 days) | 5,005 |
| 2002 | 14,218 | 39 | 19,223 |
| 2003 | 15,880 | 43.5 | 35,103 |
| 2004 | 16,744.4 | 45.875 | 51,847.4 |

Permitted Landfill space is sufficient to hold 278,000 tons of waste compacted to 900 pounds per cubic yard. The amount of space remaining as of January 1, 2005, could hold approximately (278,000 - 52,000) tons, or 226,000 tons of waste.

A spreadsheet showing estimated waste utilization at the White Hills Landfill was included as Attachment 4, Projected Waste Volumes, in the final Permit Application submitted on August 22, 2000. That spread sheet assumed that the Landfill would be open for 100 days in 2000, with initial waste acceptance of 45 tons per day, or 4500 tons the first year.

The total waste use projected for the first three and one-half years of operation was 48,482 tons. This number can be adjusted to more accurately project initial usage since 2001 by adding 80 more days of waste acceptance to the first year, for an additional (80)(45), or 3,600

tons. This increase would have made the initial projection equal to (48,482 + 3,600) = 52,082 tons. That amount is slightly more than the actual usage from 2001 through 2004 of 51,847 tons.

A revised Projected Waste Use spreadsheet is included with this Permit Renewal Application as Attachment Number 4. The initial phase of the Landfill will be filled sometime in the year 2016.

**2.3.7.2 Closure Schedule**

The active surface area of the Landfill (that portion that has not received final cover) will never be larger than three and one third acres (145,200 square feet, or 16,133 square yards). This restriction will limit the area that would require closure by a third party if the Coop were to relinquish operation of the Landfill.

Because of this restriction, some areas will receive final cover before final closure of the entire Landfill. These areas will include the top and 3:1 side slopes around the exterior edges of the area fill waste mound, and limited areas of the Landfill where intermediate cover would be exposed to atmospheric conditions for more than four years if not covered with additional sequences of waste and daily cover materials.

The size of the area potentially requiring final cover before closure of the entire Landfill is reported quarterly to the SWM Supervisor, so that areas of land filling can be adjusted to place waste over "aging" intermediate cover.

The following requirements will be met when closure or sequential partial closure of the Landfill is planned:

1. The Coop will notify the Executive Secretary of the intent to start closure of a Landfill unit 60 days before the projected final receipt of waste.

2. The Coop will begin closure of the Landfill unit within 30 days after receipt of the final volume of waste. Closure activities will be completed within 180 days from their starting time, unless an extension is granted by the Executive Secretary.

3. When closure of the facility has been completed, The Coop will submit the following to the Executive Secretary:

    a. As-built unit closure plan sheet(s) signed by a professional engineer registered in the state of Utah.

    b. Certification by the Coop and a professional engineer registered in the state of Utah that the Site has been closed in accordance with the approved closure plan.

#### 2.3.7.3 Final Inspection

The DSHW will be invited to inspect the final grading of the Landfill before revegetation. After approval of the final grading, a schedule will be established for revegetation.

Agency personnel will then be invited to return to inspect the successful establishment of vegetation after one year.

#### 2.3.7.4 Record of Title, Land Use, and Zoning Restrictions

The closed Landfill will be rezoned, if necessary, to conform to current Sanpete County regulations after final closure.

A description of the Landfill history and filled areas will be permanently appended to the record of title not later than 60 days after certification of closure. Land use restrictions will be assigned that conform to existing regulations for closed landfills at the time of closure.

### 2.3.8 Post-Closure Plan

#### 2.3.8.1 Post-Closure Performance Standard

The Coop will provide post-closure activities for continued facility maintenance and monitoring of land and gases for 30 years, or as long as the Executive Secretary requires for the facility to become stabilized and to protect human health and the environment.

#### 2.3.8.2 Post-Closure Plan

Only minor quantities of landfill gases are expected to be generated at the Landfill after closure. Initial post-closure monitoring is designed to test this hypothesis. Landfill settlement should also be minor.

*2.3.8.2.1 Gas Monitoring*

Landfill gases generally consist of methane and carbon dioxide in approximately equal quantities, with minor amounts of other gases. The presence of gas is easily tested by monitoring for methane, a combustible gas.

Gas production would be detected by the monitoring procedure established in the Plan of Operation with a hand-held detector. The closed Landfill will be monitored for methane quarterly until the Executive Secretary determines that the frequency of monitoring can be changed. Post-closure monitoring cost estimates are based on initial quarterly inspections for five years, followed by semi-annual inspections for an additional twenty five years.

*2.3.8.2.2 Land Monitoring*

Landfill topography will be visually checked for depressions that could result in ponding or rapid erosion. Irregularities in the surface of the final cover will be graded and revegetated as required to eliminate ponding or rapid erosion.

Side slopes will be maintained or reestablished with a maximum gradient of 3:1 (horizontal:vertical). The top of each closed Landfill unit will be maintained or reestablished with grades no less than two percent (convex upward surfaces) to eliminate ponding.

The closed Landfill surface and the run-on/run-off control system will be monitored quarterly until the Executive Secretary determines that the frequency of monitoring can be changed. Post-closure monitoring cost estimates are based on initial quarterly inspections for five years, followed by semi-annual inspections for an additional twenty five years.

Unscheduled monitoring of the Landfill surfaces will be conducted after any 25-year storm at Gunnison or Mayfield, Utah, or within five miles of the Landfill Site.

**2.3.8.3 Post-Closure Maintenance**

Post-closure maintenance activities will be designed and implemented under the direction of a registered professional engineer in response to results of gas and land monitoring. Design decisions will be made after the first post-closure quarterly inspection and implemented within 30 days after identification of maintenance requirements.

Results of post-closure maintenance will be reported to the Executive Secretary by a professional engineer registered in the state of Utah.

Due to the semiarid climate in Sanpete County, maintenance of closure cover and run-on and run-off systems should be minimal. Final cover and run-on/run-off control structures will be inspected periodically under the schedule provided for in the closure plan.

Run-on/run-off control structures and final cover could be damaged by an unusually intense storm. Therefore, an unscheduled inspection will be required after any occurrence of a 25-year storm event at Gunnison or Mayfield, Utah, or within a five-mile radius.

If the post-storm inspection shows damage to either the final cover or run-on/run-off control structures, the damage will be appraised by an engineer registered in the state of Utah. The engineer will prepare a cost estimate to repair damaged materials and supervise repairs by the Coop, Road Department, or a licensed contractor.

Funds for payment for repairs will be disbursed from the Financial Assurance Mechanism after approval by the Executive Secretary.

When post-closure activities are complete, as determined by the Executive Secretary, the owner or operator will submit a certification to the Executive Secretary, signed by the owner or operator and a professional engineer registered in the state of Utah. This certification will state why post-closure activities are no longer necessary (i.e., little or no settlement, gas production, or leachate generation).

### 2.3.8.4 Post-Closure Land Use

A description of the Landfill history and filled areas will be permanently appended to the record of title at closure. Land use restrictions will be assigned that conform to regulations for closed landfills at the time of closure.

If the Executive Secretary concurs that post-closure monitoring has demonstrated that the facility has stabilized, land use restrictions may be reduced. If revegetation of the closure cap has been successful, stock and wildlife grazing could be productive uses of the Landfill property.

### 2.3.8.5 Post-Closure Contact

The Coop may be contacted concerning the Landfill during the post-closure period at:

Mr. Doug Bjerregaard, Chairman
Sanpete Sanitary Landfill Cooperative
P.O. Box 7
111 N 100 W
Mayfield, Utah 84643

# BIBLIOGRAPHY


Ashcroft, G.L., D. T. Jensen and J. L. Brown, 1992, *Utah Climate*. Utah Climate Center, Utah State University, Logan, Utah.

Hardy, C. T., 1952, *Eastern Sevier Valley, Sevier and Sanpete Counties, Utah.* Utah Geol. and Mineralog. Survey Bull. 43.

Hecker, Suzanne, 1993, *Quaternary Tectonics of Utah, with Emphasis on Earthquake Hazard Characterization.* Utah Geol. Survey Bull. 127.

Landreth, Robert E., 1994, *The Hydrological Evaluation of Landfill Performance Model Version 3 (HELP3).* USEPA, Cincinnati, Ohio.

Maidment, David R., Editor in Chief, 1993, *Handbook of Hydrology*. McGraw-Hill, Inc., 29 Chapters, appendices, Index.

Pratt, A. R., and Callaghan, Eugene, 1970, *Land and Mineral Resources of Sanpete County, Utah.* Utah Geol. and Mineralog. Survey Bull. 85.

Robinson, G. B., Jr., 1971, *Ground-water hydrology of the San Pitch River drainage basin, Sanpete County, Utah.* U. S. Geological Survey Water-Supply Paper 1896.

Stokes, W. L., Madsen, J. H. Jr., and Hintze, Lehi F., 1961-1963, *Geologic Map of Utah, 1:250,000,* in four parts:

Northwest Quarter compiled by William L. Stokes, 1962
Northeast Quarter compiled by W.L. Stokes & J.H. Madsen Jr., 1961
Southwest Quarter compiled by Lehi F. Hintze, 1963
Southeast Quarter compiled by L.F. Hintze & W.L. Stokes, 1963

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SWANA, 1993, *Training Sanitary Landfill Operating Personnel, Instructor's Guidelines.* SWANA, Silver Springs, Maryland.

SWANA, *Waste Screening at Municipal Solid Waste Management Facilities.* SWANA, Silver Springs, Maryland.

SWANA, *Manager of Landfill Operations (MOLO) Course Materials.* SWANA, Silver Springs, Maryland.

Tahoma Companies, Incorporated, 1998, *Proposed Sanpete Sanitary Landfill Cooperative, Class I Landfill: Request for Exemption from Liner, Leachate Control, and Ground Water Monitoring.*

Tchobanaglous, G., H. Theisen, and R. Eliassen, 1977, *Solid Wastes: Engineering Principles and Management Issues*. McGraw Hill Book Company, New York.

Vector Engineering, Inc., 1991, *Nevada Rural Landfill Study, Landfill Inventory, Site Selection, and Detailed Characterization - Phase I Report.* Unpublished report prepared for the Nevada Division of Environmental Protection, Bureau of Waste Management, 32 pp.

Wilberg, D. E., and Heilweil, V. M., 1995, *Hydrology of Sanpete Valley, Sanpete and Juab Counties, Utah, and simulation of ground-water flow in the valley-fill aquifer.* Utah Department of Natural Resources Technical Publication No. 113.

Witkind, I. J., 1994, *The Role of Salt in the Structural Development of Central Utah.* U. S. Geol. Survey Prof. Paper 1528.

Witkind, I. J., Standlee, L. A., and Maley, K. F., 1986, *Age and Correlation of Cretaceous Rocks previously Assigned to the Morrison (?) Formation, Sanpete-Sevier Valley Area, Central Utah.* U. S. Geol. Survey Bull. 1584.

Young, R. A., and C. H. Carpenter, 1965, *Ground-water conditions and storage in the central Sevier Valley, Utah.* U. S. Geol. Survey Water Supply Paper 1787.

# LIST OF ATTACHMENTS

ATTACHMENT 1 (By Reference Only): Tahoma Companies, Inc., *Request for Exemption from Liner, Leachate Control and Ground Water Monitoring, Proposed Sanpete County Class I Landfill, White Hills Site,* dated May 10, 1998, Revised July 31, 1998. This document is available for review at the Utah DSHW office in Salt Lake City, Utah.
ATTACHMENT 2: PROOF OF OWNERSHIP
ATTACHMENT 3: WHITE HILLS LANDFILL LOCATION MAP
ATTACHMENT 4: PROJECTED LANDFILL WASTE TONNAGES AND VOLUMES
ATTACHMENT 5: SIGNATURE LOG
ATTACHMENT 6: LANDFILL OPERATION FORMS:
- Random Load Inspection Record
- Daily Log
- Landfill Operations Checklist
- Equipment Checklist
- Quarterly Methane Monitoring Report
- Inspection Form

ATTACHMENT 7: ANNUAL REPORT FORM
ATTACHMENT 8: THIRD PARTY CLOSURE COST ESTIMATE
ATTACHMENT 9: SCANNED USGS 7.5 MINUTE QUADRANGLES
ATTACHMENT 10: PRE-DEVELOPMENT LANDFILL TOPOGRAPHIC MAP
Scale: 1" = 200'
ATTACHMENT 11: AS-BUILT LANDFILL PLAN VIEW
ATTACHMENT 12: SANPETE COUNTY LOCATION MAP
ATTACHMENT 13: REGIONAL GEOLOGY MAP
ATTACHMENT 14: MAP OF TEST PITS AND TEST BORING
ATTACHMENT 15: LOG OF TEST PITS with SOILS DESCRIPTIONS AND ANALYSES
ATTACHMENT 16: LOG OF TEST BORING
ATTACHMENT 17: LAND USE COMPATIBILITY (LOCATION STANDARDS)
ATTACHMENT 18: PREDICTED SEISMIC ACCELERATION MAP and
PEAK GROUND ACCELERATION FOR MAYFIELD, UTAH
ATTACHMENT 19: SEISMIC RISK ANALYSIS
ATTACHMENT 20: PROPOSED SEQUENCING OF WHITE HILLS LANDFILL
ATTACHMENT 21: (NOT PROVIDED)
ATTACHMENT 22: CROSS SECTION OF PARTIALLY CLOSED LANDFILL
ATTACHMENT 23: DRAINAGE STUDY
ATTACHMENT 24: LOCATION AND CROSS SECTION OF PERIMETER BERMS
ATTACHMENT 25: MATERIALS BALANCE TABLE FOR COVER SOILS
ATTACHMENT 26: LETTER OF COOPERATION FROM SEVIER COUNTY COMMISSION

# ATTACHMENT 1

# EXEMPTION REQUEST REVIEW AND RESPONSES

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF SOLID AND HAZARDOUS WASTE

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
Dennis R. Downs
Director

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www.deq.state.ut.us Web

October 27, 1998

Dean Hansen, Chairman
Sanpete Sanitary Landfill Cooperative
685 West 200 North
Fountain Green, UT 84632

Subject: Review of Request for Exemption from Ground Water Monitoring, Liners, and Leachate Collection at the Proposed White Hills Landfill

Dear Mr. Hansen:

On August 4, 1998 the Division of Solid & Hazardous Waste received the *Proposed Sanpete Sanitary Landfill Cooperative Class I Landfill-Request for Exemption From Liner, Leachate Control Systems, and Ground Water Monitoring- Revised July 31, 1998* (Request) which was prepared by Tahoma Companies, Incorporated.

The design and operational plan for the proposed landfill at White Hills will be heavily influenced by the determination of whether or not ground water monitoring, liner, and leachate collection will be required. Therefore, it would be helpful for the Division to review the Request and make an early determination of whether the exemption is likely to be approved. However, the final determination of the ground water monitoring suspension and alternative design request can only be made with the issuance of a permit. A permit is issued only after all permit application information has been reviewed, the opportunity for public comment has been presented, and the entire permitting process has been completed.

The Division's review of the Request has been completed. The focus of the review was the geologic, hydrologic, and climatic characteristics of the site. These areas will have the greatest impact on whether the requested exemption may be approved. Other issues such as the landfill design, plan of operation, financial assurance, closure, and post-closure care will be review when the landfill permit application is submitted. Often, with a review of any detailed technical document, some additional information is required to provide further clarification. Attached is Request for Additional #1 (RAI#1) which explains the additional information requested.

If you have questions or need further information, please contact Jeff Emmons or Ralph Bohn at 801-538-6170.

Sincerely,

Dennis R. Downs, Executive Secretary
Utah Solid and Hazardous Waste Control Board

DRD/JTE/sm

enclosure (1)

c: Robert Resendes, M.B.A., M.T., Health Officer/Dept. Dir, Central Utah Health Dept.
George Johansen, Central Utah Public Health Department
Roger Foisy, DEQ District Engineer
Gary Player, Tahoma Companies, Inc.
Joe Blain, Sanpete County Economic Development

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File: Sanpete County/White Hills Landfill

# SANPETE COUNTY CLASS I LANDFILL
# REQUEST FOR GROUND WATER MONITORING, LINER, AND LEACHATE COLLECTION EXEMPTION

## REQUEST FOR ADDITIONAL INFORMATION #1

October 26, 1998

To obtain an exemption from ground water monitoring, the owner of the landfill must demonstrate there is no potential for the migration of leachate to ground water during the active life of the facility and the post-closure care period.

To obtain an approval for a landfill design without a liner and leachate collection system, the owner must demonstrate the proposed landfill design will minimize the potential for migration of hazardous constituents at least as effective as the standard liner design or alternative liner design in Section R315-303(3)(a) &(b) of the Solid Waste Permitting & Management Rules (Rules).

This request for additional information (rai#1) identifies information needed to complete the *Proposed Sanpete Sanitary Landfill Cooperative Class I Landfill Request for Exemption From Liner, Leachate Control Systems, and Ground Water Monitoring, Revised July 31, 1998* (Request).

MAPS

- Figures B-3, B-4, B-5, and C-1 need to include the boundaries of the proposed landfill.
- What does the large darkened area represent on eastern portion of Figure B-3?

LOCATION

Page 10 of the Request describes the location of the proposed landfill as the south ½ of the southeast ¼ of Section 25, and in the northwest ¼ of the southeast ¼ of Section 25 which is equivalent to 120 acres. Page 4 of the application states the landfill will be constructed on part of a 60 acre parcel. Figure C-1 shows a 100 acre parcel.

- What is the correct acreage?

ROCK TYPES

Page 6 of the Request states;

> *At least 3,000 feet of Arapien Formation rocks are exposed along the eastern border of Sevier Valley from east of Gunnison, Utah to Richfield, Utah. However, published estimates of these Jurassic rocks range from 4,000 feet to 13,000 feet in thickness.*

- The estimate of at least 3,000 feet of Arapien rock is different than the published estimates of 4,000 feet to 13,000 feet. What is the source of the estimate of at least 3,000 feet?

- In Figure B-5, what does the formation designation Jtg(?) represent and does the formation have any characteristics that may impact the location of the landfill?

FAULT AREAS

Figure B-5 shows the geologic cross section of the line E-F from Figure B-4.

- Does the landfill overlie the fault between the Crazy Hollow Formation and the Arapien Formation?

- What is the potential for the fault to provide a path of increased permeability which would allow for downward migration of leachate?

TEST BORING LOG

- The log of the test boring, contained in Attachment C, needs to identify the individual(s) who logged the test hole.

- What was the criteria for selecting the location of the test boring?

The test boring log indicates the rock from the depth 200 feet to 297 feet is primarily sand. This log does not appear to be consistent with the description of the Arapien Shale. The geologic information provided from the literature review of the regional geology would not have predicted the 100 foot layer of primarily sandstone found beneath the site.

- The Request needs to address the inconsistency between the description of the Arapien Shale and the appearance of the 100-foot thick sandstone layer.

- Why shouldn't additional test hole borings be drilled to confirm the site specific geology?

CONCLUSIONS CONCERNING SITE GEOLOGY AND HYDROLOGY

The conclusions on page 14 simply states the site is underlain by low permeability Arapien Shale.

- The Request needs to include a discussion of how the site geology, based on site specific data, will minimize the migration of leachate at least as effective as the liners described in Section R315-303-3(3)(a) or (b) of the Rules.

GROUND WATER

To receive an exemption from ground water monitoring the Rules require a demonstration that there is no potential for polluting ground water during the life of the facility and post-closure care period. The calculation of the life of the facility and the post-closure care period, in years, was not provided in the Request. The results of the calculations will be used in the ground water time-of-travel estimate to demonstrate there is no potential for polluting ground water.

- The Request needs to include the calculations used to determine the life of the facility and the post-closure care period.

TRAVEL TIME OF CONSTITUENTS

Leachate that escapes from a landfill has the potential to migrate through the subsurface materials and eventually reach the uppermost groundwater. Page 24 and 25 of the Request discusses the travel time of leachate through the subsurface geology. The percolation rate, as determined by the HELP model, is discussed as being equivalent in nature, and is compared in magnitude to hydraulic conductivity. The percolation rate is then used in the time of travel calculations. The percolation rate and hydraulic conductivity are not interchangeable. The percolation rate determined from the HELP model is an amount of fluid released from the lowermost layer of the landfill over a specified period, not the rate of movement of that liquid through a given material.

- The time of travel needs to be recalculated using the hydraulic conductivities of the subsurface geology as logged in the test boring.

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File: SanpeteCounty White Hills Landfill

TAHOMA COMPANIES, INCORPORATED
P.O. Box 486; Mile 5 Hwy 14
Cedar City, Utah 84721
(435) 865-0131 ☎ Fax (435) 865-0161
email: tahoma@cedarcity.net

November 16, 1998

Mr. Jeff Emmons
Solid Waste Section
Utah Division of Solid and Hazardous Waste
288 North 1460 West
P.O. Box 144880
Salt Lake City, Utah 84114-4880

**Subject: Response to Review of Request for Exemption - Sanpete County**

Dear Mr. Emmons:

Thank you for your review of the Request for Exemption from Ground Water Monitoring, Liners, and Leachate Collection at the proposed White Hills landfill site in Sanpete County dated October 27, 1998. We are pleased that your staff agrees that the site may be suitable for use as a landfill without the added expense of liners and other ground water protection facilities.

This letter is intended to provide answers to questions raised in your review dated October 27, 1998. Some of the questions you asked have been answered in greater detail in the Permit Application (PA). Others are addressed in the following Response.

## 1. Maps

Revised copies of Figures B-3, B-4, B-5, and C-1 are enclosed. These Figures now show the location of the boundaries of the proposed landfill.

The large darkened area on the eastern portion of Figure B-3 is the green-colored forested area portrayed by the USGS on their topographic map. The original colored map is included with the Permit Application.

## 2. Location

As stated in the Permit Application, the following text reiterates where the County wants to locate a landfill:

> The Sanpete Sanitary Landfill Cooperative proposes to construct a Class I landfill at the "White Hills Site", located in the south ½ of the southeast ¼ of Section 25, and in the northwest ¼ of the southeast ¼ of section 25, Township 19 South, Range 1

East, Salt Lake Baseline and Meridian, four miles southeast of Gunnison, Utah. Approximately 60 acres of the entire 120 acres will be developed as a landfill. The site will be accessed from State Route 137 to the North.

The Site is approximately 5440 feet above sea level, about 200 feet higher than Sevier Valley. The Landfill will be constructed in a broad, gently sloping amphitheater, on the western slope of the White Hills of Sanpete County. The area slopes downward to the west at an average slope of 3 to 5 percent. Surrounding hillside slopes exceed 30 percent.

The proposed Landfill unit will be developed within a 560 acre parcel to be purchased from the U.S. Bureau of Land Management (BLM). The active facility will be fenced and posted, with one gatehouse.

The legal description of the property which will be owned by the Cooperative is:

Parcel: 04-003-0010

> Beginning at the South quarter corner of Section 25, Township 19 South, Range 1 East, Salt Lake Baseline and Meridian, running North 1,320 feet, thence West 1,320 feet, thence North 5,280 feet, thence East 3,960 feet, thence South 6,600 feet, thence West 2,640 feet to the point of beginning, containing 560 acres.
>
> The West ½ of Section 25, Township 19 South, Range 1 East, the East ½ of the North East 1/4 of Section 25, Township 19 South, Range 1 East, the North East 1/4 of the South East 1/4 of Section 25, Township 19 South, Range 1 East, the South ½ of the South East 1/4 of Section 24, Township 19 South, Range 1 East, the South East 1/4 of South West 1/4 of Section 24, Township 19 South, Range 1 East.

Approximately 60 acres of the entire 560 acres will initially be developed as a landfill.

## 3. Rock Types

Rocks that are not visible from the surface are frequently encountered by drilling. For example, Kenai Formation rocks near Anchorage, Alaska, were originally estimated to be 5,000 feet thick before oil and gas exploration began. New information from drilling logs showed that the actual thickness is more than 20,000 feet.

The figure of "at least 3,000 feet of Arapien Formation rocks" refers to exposures visible at the surface near Gunnison. Published estimates ranging "from 4,000 feet to 13,000 feet" include subsurface information from wildcat oil wells.

The formation designated Jtg(?) On Figure B-5 is the Twist Gulch Formation of Jurassic age. This formation is slightly younger than the Arapien Formation and is not present beneath the proposed landfill location.

## 4. Fault Areas

The proposed landfill does not overlie the inactive fault between the Crazy Hollow Formation and the Arapien Formation. Gouge along the fault zone consists of clay with lower permeability than adjacent rocks. Therefore, downward mobility of leachate would be decreased if the fault were encountered.

## 5. Test Boring Log

The Test Boring was logged by Mr. C. David Burns, Geological Technician, and Gary F. Player, Principal Geologist for Tahoma Companies.

The test boring location was chosen for several reasons:

1. To characterize earth materials present near the proposed first phase of the Landfill;

2. To construct an up-gradient monitor well if ground water were encountered; and

3. To conform to a request from the Bureau of Land Management to drill on or very near to existing roads.

The materials encountered from 200 feet to 297 feet below ground level were not sandstone. They consisted of layers of claystone interbedded with sand-sized crystals of sylvite (potassium chloride) and halite (sodium chloride) salts. These materials are consistent with descriptions of the Arapien Formation. In fact, rock salt (halite) is mined from Arapien shales near Redmond, Utah, about ten miles to the southwest from the Landfill site. The Log of the Test Boring (enclosed) has been revised to eliminate any ambiguity in the descriptions. Please include this revised log as part of the PA.

Additional test borings are not needed because ground water was not encountered at the proposed landfill site. Sufficient test pits were obtained within the proposed landfill site to adequately characterize surficial sands and weathered Arapien Formation shales that must be excavated for landfill trenches.

## 6. Conclusions Concerning Site Geology and Hydrology

The White Hills site will minimize the migration of leachate at least as effectively as the liners described in Section R315-303-3(3)(a) or (b) of the rules. The proposed design of the Landfill, climate at White Hills, hydrogeological setting, and physical characteristics of waste to be accepted for disposal combine to minimize potential migration.

Site specific data (given with the PA) justify this conclusion:

1. Ground water is not present within at least 300 feet of the surface.

2. Run-on of precipitation will be eliminated with berms constructed from materials excavated from landfill trenches.

3. Leachate generation, as predicted by HELP3 modeling, will be very low ($1.5 \times 10^{-9}$ cm/second).

4. The climate is semi-arid, with average precipitation about 9 inches.

5. Pan evaporation at Gunnison is about 50 inches, approximately 5.5 times the average precipitation rate.

6. The site is in a natural amphitheater with nearby drainage divides and a very small drainage basin.

7. Rock units underlying the site consist of 200 feet of shale underlain by 100 feet of shale interbedded with layers of the saline minerals halite, sylvite, and gypsum. These materials have a saturated permeability (hydraulic conductivity) of $10^{-6}$ centimeters per second or less, and unsaturated hydraulic conductivity of nine (9) to fourteen orders of magnitude slower.

8. Two hundred feet of earth materials with a saturated hydraulic conductivity of $10^{-6}$ centimeters per second has the equivalent time for leachate travel as a twenty feet thick liner constructed of materials with hydraulic conductivity of $10^{-7}$ centimeters per second. In contrast, the alternative design described in section R315-303-3(3)(b) requires only three (3) feet of materials with hydraulic conductivity of $10^{-7}$ centimeters per second.

9. No active faults are present at or near the Landfill site.

10. Fault gouge, if present, would have hydraulic conductivity equal to or less (slower) than the rock units.

## 7. Ground Water Protection and Landfill Life

As shown in "Section 2.3.2 Landfill Unit Design" in the Permit Application, initial landfill trenches and area method fill sequences to be constructed have sufficient volume for approximately 278,000 tons of waste compacted to 900 pounds per cubic yard.

Starting with the current use in the County of 45 tons per day, projections of landfill usage have been completed using a predicted three percent per year increase.

If the new Landfill is open for 100 days in 1999 and accepts waste 307 days per year thereafter, the initial phase of the Landfill will be filled early in the year 2015.

A spreadsheet entitled Estimated Waste Utilization (enclosed) was included with the PA. The spreadsheet shows that the cumulative waste to be accepted by the end of 2014 will be 269152 tons. The life of the initial landfill units would therefore be 15 years. The post closure care period will be 30 years.

## 8. Travel Time of Constituents

The discussion of hydraulic conductivity and HELP3 model percolation rates provided by the UDSHW is appropriate and useful. Tahoma agrees that these measurements are not directly equivalent. In our opinion, the leachate percolation rate is **the** most important limiting factor.

The HELP program simulates daily water movement into, through and out of a landfill. Surface and subsurface processes are modeled. The surface processes modeled are snowmelt, interception of rainfall by vegetation, surface runoff, and evaporation of water, interception and snow from the surface. The subsurface processes modeled are evaporation of water from the soil, plant transpiration, vertical unsaturated drainage, geomembrane liner leakage and barrier soil liner percolation (not applicable in this case, as no liner was included in model runs), and lateral saturated drainage. In summary, the HELP program considers all sources of water when calculating a percolation rate for the leachate.

Any percolating leachate will descend vertically in unsaturated materials for at least 300 feet, as there are no aquifers present beneath the Landfill site in that distance to deflect the flow. Unsaturated hydraulic conductivity in the shale and claystone soils at White Hills has been calculated to range from 9 to 14 orders of magnitude less than saturated hydraulic conductivity in the same soils using equations included in the *Engineering Documentation for Version 3* of the

HELP model and in Maidment, ed., 1992. The calculations that substantiate these unsaturated hydraulic conductivity values are included in the attached Appendix.

Unsaturated hydraulic conductivity of the naturally occurring soils will determine the rate at which leachate initially moves through the soils. This rate is substantially slower than the percolation of leachate out the bottom of the Landfill. Once a partial column of soil becomes saturated with leachate, the rate of leachate percolation through the natural soils will increase until percolation is limited by the quantity of leachate available. Percolation at the "leachate front" (the lowermost limit of leachate percolation) will then stabilize at a rate intermediate between the saturated and unsaturated hydraulic conductivities.

The actual rate of infiltration is difficult to determine, but it will be somewhere between the unsaturated hydraulic conductivity (about $10^{-15}$ cm/second) and the saturated hydraulic conductivity (about $10^{-6}$ cm/second) of the natural soil substrate.

The HELP3 model shows that only enough leachate will be generated by the Landfill to provide moisture to the natural soils at the rate of $1.5 \times 10^{-9}$ cm/second (equivalent to .02 inches per year), and **it is impossible for leachate to saturate the clay-rich natural soils any faster than it is generated by the Landfill.**

The travel time for leachate to travel to 300 feet (shallowest possible ground water) would be 9,474 years if the leachate percolation rate were to be used. This is substantially greater than the 45 years of landfill activity and post-closure care time.

Thanks again for helping Tahoma Companies and SanpeteCounty meet our goal of conforming to the landfill regulations at a reasonable cost.

Sincerely,

Gary F. Player
Vice President and Principal Geologist

cc: Joe Blaine

K:\SHARE\CLIENTS\98004-1\CORRES\RESPONSE.WPD

TAHOMA COMPANIES, INCORPORATED
444 South Main Street, Suite C-7
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email: tahoma@cedarcity.net

| LOG OF TEST BORING<br>Sanpete Sanitary Landfill Cooperative | | |
|---|---|---|
| **SAMPLE DEPTH (feet)** | **USCS NAME** | **SAMPLE DESCRIPTION** |
| 3-4 | SP | Fine brown sand with trace medium-coarse sand and silt. Trace of caliche. Small amount of angular gravel. |
| 5-6 | SM | Fine brown sand, silty, with trace medium-coarse sand. Trace of caliche. Trace amount of angular gravel. |
| 7-8 | SP | Fine brown sand with trace medium-coarse sand and some silt. Trace angular gravel. Trace caliche cement. |
| 9-10 | SP | Fine brown sand with trace of caliche and medium sand. Trace angular gravel/shale. |
| 13-15 | | Claystone- silty, soft, tan to orange-brown. Gypsum crystals to 3 mm. |
| 18.5-20 | | Tan-Orange siltstone with fine sand and a trace of gypsum. |
| 22 | | (Clay/silt)stone, brown |
| 25 | | Tan siltstone. |
| 30 | CL | Yellow clay with a little silt. |
| 40 | CL | Yellow clay with a little silt. |
| 50 | CL | Yellow clay with a little silt. |
| 60 | | Yellow claystone with silt. |
| 70 | ML | Blue-yellow clay with silt. Stiff. |
| 80 | ML | Brown clay with silt. Stiff. |
| 90 | ML | Tan-dark brown-blue clay with silt. Stiff. |
| 100 | CL | Blue clay with streaks of tan clay. Stiff. |
| 110 | CL | Blue clay. |
| 120 | ML | Blue silt/sand with shale bits. |
| 125-130 | SW | Coarse blue sand with shale bits (rare). Trace fine-medium sand. |
| 138-140 | SP | Coarse blue sand with shale bits (more common). Trace fine-medium sand. |
| 150 | ML | Plastic blue silt with clay and sand of all sizes and shale bits. |
| 160 | | Brown silt/claystone with a little blue silt-clay. Some sylvite. |
| 170 | | Blue-brown siltstone with some coarse sand and a trace of fine and medium sand. Contains common soluble halite and sylvite. |
| 178-181 | | Brown-blue sandy clay with sand grains of all sizes (fine- coarse) with shale bits. Some sylvite. |

| LOG OF TEST BORING<br>Sanpete Sanitary Landfill Cooperative | | |
|---|---|---|
| **SAMPLE DEPTH (feet)** | **USCS NAME** | **SAMPLE DESCRIPTION** |
| 190 | CL | Blue-yellow-brown sandy clay with sand grains of all sizes and shale bits. Sylvite present. |
| 200 | SP | Sylvite crystals to 2 mm. Blue-brown-yellow very coarse sand-sized crystal fragments. Trace fine to coarse sand-sized crystals. |
| 210 | SP | Blue-brown sand-sized grains of halite and sylvite. Bits of shale. |
| 220 | SP | Blue-brown sand-sized grains of halite and sylvite. Bits of shale. Crystals to a few mm. |
| 230 | SP | Brown medium sand-sized halite and sylvite. Trace fine-coarse sand and silt. |
| 240 | SP | Very coarse blue-brown sand-sized halite and sylvite with bits of shale. Trace medium fine sand-sized salt crystal fragments. |
| 250 | SP | Very coarse red-brown sand-sized sylvite and halite. Blue shale chips. |
| 260 | SP | Blue-yellow very coarse sand-sized halite and sylvite in shale. Trace fine-coarse sand and silt. |
| 270 | SP | Red brown medium sand-sized halite and sylvite. Trace siltstone and fine-coarse sand-sized halite. |
| 280 | SP | Blue-brown to tan very coarse sand-sized sylvite and shale bits. Trace silt and fine silica sand. |
| 295-297 | | Red-brown to tan very coarse sand-sized halite and sylvite and shale bits. Trace siltstone and fine silica sand. |
| 297-300 | | Red brown siltstone and sand-sized halite and sylvite with shale bits and trace silt and fine silica sand. |

DATE DRILLED: July 15 - 22, 1998 DRILLED BY: Steve Thayer Drilling Company

SURFACE ELEVATION: 5440' (est.) LOGGED BY G.F. PLAYER AND C.D. BURNS

TOTAL DEPTH: 300' ELEVATION AT TOTAL DEPTH: 5140'

DRILLING METHOD: Cable tool, with Standard Penetration Tests in upper 20 feet.

SAMPLING METHOD: STP to 20 feet, grab samples below.

HOLE DIAMETER: 6 inches total depth. CASING: None

ABANDONMENT: Set bentonite plug from total depth to surface on July 22, 1998.

WATER LEVEL: None encountered.

*Notes:*
1. *Top of weathered Arapien Shale Formation bedrock at 13 feet below ground level.*
2. *Soft siltstones and claystones logged as soils, where encountered.*

FILE: K:\SHARE\CLIENTS\98004-1\REPORTS\WAIVER\TSTBORE.TBL

| | | | | |
|---|---|---|---|---|
| for SANPETE COUNTY, UTAH | PROPOSED WHITE HILLS LANDFILL | | | |
| CALCULATIONS OF UNSATURATED HYDRAULIC CONDUCTIVITY | | | | |
| REFERENCE: Campbell, G.S., 1974, *A Simple Method for Determining Unsaturated Hydraulic Conductivity from Moisture Retention Data,* Soil Science, Vol 117, No. 6, pp. 311-314. | | | | |
| | | | | |
| FOR SILT LOAM: | | | | |
| | | | | |
| ACTUAL SOIL WATER CONTENT = SM = | | 0.1 | VOL/VOL | |
| RESIDUAL SOIL WATER CONTENT = RS = | | 0.015 | VOL/VOL | |
| SATURATED WATER CONTENT (POROSITY) = UL = | | 0.486 | VOL/VOL | (EFFECTIVE) |
| | | | | |
| PORE SIZE DISTRIBUTION INDEX = LAMBDA = | | 0.234 | DIMENSIONLESS | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| FOR SILTY CLAY: | | | | |
| | | | | |
| ACTUAL SOIL WATER CONTENT = SM = | | 0.11 | VOL/VOL | |
| RESIDUAL SOIL WATER CONTENT = RS = | | 0.056 | VOL/VOL | |
| SATURATED WATER CONTENT (POROSITY) = UL = | | 0.423 | VOL/VOL | (EFFECTIVE) |
| | | | | |
| PORE SIZE DISTRIBUTION INDEX = LAMBDA = | | 0.15 | DIMENSIONLESS | |
| | | | | |
| | | | | |
| | | | | |

TAHOMA COMPANIES
SOLID WASTE MANAGEMENT FOR SANPETE COUNTY, UTAH
ESTIMATED WASTE UTILIZATION
FACILITY: SANPETE SANITARY LANDFILL COOPERATIVE
WHITE HILLS LANDFILL SITE

3% INCREASE PER YEAR IN DAILY UTILIZATION

FILE:WASTEUSE.XLS
28-Jul-98

| CALENDAR YEAR | WASTE ACCEPTED (TONS/DAY) (A) | DAYS OPEN TO ACCEPT WASTE (B) | WASTE ACCEPTED (TONS/YEAR) (D=A*B) | WASTE ACCEPTED (CUBIC YDS/YEAR (E=D*2000/900) | CUMULATIVE WASTE ACCEPTED (TONS) | CUMULATIVE WASTE ACCEPTED (CUBIC YARDS) |
|---|---|---|---|---|---|---|
| 1999 | 45.00 | 100 | 4500 | 10000 | 4500 | 10000 |
| 2000 | 46.35 | 307 | 14229 | 31621 | 18729 | 41621 |
| 2001 | 47.74 | 307 | 14656 | 32570 | 33386 | 74191 |
| 2002 | 49.17 | 307 | 15096 | 33547 | 48482 | 107737 |
| 2003 | 50.65 | 307 | 15549 | 34553 | 64031 | 142290 |
| 2004 | 52.17 | 307 | 16015 | 35590 | 80046 | 177880 |
| 2005 | 53.73 | 307 | 16496 | 36657 | 96542 | 214538 |
| 2006 | 55.34 | 307 | 16991 | 37757 | 113533 | 252295 |
| 2007 | 57.00 | 307 | 17500 | 38890 | 131033 | 291185 |
| 2008 | 58.71 | 307 | 18025 | 40057 | 149058 | 331241 |
| 2009 | 60.48 | 307 | 18566 | 41258 | 167625 | 372499 |
| 2010 | 62.29 | 307 | 19123 | 42496 | 186748 | 414995 |
| 2011 | 64.16 | 307 | 19697 | 43771 | 206445 | 458766 |
| 2012 | 66.08 | 307 | 20288 | 45084 | 226733 | 503850 |
| 2013 | 68.07 | 307 | 20896 | 46437 | 247629 | 550287 |
| 2014 | 70.11 | 307 | 21523 | 47830 | 269152 | 598116 |
| 2015 | 72.21 | 307 | 22169 | 49264 | 291321 | 647381 |
| 2016 | 74.38 | 307 | 22834 | 50742 | 314155 | 698123 |
| 2017 | 76.61 | 307 | 23519 | 52265 | 337675 | 750388 |
| 2018 | 78.91 | 307 | 24225 | 53833 | 361899 | 804220 |
| 2019 | 81.28 | 307 | 24951 | 55448 | 386851 | 859668 |
| 2020 | 83.71 | 307 | 25700 | 57111 | 412551 | 916779 |
| 2021 | 86.22 | 307 | 26471 | 58824 | 439022 | 975604 |
| 2022 | 88.81 | 307 | 27265 | 60589 | 466287 | 1036193 |
| 2023 | 91.48 | 307 | 28083 | 62407 | 494370 | 1098599 |
| 2024 | 94.22 | 307 | 28926 | 64279 | 523295 | 1162878 |
| 2025 | 97.05 | 307 | 29793 | 66207 | 553089 | 1229086 |
| 2026 | 99.96 | 307 | 30687 | 68194 | 583776 | 1297279 |
| 2027 | 102.96 | 307 | 31608 | 70239 | 615383 | 1367519 |
| 2028 | 106.05 | 307 | 32556 | 72347 | 647939 | 1439865 |
| 2029 | 109.23 | 307 | 33533 | 74517 | 681472 | 1514382 |
| 2030 | 112.50 | 307 | 34539 | 76752 | 716011 | 1591135 |
| 2031 | 115.88 | 307 | 35575 | 79055 | 751585 | 1670190 |
| 2032 | 119.36 | 307 | 36642 | 81427 | 788227 | 1751616 |
| 2033 | 122.94 | 307 | 37741 | 83869 | 825969 | 1835486 |
| 2034 | 126.62 | 307 | 38874 | 86386 | 864842 | 1921871 |
| | 79.09 | 10845 | 25233 | 56074 | 864842 | 1921871 |

| TOTALS | AVERAGE WASTE ACCEPTED (TONS/DAY) | DAYS OPEN TO ACCEPT WASTE | AVERAGE WASTE ACCEPTED (TONS/YEAR) | AVERAGE WASTE ACCEPTED (CUBIC YDS/YEAR | CUMULATIVE WASTE ACCEPTED (TONS) | CUMULATIVE WASTE ACCEPTED CUBIC YDS/YEAR |
|---|---|---|---|---|---|---|

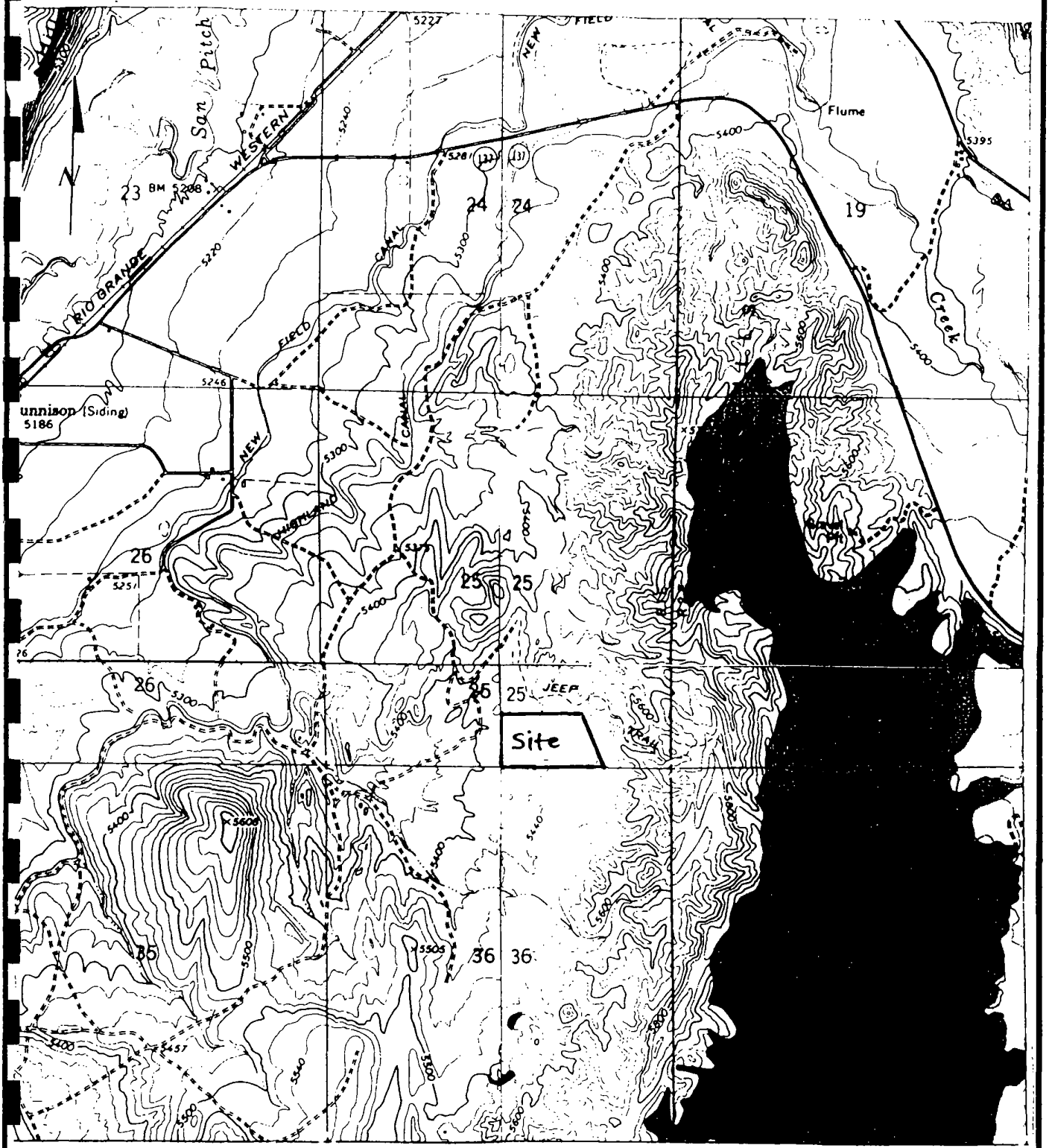


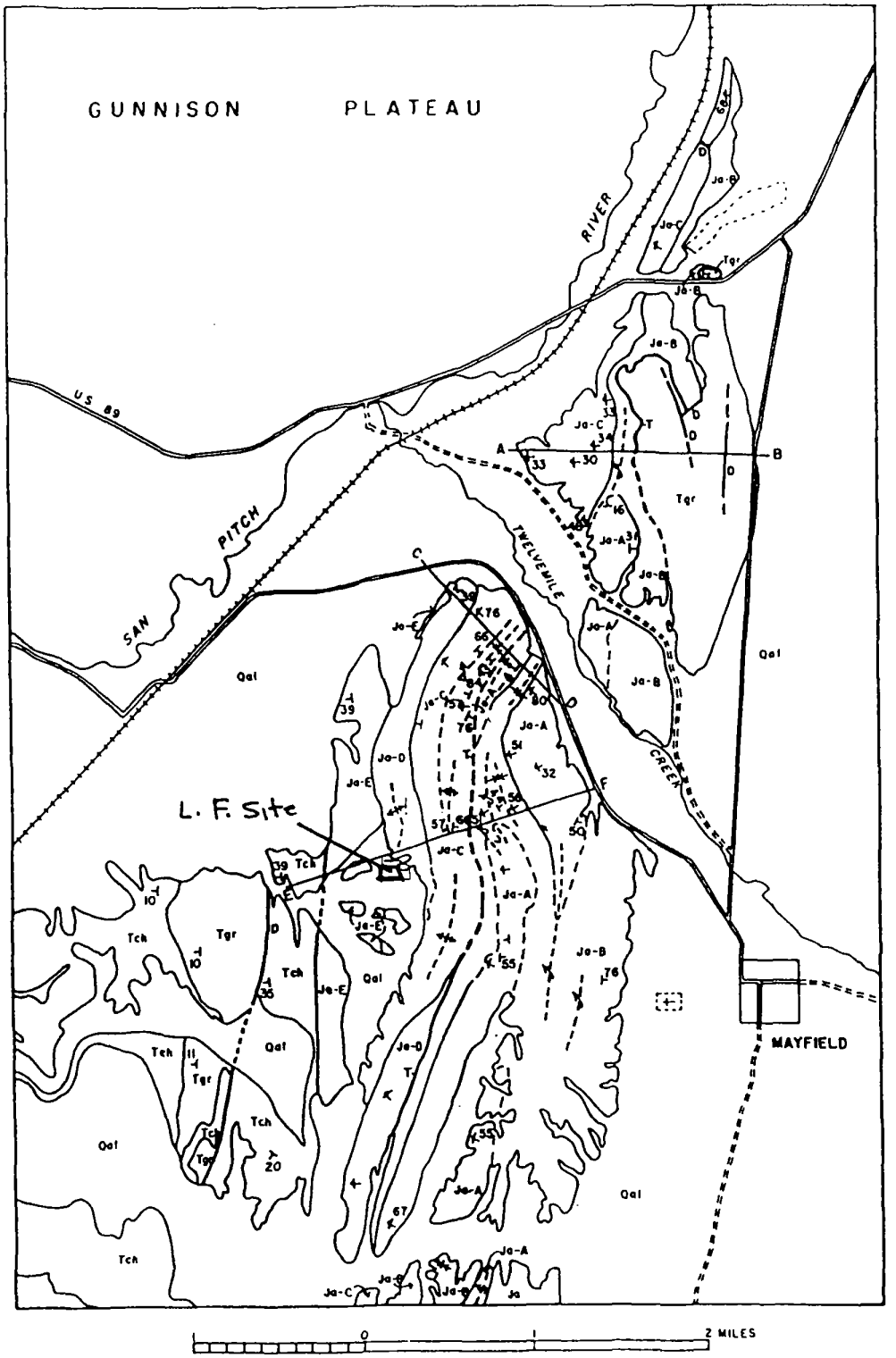

*Figure B-3*

Tahoma Companies, Incorporated
111 South Main, Suite C
Cedar City, Utah 84720
Phone (435)865-0131 Fax (435)865-0136

| |
|---|
| Date: April 24, 1998 |
| SPTOPO.TCW |
| Scale: Not to Scale |
| Drawn by: G. Hatch |
| Tahoma Job No: 98004-1 |

*Topographic Map*
*Sanpete Sanitary Landfill Cooperative*

# *Geology of White Hills Landfill Site*
# *Showing Location of Geologic Cross Section*




## *Figure B-4*

After C.T. Hardy, 1952


*Tahoma Companies, Incorporated*
444 South Main, Suite C-7
Cedar City, Utah 84720
Phone: (435)865-0131 Fax: (435)865-0161


| | |
|---|---|
| Date: April 24, 1998 | *Location of Geologic Cross Section* |
| SPBASE.TCW | *Sanpete Sanitary Landfill Cooperative* |
| Scale: Not to Scale | |
| Drawn by: G. Hatch | |
| Job No. 98004 | |

# *Cross Section E-F*

***Sanpete Sanitary Landfill Cooperative***

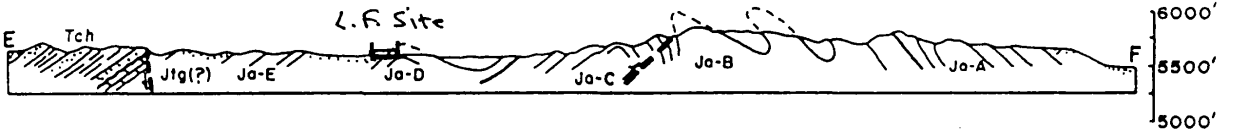
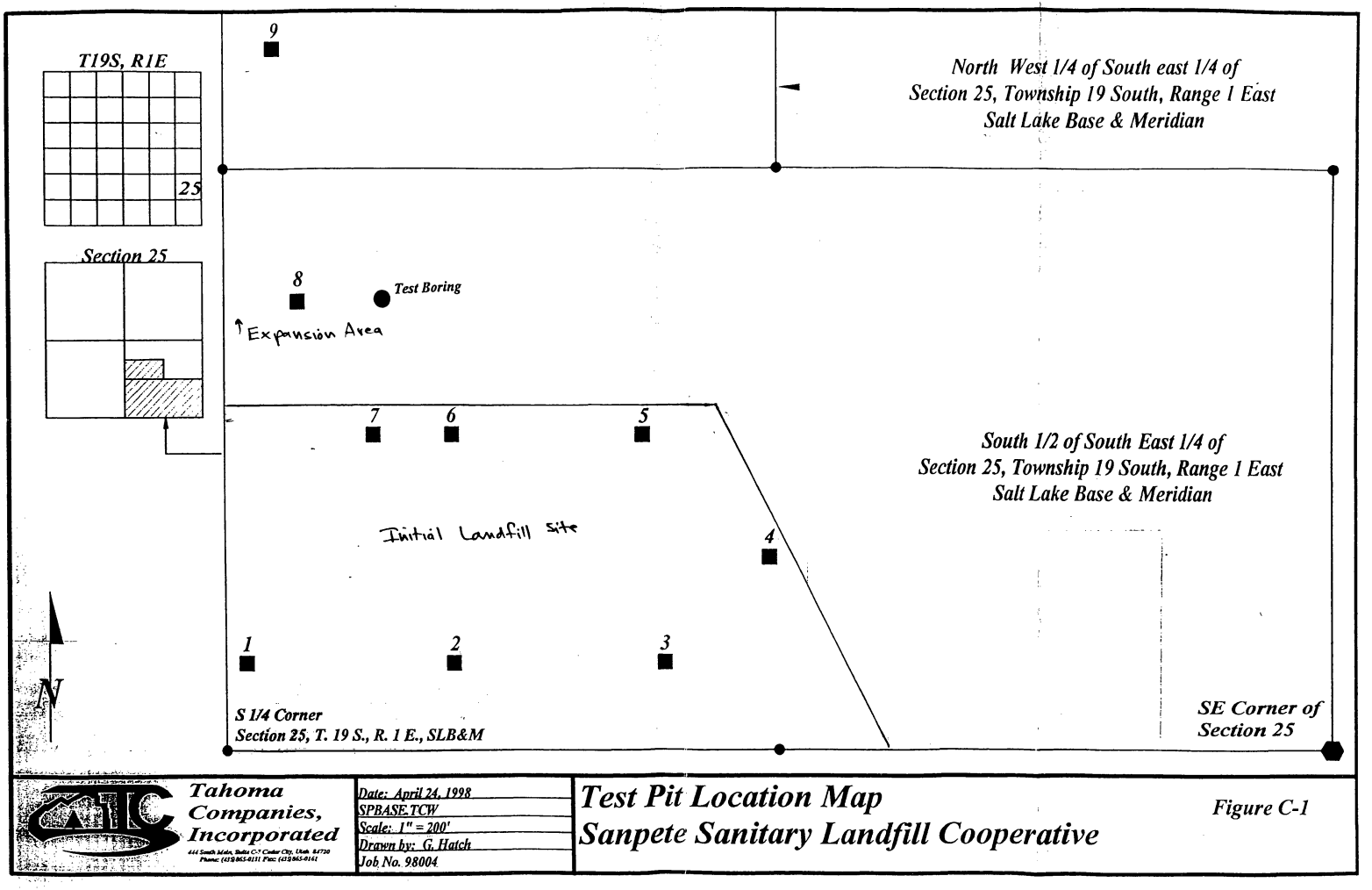



***Figure B-5***

After C.T. Hardy, 1952

| | | |
|---|---|---|
| *Tahoma Companies, Incorporated* | *Date: April 24, 1998*<br>*SPBASE.TCW*<br>*Scale: Not to Scale*<br>*Drawn by: G. Hatch*<br>*Job No. 98004* | ***Geological Cross Section***<br>***Sanpete Sanitary Landfill Cooperative*** |




Tahoma Companies, Incorporated

444 South Main, Suite C-7 Cedar City, Utah 84720
Phone: (435)865-0111 Fax: (435)865-0161

Date: April 24, 1998
SPBASE.TCW
Scale: 1" = 200'
Drawn by: G. Hatch
Job No. 98004

# Test Pit Location Map
# Sanpete Sanitary Landfill Cooperative

Figure C-1

# ATTACHMENT 2

# PROOF OF OWNERSHIP

Form 1860-9
(January 1988)

# The United States of America

To all to whom these presents shall come, Greeting:

UTU-75929-01

WHEREAS,

**Sanpete County Sanitary Landfill Cooperative**

is entitled to a land patent pursuant to the Recreation and Public Purposes Act of June 14, 1926 (44 Stat. 741), as amended and supplemented (43 U.S.C. 869; et. seq.), for the following described land in Sanpete County:

Salt Lake Meridian, Utah

T. 19 S., R. 1 E.,
Sec. 24, SE¼SW¼, SW¼SE¼;
Sec. 25, W½NE¼, E½NW¼, NE¼SW¼,
NW¼SE¼, S½SE¼.

Containing 400.00 acres, more or less.

NOW KNOW YE, that the UNITED STATES OF AMERICA, in consideration of the premises, and in conformity with said Act of Congress, HAS GIVEN AND GRANTED, and by these presents DOES GIVE AND GRANT unto the said **Sanpete County Sanitary Landfill Cooperative**, the land above described for the use as a sanitary landfill: TO HAVE AND TO HOLD the same, together with all rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the same **Sanpete County Sanitary Landfill Cooperative**, its successors or assigns, forever; and

EXCEPTING AND RESERVING TO THE UNITED STATES:

1. A right-of-way thereon for ditches and canals constructed by the authority of the United States. Act of August 30, 1890, (43 U.S.C. 946); and

2. All the mineral deposits in the lands so patented, and the right of the United States, or persons authorized by the United States, to prospect for, mine and remove such deposits from the same under applicable laws and regulations as the Secretary of the Interior may prescribe.

Patent Number ***43-2001-0024***

UTU-75929-01

SUBJECT TO:

3. Those rights for a water facility, granted to Utah Division of Water Resources, its successors and assigns, by right-of-way number UTU-68949, pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761), as to the SW¼SE¼SW, Section 24, T. 19 S., R. 1 E.;

4. Domestic livestock grazing use by J.D. Jackson, as holder of grazing permit No.435262, for the Gunnison Valley Allotment. The right of the permittee to graze livestock pursuant to the terms and conditions of his permit and this clause shall expire on August 31, 2002;

5. Domestic livestock grazing use by Bryce Christensen, as holder of grazing permit No.435360, for the Sanpitch Allotment. The right of the permittee to graze livestock pursuant to the terms and conditions of his permit and this clause shall expire on August 31, 2002;

6. Sanpete County Sanitary Landfill Cooperative, its successors or assigns, shall comply with all Federal and State laws applicable to the disposal, placement, or release of hazardous substances (substance as defined in 40 CFR Part 302);

7. Sanpete County Sanitary Landfill Cooperative, its successors or assigns, assumes all liability for and shall defend, indemnify, and save harmless the United States and its officers, agents, representatives, and employees (hereinafter referred to in this clause as the United States), from all claims, loss, damage, actions, causes of action, expense, and liability (hereinafter referred to in this clause as claims) resulting from, brought for, or on account of, any personal injury, threat of personal injury, or property damage received or sustained by any person or persons (including the patentee's employees) or property growing out of, occurring, or attributable directly or indirectly, to the disposal, placement, or release of hazardous substances from the above described land, regardless of whether such claims shall be attributable to: (1) the concurrent, contributory, or partial fault, failure, or negligence of the United States, or ( 2) the sole fault, failure, or negligence of the United States; The patentee shall indemnify and hold harmless the United States against any legal liability or future costs that may arise out of any violation of such laws;

8. No portion of the land covered by such patent shall under any circumstance revert to the United States if such portion has been used for solid waste disposal or for any other purpose that the authorized officer determines may result in the disposal, placement, or release of any hazardous substance;

9. The above described land has been conveyed for utilization as a sanitary landfill. The land may contain small quantities of commercial and household hazardous waste as determined in the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901), and defined in 40 CFR 261.4 and 261.5; and

10. If, at any time, the patentee transfers to another party ownership of any portion of the land not used for the purpose specified in the application and approved plan of development, the patentee shall pay the Bureau of Land Management the fair market value, as determined by the authorized officer, of the transferred portion as of the date of transfer, including the value of any improvements thereon.

Patent Number ***43-2001-0024***

Form 1860-10
(April 1988)

UTU-75929-01

In addition to the above, the grant of the herein described land is subject to the following reservations, conditions, and limitations:

1. The patentee and its successors or assigns in interest shall comply with and shall not violate any of the terms or provisions of the Title VI of the Civil Rights Act of 1964, 78 Stat. 241, and requirements of the regulations, as modified or amended, of the Secretary of the Interior issued pursuant thereto, 43 CFR 17, for the period that the lands conveyed herein are for the purpose for which the grant was made pursuant to the act cited above, or for another purpose involving the provision of similar services or benefits;

2. The United States shall have the right to seek judicial enforcement of the requirements of Title VI of the Civil Rights Act of 1964, and the terms and conditions of the regulations, as modified or amended, of the Secretary of the Interior issued pursuant to said Title, in the event of their violation by the patentee;

3. The patentee and its successors or assigns in interest will, upon request of the Secretary of the Interior or his delegate, post and maintain on the property conveyed by this document signs and posters bearing legend concerning the applicability of the Title VI of the Civil Rights Act of 1964 to the area or facility conveyed:

4. The reservations, conditions, and limitations contained in sections (1) through (3) above shall constitute a covenant running with the lands, binding on the patentee and its successors or assigns in interest for the period for which the lands described herein is used for the purpose for which this grant was made, or for another purpose involving the provision of similar services or benefits; and

5 The assurance and covenant required by sections (1) through (4) above shall not apply to ultimate beneficiaries under the program for which this grant is made. "Ultimate beneficiaries" are identified in 43 CFR 17.12(h).

IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

GIVEN under my hand, in Salt Lake City, Utah the Twenty-Ninth day of January in the year of our Lord two thousand and One of the Independence of the United States the two hundred and Twenty-Fifth

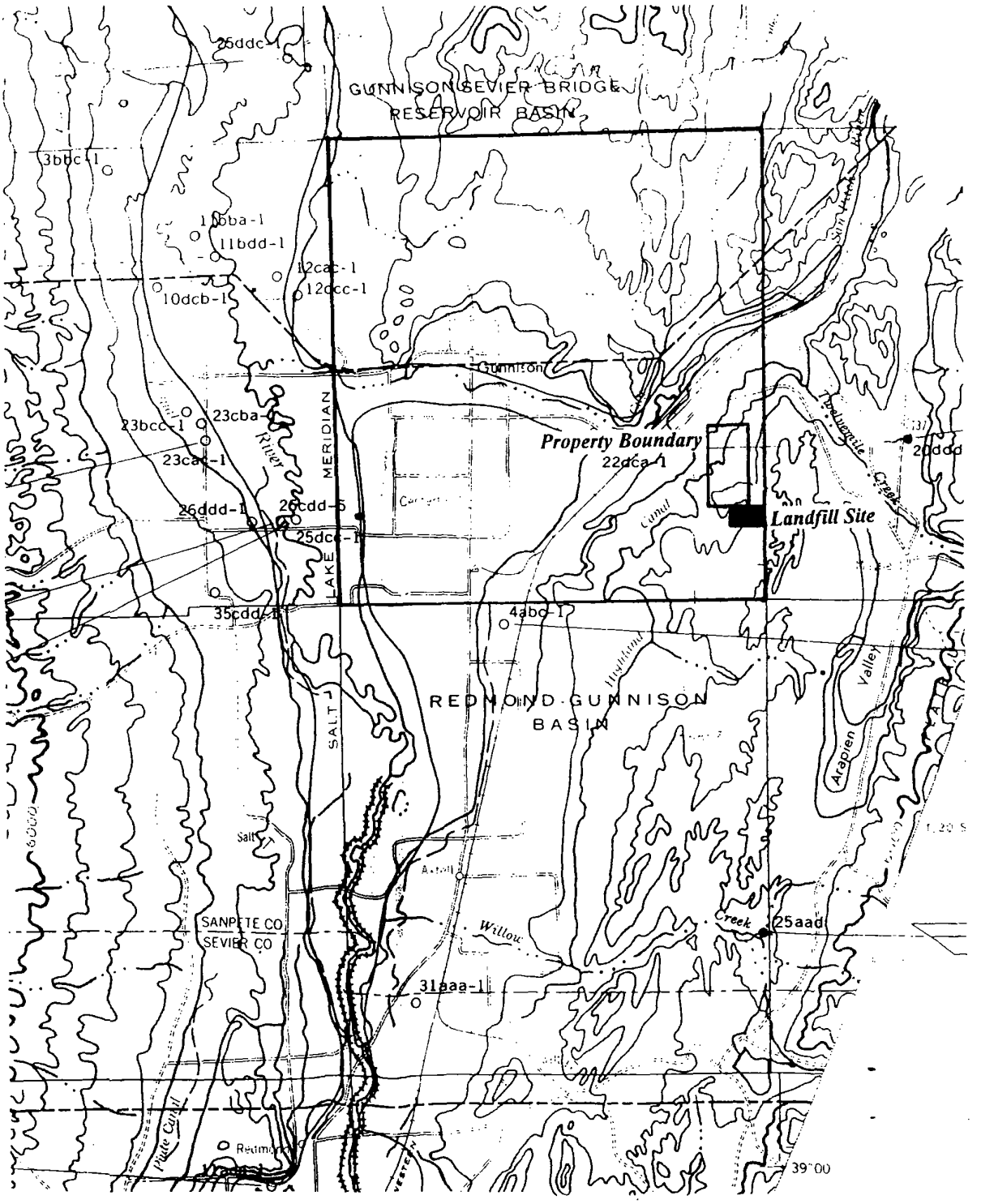
By William Bury
Acting Chief, Branch of Lands and Realty

Patent Number 43-2001-0024

# ATTACHMENT 3

# WHITE HILLS LANDFILL LOCATION MAP

*Sanpete County Landfill Site*
*Southern 1/2 of the SE 1/4 of Section 25, Township 19 S, Range 1 E*




**GARY F. PLAYER**

**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**

*Sanpete County Landfill Site*
*Sanpete Sanitary Landfill Cooperative*

# ATTACHMENT 4

# PROJECTED LANDFILL WASTE TONNAGES AND VOLUMES

SOLID WASTE MANAGEMENT FOR SANPETE SANITARY LANDFILL COOPERATIVE
ESTIMATED WASTE UTILIZATION
FACILITY: SANPETE COUNTY SANITARY LANDFILL COOPERATIVE
WHITE HILLS CLASS I LANDFILL SITE

3% INCREASE PER YEAR IN DAILY UTILIZATION
ACTUAL USE TO DATE IN RED. PROJECTED USE IN BLUE.

FILE: REVISED WASTE USE.XLS
14-Feb-05

| CALENDAR YEAR | WASTE ACCEPTED (TONS/DAY) (A) | DAYS OPEN TO ACCEPT WASTE (B) | WASTE ACCEPTED (TONS/YEAR) (D=A*B) | WASTE ACCEPTED (CUBIC YDS/YEAR) (E=D*2000/900) | CUMULATIVE WASTE ACCEPTED (TONS) | CUMULATIVE WASTE ACCEPTED (CUBIC YARDS) |
|---|---|---|---|---|---|---|
| 2001 | 28.00 | 180 | 5005 | 11122 | 5005 | 11122 |
| 2002 | 46.62 | 305 | 14218 | 31596 | 19223 | 42718 |
| 2003 | 52.07 | 305 | 15880 | 35289 | 35103 | 78007 |
| 2004 | 54.90 | 305 | 16744 | 37209 | 51847 | 115216 |
| 2005 | 56.55 | 305 | 17246 | 38325 | 69093 | 153541 |
| 2006 | 58.24 | 305 | 17764 | 39475 | 86857 | 193016 |
| 2007 | 59.99 | 305 | 18297 | 40659 | 105154 | 233675 |
| 2008 | 61.79 | 305 | 18846 | 41879 | 123999 | 275554 |
| 2009 | 63.64 | 305 | 19411 | 43135 | 143410 | 318689 |
| 2010 | 65.55 | 305 | 19993 | 44429 | 163403 | 363118 |
| 2011 | 67.52 | 305 | 20593 | 45762 | 183996 | 408881 |
| 2012 | 69.54 | 305 | 21211 | 47135 | 205207 | 456016 |
| 2013 | 71.63 | 305 | 21847 | 48549 | 227054 | 504565 |
| 2014 | 73.78 | 305 | 22503 | 50006 | 249557 | 554571 |
| 2015 | 75.99 | 305 | 23178 | 51506 | 272734 | 606076 |
| 2016 | 78.27 | 305 | 23873 | 53051 | 296607 | 659127 |
| AVERAGES AND TOTALS | 61.50 AVERAGE WASTE ACCEPTED (TONS/DAY) | 4755 DAYS OPEN TO ACCEPT WASTE | 18882 AVERAGE WASTE ACCEPTED (TONS/YEAR) | 41960 AVERAGE WASTE ACCEPTED (CUBIC YDS/YEAR) | 296607 CUMULATIVE WASTE ACCEPTED (TONS) | 659127 CUMULATIVE WASTE ACCEPTED (CUBIC YDS) |

# ATTACHMENT 5

# SIGNATURE LOG

## SIGNATURE LOG

Sanpete County Sanitary Landfill Cooperative

All Landfill personnel must read the approved Permit and Plan of Operation before beginning work at the facility. Please sign this Signature Log after reading the approved Permit and Plan of Operation.

| Name (Print) | Signature | Date |
| --- | --- | --- |

# ATTACHMENT 6

## LANDFILL OPERATION FORMS:

Random Load Inspection Record
Daily Log
Landfill Operations Checklist
Equipment Checklist
Quarterly Methane Monitoring Report
Inspection Form

SANPETE SANITARY LANDFILL COOPERATIVE

## WHITE HILLS LANDFILL

## Random Load Inspection Record

| | |
|---|---|
| **INSPECTION INFORMATION** | |
| Inspector's Name: | |
| Date of Inspection: | |
| Time of Inspection: | |
| Facility Name: | |
| **TRANSPORTATION COMPANY INFORMATION** | |
| Company Name: | |
| Address: | |
| | |
| Phone Number: | |
| **VEHICLE INFORMATION** | |
| Driver's Name: | |
| Vehicle Type: | |
| Vehicle License Number: | |
| Vehicle Contents: | o Household Waste o Commercial Waste o Other_____ |
| **OBSERVATIONS AND ACTIONS TAKEN** | |
| | |
| | |
| | |
| Photo Documentation: o Yes o No | |

Driver's Signature*: _____ Date: _____

Inspector's Signature: _____ Date: _____

*Driver's signature hereon denotes: His presence during the inspection and does not admit, confirm or identify liability.

# SANPETE SANITARY LANDFILL COOPERATIVE
# WHITE HILLS, CLASS I LANDFILL
# DAILY LOG

| Date | Company/Hauler Name | Vehicle License # | Time | Estimated Weight | Load Description | Initials |
|---|---|---|---|---|---|---|
| | | | | | | |
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FILE: C:\Documents and Settings\Gary F. Player\My Documents\SANPETE LANDFILLS\OLD SANPETE LANDFILL\REPORTS\1999 PERMIT\PAFORMS\DAILYLOG.FRM

## **LANDFILL OPERATIONS CHECKLIST**, page one of two

Inspector:_____ Date:_____ Time:_____

| ITEM OR AREA INSPECTED | OK | DESCRIBE ANY PROBLEMS | DESCRIBE REPAIRS COMPLETED | DATE OF REPAIRS |
|---|---|---|---|---|
| **ENTRANCE** | | | | |
| Signs posted? | | | | |
| Appearance | | | | |
| Cleanliness | | | | |
| Gate locked when site not operating? | | | | |
| **PERSONNEL** | | | | |
| Attendant present? | | | | |
| Safety equipment in use and available? | | | | |
| **DISPOSAL AREA** | | | | |
| Unloading area clearly marked? | | | | |
| Public and commercial areas separated? | | | | |
| Working face as small as possible? | | | | |
| Litter fences in use? | | | | |
| Is refuse burning? | | | | |
| Are odors a problem? | | | | |
| Dust or litter blowing? | | | | |
| Daily cover applied? | | | | |
| Compaction sufficient? | | | | |
| Final cover and vegetation intact? | | | | |
| **SALVAGE** | | | | |
| Scavenging prohibited? | | | | |
| Separate salvage area established? | | | | |

| ITEM OR AREA INSPECTED | OK | DESCRIBE ANY PROBLEMS | DESCRIBE REPAIRS COMPLETED | DATE OF REPAIRS |
|---|---|---|---|---|
| Salvage materials regularly removed? | | | | |
| **WATER QUALITY** | | | | |
| Area graded to prevent standing water? | | | | |
| Run/on-Run/off system in good repair and working? | | | | |
| Any leachate visible? | | | | |
| **VERMIN CONTROL** | | | | |
| Rodents a problem? | | | | |
| Birds a problem? | | | | |
| Insects a problem? | | | | |
| **FIRE PROTECTION** | | | | |
| No Smoking enforced? | | | | |
| Cover soils available? | | | | |
| Fire extinguishers on all equipment? | | | | |
| Radio or phone on site? | | | | |
| **HOUSEKEEPING** | | | | |
| Site pleasing to see? | | | | |
| Litter picked up? | | | | |
| **DOCUMENTS** | | | | |
| Permit on display? | | | | |
| Development plan available to read? | | | | |
| Operating cost records on file in office? | | | | |
| Daily records (haulers vehicles, waste volumes and types) on file? | | | | |

# EQUIPMENT CHECKLIST

Walk around the rig and look for signs of wear, damage, or leaks before start up. Remember, even if everything looked fine last night, something could have happened in the mean time.

Use your intuition as you run through your check list and evaluate the machine's general condition. Operating an improperly running vehicle invites serious property damage and loss of time or well-being.

| ITEM | REMARKS | DATE | INITIALS |
|---|---|---|---|
| Fluid Levels<br>Indicate which--<br>Hydraulic<br>Crankcase Oil<br>Radiator Coolant<br>Transmission Oil | | | |
| Tracks/Tread/Tires (wear or damage) | | | |
| Screens and Filters (check for clogging) | | | |
| Undercarriage | | | |
| Fuel Pressure Gauge | | | |
| Track Roller Collar, Bolts, Track Shoe Bolts | | | |
| Turbocharger, Manifold, and Air Cleaner Connections | | | |
| Joints in Drive Case | | | |
| Sprocket Hub Seals | | | |

Operator Name _____ Signature _____

# WHITE HILLS CLASS I LANDFILL
# QUARTERLY METHANE MONITORING REPORT

Name:_____ Date:_____

Was the photoionization detector (PID) calibrated before use? ☐ Yes ☐ No

| LOCATION | PID READING | UNITS |
|---|---|---|
| Inside Operator's Shack | | |
| Front Gate | | |
| NW Corner of Fence | | |
| NE Corner of Fence | | |
| SE Corner of Fence | | |
| SW Corner of Fence | | |

Comments/Observations/Actions Taken:

_____

_____

_____

_____

FILE: C:\Documents and Settings\Gary F. Player\My Documents\SANPETE LANDFILLS\OLD SANPETE LANDFILL\REPORTS\1999 PERMIT\PAFORMS\METHANE.FRM

# SANPETE SANITARY LANDFILL COOPERATIVE
# WHITE HILLS, CLASS I LANDFILL
# INSPECTION FORM

Performed by: _____ Date: _____

| | Overall Condition | |
|---|---|---|
| | **Satisfactory** | **Needs Work*** |
| **I. Structures and Roads** | | |
| 1. Buildings | _____ | _____ |
| 2. Fences | _____ | _____ |
| 3. Gates | _____ | _____ |
| 4. Roads | | |

*Specify recommended repairs and/or list actions taken: _____

_____

_____

_____

| | | |
|---|---|---|
| **II. Operations** | | |
| 1. Litter and Weed Control | _____ | _____ |
| 2. Excavations | _____ | _____ |
| 3. Daily Cover | _____ | _____ |
| 4. Final Cover | _____ | _____ |
| 5. Segregated Waste Piles | | |
| a. Scrap Metal | _____ | _____ |
| b. Appliances | _____ | _____ |
| c. Dead Animal Pit | _____ | _____ |
| d. Yard Waste | _____ | _____ |
| e. Construction Debris | _____ | _____ |
| f. Waste Oil/Anti-Freeze Tanks | _____ | _____ |
| g. Used Battery Skid | _____ | _____ |
| h. Recyclables/Reuse Storage Area | _____ | _____ |

*Specify recommended repairs and/or list actions taken: _____

_____

_____

_____

# ATTACHMENT 7

# ANNUAL REPORT FORM

**Mail to:**
Dennis R. Downs, Director
Division of Solid and Hazardous Waste
P.O. Box 144880
Salt Lake City, Utah 84114-4880

Date Entered:_____

# 2005 SOLID WASTE LANDFILL ANNUAL REPORT

## Administrative Information

Calendar or fiscal year of report:_____
If fiscal year, please provide period covered: From _____ To _____
Facility Name:_____
Facility Mailing Address:_____
(Number & Street, Box and/or Route)
City:_____, State:_____ Zip Code:_____
County:_____

Contact's Name:_____ Phone No.:(_____)_____
Title:_____
Contact's Mailing Address:_____
Contact's Email Address:_____

Owner
Name:_____ Phone No.:(_____)_____
Mailing Address:_____
(Number & Street, Box and/or Route)
City:_____, State:_____ Zip Code:_____

Operator *(Complete this section only if the operator is not an employee of the Owner shown above)*
Name:_____ Phone No.:(_____)_____
Mailing Address:_____
(Number & Street, Box and/or Route)
City:_____, State:_____ Zip Code:_____

## Facility Type and Status

| | | |
|---|---|---|
| ☐ Class I | ☐ Class IIIb | ☐ Class V |
| ☐ Class II | ☐ Class IVa | ☐ Class VI |
| ☐ Class IIIa | ☐ Class IVb | |

Does the facility have a construction and demolition (C/D) cell as part of the permit (not operated under a separate permit number)? Yes _____ No _____
If facility was permanently closed during the year enter date closed:_____
_____

## Annual Disposal

Total facility tons:_____ or cubic yards:_____

*If separate tonnages are available*
Municipal tons:_____or cubic yards:_____
C/D tons:_____or cubic yards:_____
Industrial tons:_____or cubic yards:_____

**Conversion Factor used**

- ☐ No conversion factors used
- ☐ Conversion factor from rules (R315-302-2(4)(c)) used
- ☐ Site specific conversion used Please list:_____

Tons Recycled:_____
Cubic Yards Recycled:_____

**Financial Assurance**

Current Closure Cost Estimate:_____
Current Post-Closure Cost Estimate:_____
Current Financial Assurance Mechanism:_____
(ie. Bond, Trust Fund, Corporate or government Test etc.)
Financial Assurance Mechanism Holder:_____
(ie. Name of Bond Company, Bank etc.. If PTIF Account give account number)
Current Amount or Balance in Mechanism:_____

**Other Required Reports**

Financial Assurance: Each facility must recalculate the cost of closure and post-closure care to account for inflation and design changes each year. The recalculation, along with proof that the new cost estimates are fully covered by the assurance mechanism currently be utilized, must be submitted. Facilities that are using a trust account should include a copy of the most recent account statement.

*Note* Facilities using "Local Government Financial Test" must provide the information required in R315-309-3(7)(d) each year.

Ground Water Monitoring: Each facility that is required to monitor ground water must submit a ground water monitoring report that contains water elevations, sampling results, and statistical analyses. Check box if facility is exempt from ground water monitoring ☐

Explosive Gas Monitoring: A gas monitoring report must be included unless the facility is a Class II landfill that has receive an exemption, a Class III, IV, or VI landfill, or any other facility that has an exemption. Check box if facility is exempt from gas monitoring ☐

Training Report: A report of all training programs or procedures completed by facility personnel during the year.

**Signature:**_____ **Date:**_____
Signature should be by an executive officer, general partner, proprietor, elected official, or a duly authorized representative. A duly authorized representative must meet the requirements of the solid waste rules (UAC R315-310-2(4)(d)).

**Print name:**_____ **Title:**_____

# ATTACHMENT 8

# THIRD PARTY CLOSURE COST ESTIMATE

# PROPOSAL

**JENSEN EXCAVATING**
403 West 200 North
Manti, Utah 84642
(435) 835-3071

PROPOSAL SUBMITTED TO: Sanpete County Sanitary Landfill Corp.

PROPOSAL FOR: Sanpete County Landfill

We hereby submit specifications and estimates for:

This bid consists of:

Moving dirt 1,500 feet for use of final cover material

Our bid does not include any of the following:

Hauling dirt or purchasing of dirt

**WE PROPOSE** hereby to furnish machinery , labor and materials to complete in accordance with above specification, for the sum of:

Two Dollar and fifty cents per cubic yard

Payments are to be paid when our work is completed.

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents, or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

Authorized Signature Barbara Vee Jensen Date 8/21/00

**Acceptance of Proposal** - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

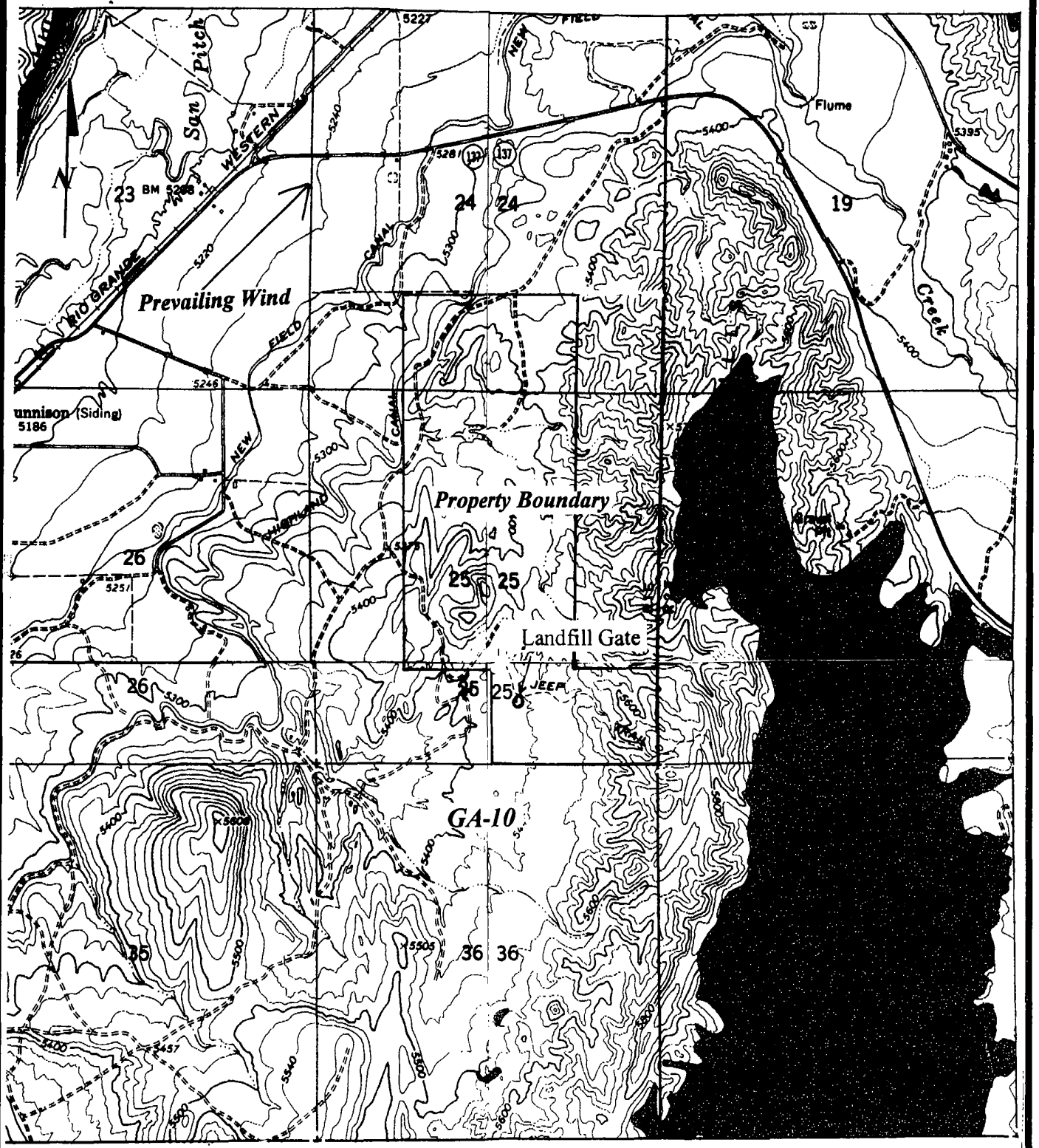
Date of Acceptance: _____

Signature: _____

Signature: _____

# ATTACHMENT 9

# SCANNED USGS 7.5 MINUTE QUADRANGLES




**Prepared from Four Intersecting U.S.G.S. 7.5 Minute Quadrangles: Gunnison, Sterling, Mayfield, and Redmond, Utah**

**GARY F. PLAYER**

**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

1671 W 546 S, Cedar City, Utah 84720
(435) 867 5637

*Topographic Map*
*Sanpete Sanitary Landfill Cooperative*

# ATTACHMENT 10

# PRE-DEVELOPMENT LANDFILL TOPOGRAPHIC MAP

## Scale: 1" = 200'

# ATTACHMENT 12

# SANPETE COUNTY LOCATION MAP

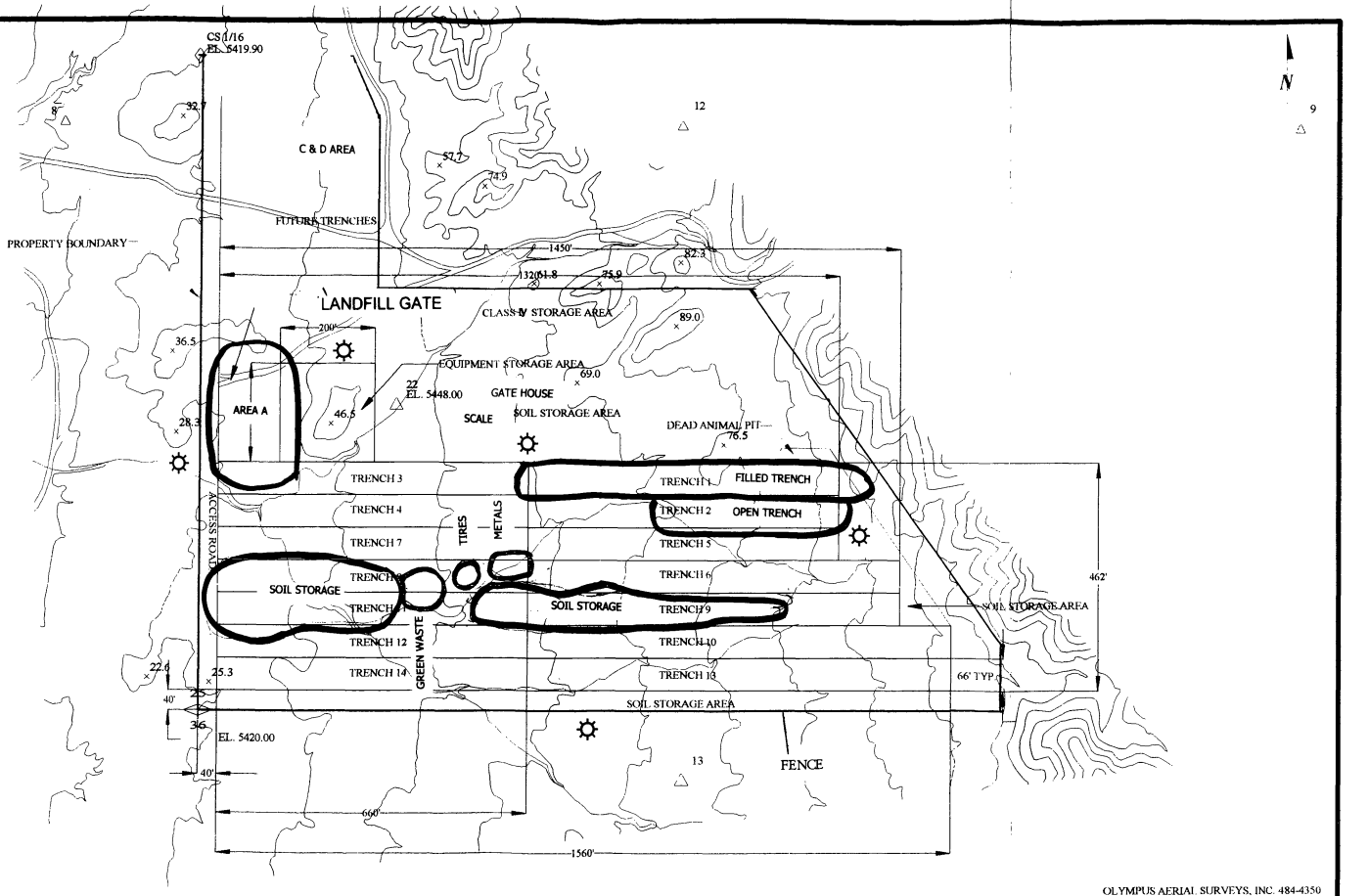
Drawing Unable to Scan

# ATTACHMENT 11

# AS-BUILT LANDFILL PLAN VIEW

# ATTACHMENT 11

# AS-BUILT LANDFILL PLAN VIEW




OLYMPUS AERIAL SURVEYS, INC. 484-4350


GARY F. PLAYER
UTAH PROFESSIONAL
GEOLOGIST
NO. 5280804-2250
1671 W 546 S, Cedar City, Utah 84720
(435) 867 5637


**WHITE HILLS LANDFILL**
**AS BUILT LANDFILL UTILIZATION**
**MARCH, 2005**

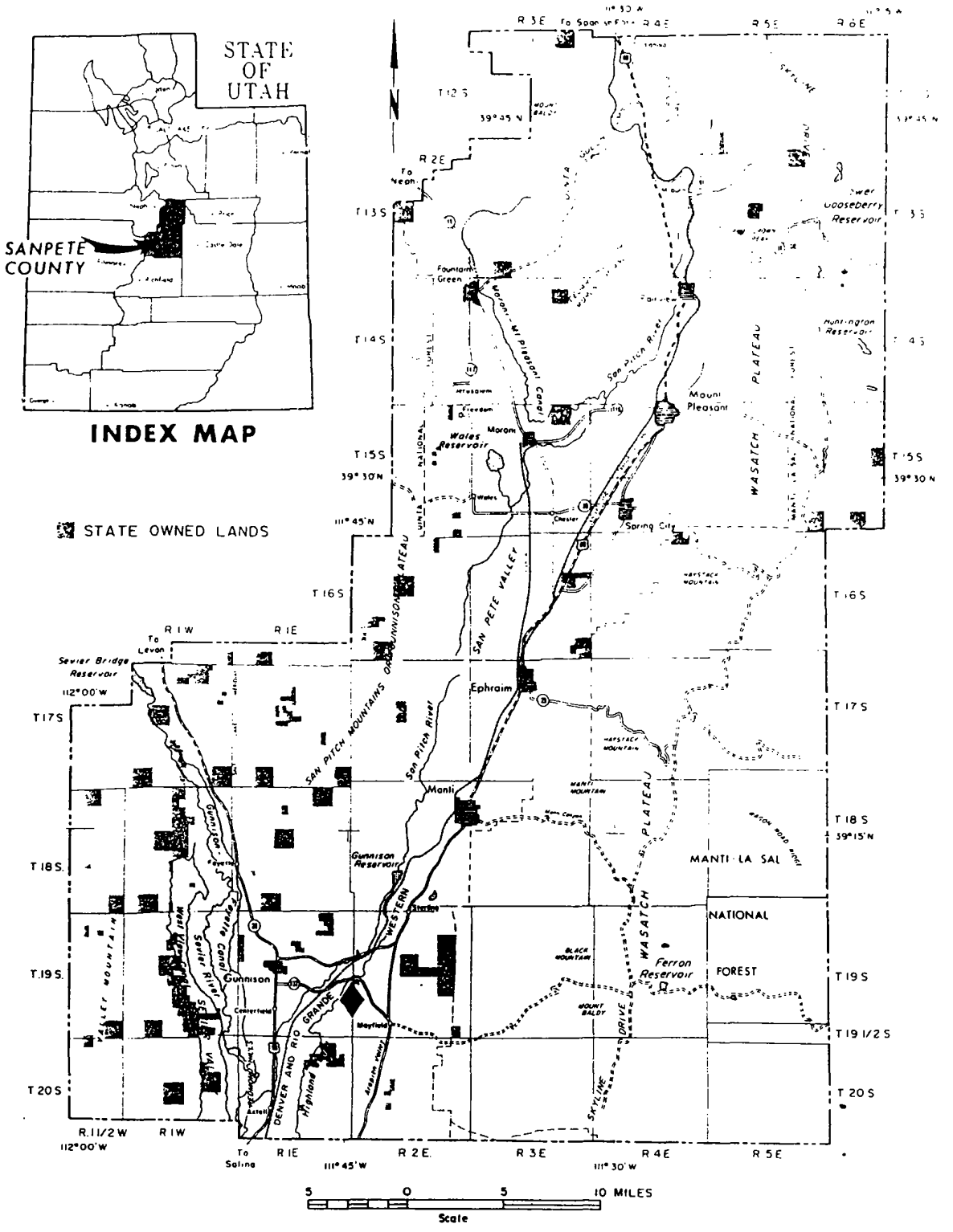
Scale: 1" = 200'

# *Landfill Trench Method Plan View*
# *Sanpete Sanitary Landfill Cooperative*

☼ *Gas Monitoring Point*

# ATTACHMENT 12

# SANPETE COUNTY LOCATION MAP





**GARY F. PLAYER**

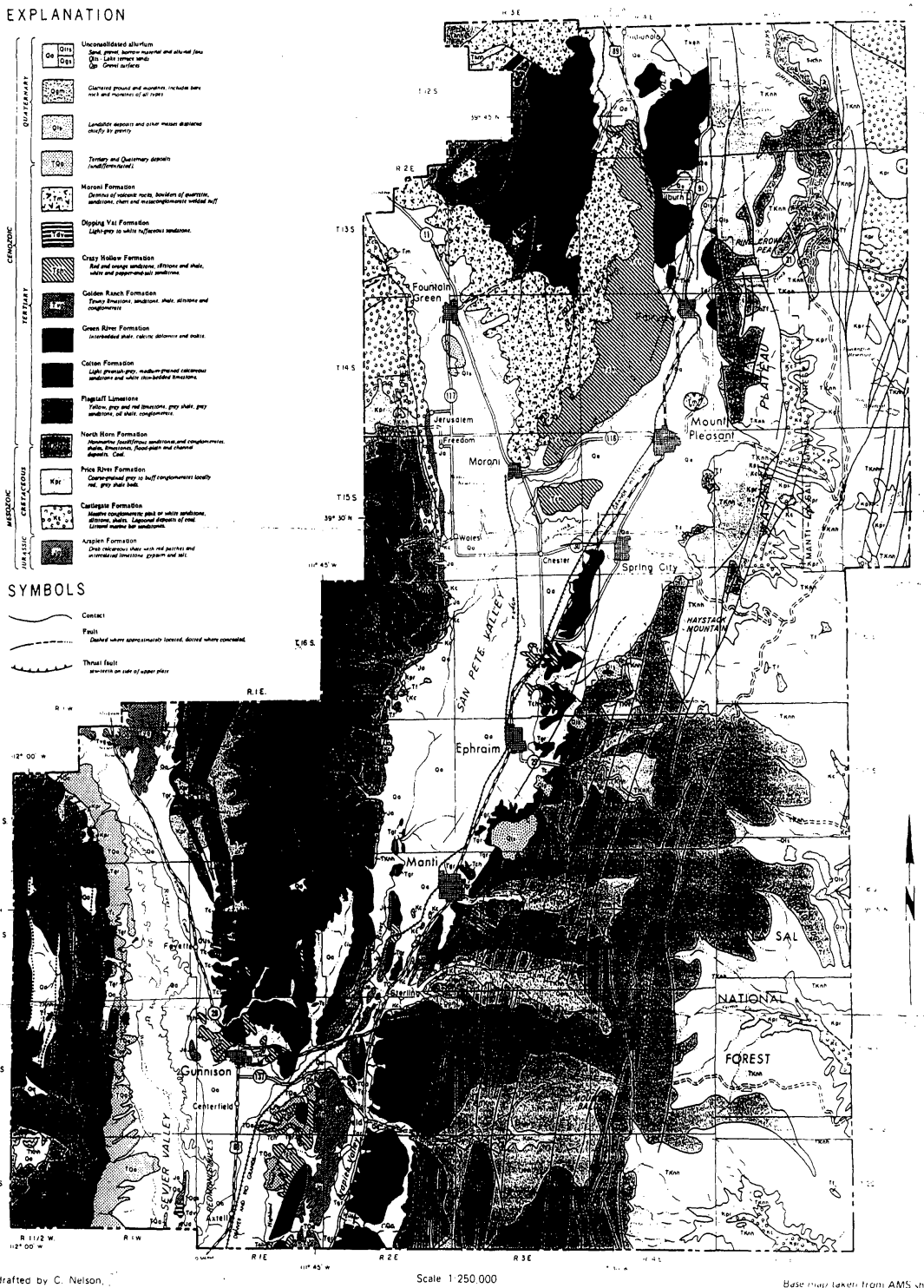
**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**


***Sanpete County Location Map***
***Sanpete County, Utah***

# ATTACHMENT 13

# REGIONAL GEOLOGY MAP




Base map taken from AMS sheets, Price, Utah, 1953-62 and Delta Utah, 1956-62, 1:250,000

Geology from W. L. Stokes, J. H. Madsen, Jr., and L. F. Hintze, 1961-63, 1:250,000

...p drafted by C. Nelson, ... Holland and J. Robb ...

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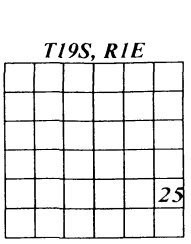
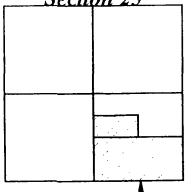
UNIVERSITY OF UTAH
SALT LAKE CITY, UTAH, 84112

# Geology of Sanpete County

# ATTACHMENT 14

# MAP OF TEST PITS AND TEST BORING




9

North West 1/4 of South east 1/4 of
Section 25, Township 19 South, Range 1 East
Salt Lake Base & Meridian

8

Test Boring

7 6 5

South 1/2 of South East 1/4 of
Section 25, Township 19 South, Range 1 East
Salt Lake Base & Meridian

4

1 2 3

N

S 1/4 Corner
Section 25, T. 19 S., R. 1 E., SLB&M

SE Corner of
Section 25

GARY F. PLAYER

UTAH PROFESSIONAL GEOLOGIST
NO. 5280804-2250

1671 W 546 S, Cedar City, Utah 84720
(435) 867 5637

Date: April 24, 1998
SPBASE.TCW
Scale: 1" = 200'
Drawn by: G. Hatch
Job No. 98004

# Test Pit Location Map
# Sanpete Sanitary Landfill Cooperative

# ATTACHMENT 15

# LOG OF TEST PITS with SOILS DESCRIPTIONS AND ANALYSES

# LOG OF TEST PITS
## SANPETE SANITARY LANDFILL COOPERATIVE, WHITE HILLS SITE

POINT OF ORIGIN: SW corner of the SE quarter of section 25, T. 19 S., R. 1 E., Salt Lake Baseline and Meridian, Utah. Pits excavated and described by Gary F. Player and Richard Kane on April 8, 1998.

| Test Pit No. | Depth | Soil Description |
|---|---|---|
| 1 | Location: 200' N and 50' E from Point of Origin - Elevation: 5420' Est. | |
| | 0 - 8' | SW, gravelly, silty, loose, gray brown; pebbles to 2" are mostly shale, platy; trace gypsum fragments. |
| | 8' -11' | SM, fine grained, cohesive, reddish brown, common voids from rootlets with lenses of light reddish brown clay veined with white caliche. May be transitional, residual soil on top Arapien Shale. |
| | 11' - 14.5 | Weathered Arapien Shale bedrock, clay rich, dark reddish brown, with caliche veinlets and fragments of hard shale and siltstone. |
| 2 | Location: 200' N and 550' E from Point of Origin - Elevation: 5438' Est. | |
| | 0 - 10.5' | SW, gravelly, silty, loose, gray brown; pebbles to 2" are mostly shale, platy; trace gypsum fragments. |
| | 10.5' - 14' | SM, fine grained, cohesive, reddish brown, common voids from rootlets, with lenses of light reddish brown clay veined with white caliche. May be transitional, residual soil on top Arapien Shale. |
| | 14' - 16' | Weathered Arapien Shale bedrock, clay rich, dark reddish brown, with caliche veinlets, gypsum crystals, and fragments of hard shale and siltstone. |
| 3 | Location: 200' N and 1050' E from Point of Origin - Elevation: 5460' Est. | |
| | 0 - 12.5' | SM/ML, gravelly, with gravel-sized chunks of transparent selenite gypsum, gray yellowish brown, loose, dry, trace caliche veinlets. |
| | 12.5' - 15.5' | ML, sandy, cohesive, reddish brown, common voids from rootlets, with lenses of light reddish brown clay veined with white caliche. May be transitional, residual soil near top of Arapien Shale. |
| 4 | Location: 440' N and 1300' E from Point of Origin, at base of hills - Elevation: 5475' Est. | |
| | 0 - 3' | SM, gravelly, loose, dry, gray brown. |
| | 3' - 10' | Weathered Arapien Shale bedrock, clay rich, tan, green, and dark reddish brown, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. Apparent strike of bedding is N40°W, dip 45° to NE. Backhoe refusal on hard, weathered bedrock at 10 feet. |

| Test Pit No. | Depth | Soil Description |
|---|---|---|
| 5 | Location: 720' N and 1,000' E from Point of Origin - Elevation 5460' Est. | |
| | 0 - 11' | SW, gravelly, silty, loose, gray brown; pebbles to 2" are mostly shale, platy, trace gypsum fragments |
| | 11' - 12' | Weathered Arapien Shale bedrock, clay rich, tan, green, and dark reddish brown, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. Backhoe refusal on hard, weathered bedrock at 12 feet. This test pit was excavated about 65 feet from the base of a shale hillside |
| 6 | Location: 720' N and 550' E from Point of Origin - Elevation: 5430' Est. | |
| | 0 - 10' | SM, gravelly, with gravel-sized chunks of shale and transparent selenite gypsum, gray yellowish brown, loose, dry, trace caliche veinlets. |
| | 10' - 11' | Weathered Arapien Shale bedrock, clay rich, tan, green, and dark reddish brown, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. Backhoe refusal on hard, weathered bedrock at 11 feet. |
| 7 | Location: 720' N and 360' E from Point of Origin - Elevation: 5420' Est. | |
| | 0 - 8' | SW, reddish brown, fine to medium grained, gypsiferous cement, probably weathered Arapien sandstone lens. |
| | 8' - 12' | Weathered Arapien Shale bedrock, clay rich, green, and dark reddish brown, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. Also contains siliceous, cobble- and boulder-sized concretions in the test pit and littering the weathered, reddish brown, shale land surface. These are not alluvial boulders, but cemented portions of the shale bedrock. |
| 8 | Location: 1020' N and 180' E of Point of Origin - Elevation: 5420' Est. | |
| | 0 - 6' | SW, gravelly, gray brown, loose, with gravel-sized platy chips of shale. |
| | 6' - 8' | CL, deeply weathered Arapien Shale bedrock, soft, clay rich, reddish brown, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. |
| | 8' - 11' | Weathered Arapien Shale bedrock, reddish brown, firm, cohesive, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. Digs readily with backhoe. |
| 9 | Location: 1600' N and 120' E from Point of Origin - Elevation: 5430' Est. | |
| | 0 - 14' | SW-SM, gravelly, gray brown, loose alluvial sand, with gravel-sized chips of shale and traces of caliche veinlets. |
| | 14' - 15' | CL, weathered Arapien Shale bedrock, reddish brown, soft, cohesive, with caliche veinlets, gypsum crystals, and fragments of hard, green shale and siltstone. Digs readily with backhoe. |

*File: K:\SHARE\CLIENTS\98004-1\REPORTS\WAIVER\TESTPIT.TBL*

Western Laboratories, Inc.
211 Highway 95 • P.O. Box 1020
Parma, Idaho 83660
800-658-3858 • FAX 208-722-6550

**Dealer #:** GPV

**Date:** 4/1/2005

**Dealer:** Gary Player Ventures
1671 W 546 S

Cedar City UT 84720

# OFFICIAL TEXTURE REPORT

| Lab # | Grower | Field ID | % Sand | % Silt | % Clay | Textural Class |
|---|---|---|---|---|---|---|
| 304002 | White Hills | Soil Storage Area | 0 | 36.25 | 63.75 | Clay |
| 304003 | White Hills | Soil Storage E. Area | 0 | 26.25 | 73.75 | Clay |
| 304004 | White Hills | Soil Storage W. Area | 0 | 46.25 | 53.75 | Silty Clay |

[redacted]

Western Laboratories, Inc.

P.O. Box 1020 • 211 Highway 95 • Parma, ID 83660

0.1408333

Dealer #: GPV
Name: Gary Player Ventures
Address: 1671 W 546 S
Cedar City, UT 84720

Date: 04/01/05

Location: White Hills Landfill

| LAB# | Field ID | BD | WHC | Wilt Pt | Fld Cap | WHC | Field MC |
|---|---|---|---|---|---|---|---|
| 304002 | Soil Storage Area | 1.43 | 1.69 | 0.38 | 0.52 | 0.141 | 11.93 |
| 304003 | Soil Storage E. Area | 1.33 | 1.51 | 0.44 | 0.57 | 0.126 | 19.23 |
| 304004 | Soil Storage W. Area | 1.43 | 1.87 | 0.32 | 0.47 | 0.156 | 7.70 |
| | **Average** | | 1.690 | 0.381 | 0.522 | 0.141 | 12.953 |
| | | | (in./ft.) | (vol./vol.) | (vol./vol.) | (vol./vol.) | (wt. percent) |

WHC = Moisture Holding Capacity

*John P. Taberna, Soil Scientist*

# SOIL CLASSIFICATION

Client: Gary Player

Project Number: GP-101-03

Project Name: Landfills

Date: 5/22/03

Sample Source: White Hills

Test Method: ASTM-D-422

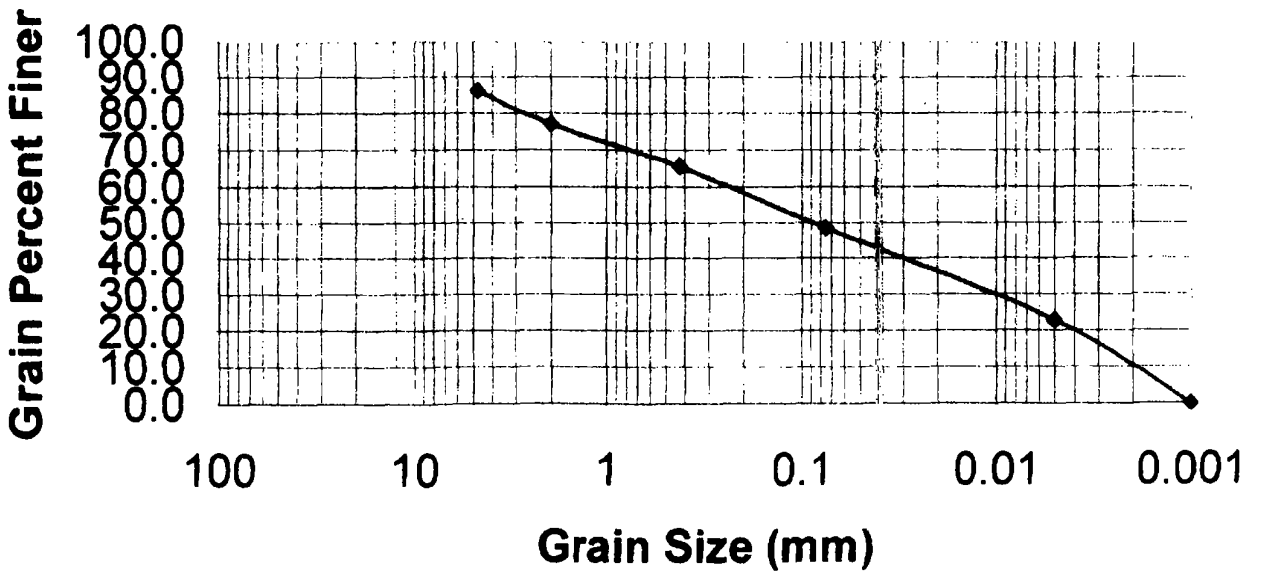
Unified Soil Classification: SM-SC

Atterberg Limits: LL =22, PL =16, PI =6

| Sieve Size | Cumulative Wt. Retained (g) | Percent Retained | Percent Passing |
|---|---|---|---|
| 4 | 160.3 | 13.7 | 86.3 |
| 10 | 106.9 | 9.2 | 77.1 |
| 40 | 134.0 | 11.5 | 65 6 |
| 200 | 198.4 | 17.0 | 48.6 |
| -200 | 15.6 | 1.3 | |

| PERCENTAGES | Sand | Silt (0.005 mm) | Clay (0.001mm) |
|---|---|---|---|
| | 51.4 | 25.9 | 22.7 |

## Grain Size Distribution




Reviewed By: Joel A. Myers, P.E.

GEO Consultants

580 North Main Street, Cedar City, Utah 84720 Ph# (435) 586-8089

# ATTACHMENT 16

# LOG OF TEST BORING

| LOG OF TEST BORING WHITE HILLS LANDFILL<br>Sanpete Sanitary Landfill Cooperative | | |
|---|---|---|
| **SAMPLE DEPTH (feet)** | **USCS NAME** | **SAMPLE DESCRIPTION** |
| 3-4 | SP | Fine brown sand with trace medium-coarse sand and silt. Trace of caliche. Small amount of angular gravel. |
| 5-6 | SM | Fine brown sand, silty, with trace medium-coarse sand. Trace of caliche. Trace amount of angular gravel. |
| 7-8 | SP | Fine brown sand with trace medium-coarse sand and some silt. Trace angular gravel. Trace caliche cement. |
| 9-10 | SP | Fine brown sand with trace of caliche and medium sand. Trace angular gravel/shale. |
| 13-15 | NA | Claystone- silty, soft, tan to orange-brown. Gypsum crystals to 3mm. |
| 18.5-20 | NA | Tan-Orange siltstone with fine sand and a trace of gypsum. |
| 22 | NA | (Clay/silt)stone, brown |
| 25 | NA | Tan siltstone. |
| 30 | CL | Yellow clay with a little silt. |
| 40 | CL | Yellow clay with a little silt. |
| 50 | CL | Yellow clay with a little silt. |
| 60 | NA | Yellow claystone with silt. |
| 70 | ML | Blue-yellow silt with clay. Stiff. |
| 80 | ML | Brown silt with clay. Stiff. |
| 90 | ML | Tan-dark brown-blue silt with. Stiff. |
| 100 | CL | Blue clay with streaks of tan clay. Stiff. |
| 110 | CL | Blue clay. |
| 120 | ML | Blue silt/sand with shale bits. |
| 125-130 | NA | Cuttings are coarse blue sand-sized with shale bits (rare). Trace fine-medium sand-sized. |
| 138-140 | NA | Cuttings are coarse blue sand-sized with shale bits (more common). Trace fine-medium sand-sized. |
| 150 | ML | Plastic blue silt with clay and sand-sized of all sizes and shale bits. |
| 160 | NA | Brown silt/claystone with a little blue silt-clay. Some sylvite. |
| 170 | NA | Blue-brown siltstone with some coarse sand-sized cuttings and a trace of fine and medium sand-sized. Contains common soluble saline minerals. |
| 178-181 | NA | Brown-blue sand-sized claystone cuttings of all sizes (fine- coarse) with shale bits. Some sylvite. |
| 190 | CL | Blue-yellow-brown sand-sized clay with cuttings of all sizes and shale bits. Sylvite present. |

| LOG OF TEST BORING WHITE HILLS LANDFILL<br>Sanpete Sanitary Landfill Cooperative | | |
|---|---|---|
| **SAMPLE DEPTH (feet)** | **USCS NAME** | **SAMPLE DESCRIPTION** |
| 200 | NA | Sylvite crystals to 2 mm. Cuttings are blue, brown, and yellow fine-coarse sand-sized. |
| 210 | NA | Cuttings are blue-brown sand-sized with very coarse grains and sylvite. Bits of shale. Shale bedrock with lenses of saline minerals. |
| 220 | NA | Cuttings are blue-brown sand-sized with very coarse grains, halite and sylvite. Bits of shale. Crystals to a few mm. |
| 230 | NA | Cuttings are brown medium sand-sized with sylvite. Trace fine-coarse sand-sized and silt. Shale bedrock with lenses of saline minerals. |
| 240 | NA | Cuttings are very coarse blue-brown sand-sized with bits of shale. Some sylvite. Trace medium fine sand-sized. |
| 250 | NA | Cuttings are very coarse red-brown sand-size materials. Trace silt. Sylvite. Blue shale chips. |
| 260 | NA | Cuttings are blue-yellow very coarse sand-sized. Sylvite. Trace fine-coarse sand-sized and silt. |
| 270 | NA | Cuttings are red brown medium sand-sized with halite and sylvite. Trace siltstone and fine-coarse sand-sized. |
| 280 | NA | Cuttings are blue-brown tan very coarse sand-sized with sylvite and shale bits. Trace silt and fine-coarse sand-sized. |
| 295-297 | NA | Red-brown to tan very coarse sand-sized with sylvite and shale bits. Trace siltstone and fine-coarse sand-sized |
| 297-300 | NA | Red brown siltstone and sand-sized with shale bits and Sylvite. Trace silt and fine sand-sized. |

DATE DRILLED: July 15 - 22, 1998 DRILLED BY: Steve Thayer Drilling Company

SURFACE ELEVATION: 5440' (approximate)

TOTAL DEPTH: 300' ELEVATION AT TOTAL DEPTH: 5140'

DRILLING METHOD: Cable tool, with Standard Penetration Tests in upper 20 feet.

SAMPLING METHOD: STP to 20 feet, grab samples below.

HOLE DIAMETER: 6 inches total depth. CASING: None

ABANDONMENT: Set bentonite plug from total depth to surface on July 22, 1998.

WATER LEVEL: None encountered.

*Notes:*

1. *Top of weathered Arapien Shale Formation bedrock at 13 feet below ground level.*
2. *Soft siltstones and claystones logged as soils, where encountered. Remainder is bedrock.*
3. *NA = Not Applicable. Material is bedrock–not a soil*

FILE: C:\Documents and Settings\Gary F. Player\My Documents\SANPETE LANDFILLS\2005 WHITE HILLS\TSTBORE.wpd

# ATTACHMENT 17

# LAND USE COMPATIBILITY (LOCATION STANDARDS)

# United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Richfield District Office
150 East 900 North
Richfield, Utah 84701

IN REPLY REFER TO

MAR 30 1998

2000
(UT-050)

March 25, 1998

Ms Marci Perea
Tahoma Companies, Incorporated
444 South Main Street, Suite C-7
Cedar City, UT 84720

Dear Ms Perea:

This letter is to respond to your request for information on the land surrounding the proposed Gunnison landfill. Specifically, the Southern 1/2 of the Southeast 1/4 of Section 25, Township 19 South, Range 1 East, containing 80 acres.

The subject land is not within any national park, national monument, recreation area, designated wilderness or wilderness study area or wild and scenic river area.

We will plan to meet representatives of Tahoma to tour the site on April 7, 1998, at about 1:00PM.

If you have any further questions concerning this matter, please contact me at 896-1515.

Sincerely,

Ronald K. Erickson
Realty Specialist

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
LINCOLN PLAZA
145 EAST 1300 SOUTH, SUITE 404
SALT LAKE CITY, UTAH 84115

In Reply Refer To
(FWE)

April 22, 1998

APR [illegible]

Ms. Marci Perea
Tahoma Companies, Inc.
444 South Main St., Suite C7
Cedar City, Utah 84720

Dear Ms. Perea:

We have received your letter of March 23, 1998 concerning the proposed development of a landfill facility in Sanpete County, Utah within Section 25, T.19S., R.1E. SLBM. The U.S. Fish and Wildlife Service concurs with your assessment that no federally listed threatened or endangered species are known to occur on these project sites. Please contact us if we can be of any further assistance.

Sincerely,

for David McGillivary
Assistant Field Supervisor

United States Department of Agriculture
Natural Resources Conservation Service
P.O. Box 534
Richfield, UT 84701
March 27, 1998

Marci Perea
Staff Environmental Scientist
Tahoma Companies, Incorporated
444 South Main Street, Suite C-7
Cedar City, Utah 84720

Dear Ms. Perea:

The site proposed for the new Sanpete County Landfill does not contain any soils classified as prime, unique, or of statewide importance.

The Sanpete Valley Soil Survey (USDA, 1981) lists the area in the southern 1/2 of the Southeast 1/4 of Section 25, Township 19 South, Range 1 East as containing 3 mapping units; Badland, Shaly colluvial land, and Mayfield shaly loam, 2 to 5 percent slopes, eroded. None of which meet the criteria for prime, unique, or important farmland.

If I can be of any further assistance, please call me at 435-896-6441.

Sincerely,

Victor L. Parslow
Soil Scientist

cc: Bill Broderson

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audio tape, etc.) should contact the USDA Office of Communications at (202)720-5881 (voice) or (202)720-7808(TDD). To file a complaint, write the Secretary of Agriculture, U.S.Department of Agriculture, Washington, DC., 20250, or call (202)720-7327 (voice) or (202)690-1538(TDD). USDA is an equal employment opportunity employer.

TAHOMA COMPANIES, INCORPORATED
444 South Main Street, Suite C-7
Cedar City, Utah 84720
(435) 865-0131 ☎ Fax (435) 865-0161
email: tahoma@cedarcity.net

# MEMO

To: File
From: Gary F. Player, Vice President and Principal Geologist
Subject: Sanpete County Landfill Site in White Hills
Date: April 9, 1998

Richard Kane and I spent most of April 7 and April 8, 1998, on a geological reconnaissance of the subject site. While there we looked for possible violations of the required location standards and found none.

The site is more than 1/4 mile from any existing dwellings, residential area, historical structures, or archaeological sites. Petroglyphs occur on sandstone cliffs just west of the southwest corner of section 25, T. 19 S., R. 1 E., SLBM. The petroglyphs are greater than ½ mile west of the landfill site.

There is no wetlands vegetation anywhere on the site. The surface soils consist of well drained fine sand and gravel-sized chips of shale that support a sparse growth of sage brush and heavily grazed grasses.

There are no flood plains on the site.

K:\SHARE\CLIENTS\98004-1\NOTES\SITINVST.WPD

Michael O. Leavitt
Governor
Max J. Evans
Director

State of Utah
Department of Community and Economic Development
Division of State History
Utah State Historical Society

300 Rio Grande
Salt Lake City, Utah 84101-1182
(801) 533-3500 FAX 533-3503 TDD 533-3502
cehistry.ushs@email.state.ut.us

UTAH STATE HISTORICAL SOCIETY
SINCE 1897

April 3, 1998

APR 11 1998

Mari Perea
Staff Environmental Scientist
Tahoma Companies, Inc.
444 South Main Street, Suite C-7
Cedar City UT 84720

RE: Landfill Facility in Sanpete County

In Reply Please Refer to Case No. 98-0358

Dear Ms. Perea:

The Utah State Historic Preservation Office has reviewed our cultural resource files for the above requested project area. After consideration of our project files, there are no known sites within 1/4 mile of the site, however no surveys have been completed to our knowledge of the area. Therefore there may be unknown sites in the area of potential effect.

The Utah Preservation Office would recommend a survey of the project area to determine if there are sites in the project area.

This information is provided on request to assist Sanpete County in identifying historic properties, as specified in U.C.A. 9-8-404. If you have questions, please contact me at (801) 533-3555, or Barbara L. Murphy at (801) 533-3563. My email address is: jdykman@state.ut.us

As ever,

James L. Dykmann
Compliance Archaeologist

JLD:98-0358 OR

F:\CULTURAL\JIM\98-0358.wpd

DENVER AIRPORTS DISTRICT OFFICE
26805 EAST 68th AVENUE, SUITE 224
DENVER, COLORADO 80249-6361
(303) 342-1263

FEDERAL AVIATION
ADMINISTRATION

APR 06 1998

April 1, 1998

Ms. Marci Perea
Tahoma Companies, Incorporated
444 South Main Street, Suite C-7
Cedar City, Utah 84720

Dear Ms. Perea:

This is in response to your letter dated March 23, 1998 regarding the proposed Sanpete County Landfill, located in the Southern 1/2 of the Southeast 1/4 of Section 25, Township 19 South, Range 1 East.

No public use airports are located within 10,000 feet of the proposed landfill.

If you have any questions concerning this matter, please contact me.

Sincerely,

Scott T. Fredericksen, P.E.
Utah State Engineer

TAHOMA COMPANIES, INCORPORATED

444 South Main Street, Suite C-7
Cedar City, Utah 84720

(435) 865-0131 ▪ Fax (435) 865-0161
email tahoma@cedarcity.net

May 4, 1998

Dale Nicholls
Building official/Zoning Administrator
40 West 200 North
Manti, Utah, 84642

Dear Mr. Nicholls:

Sanpete County has contracted with Tahoma Companies, Inc. to prepare a permit to construct and operate a new landfill facility, I am requesting information to complete the location standards which must be met before the facility can be permitted.

The location of the Sanpete County Landfill Site is:

Southern ½ of the Southeast ¼ of Section 25, Township 19 South, Range 1 East.

Our Principal Geologist, Gary Player, was in your office on Friday, May 1, 1998 and reviewed your files and map of the proposed area. He found that the site is zoned as a GA-10, Grazing-Agriculture Zone.

We have reviewed these zoning requirements and find the zoning allows "for certain types of activities which are incompatible to higher density residential type areas". A GA-10 zone also lists "Public recreation grounds and facilities" as a permitted use.

We have concluded that the proposed site meets the zoning requirements for use as a Municipal Solid Waste Landfill.

If you have any questions or comments with this matter, I can be reached at the address and phone number above. If I do not hear from you, I will assume that our conclusions are correct and the project will proceed.

Sincerely,

Marci Perea

Marci Perea
Staff Environmental Scientist

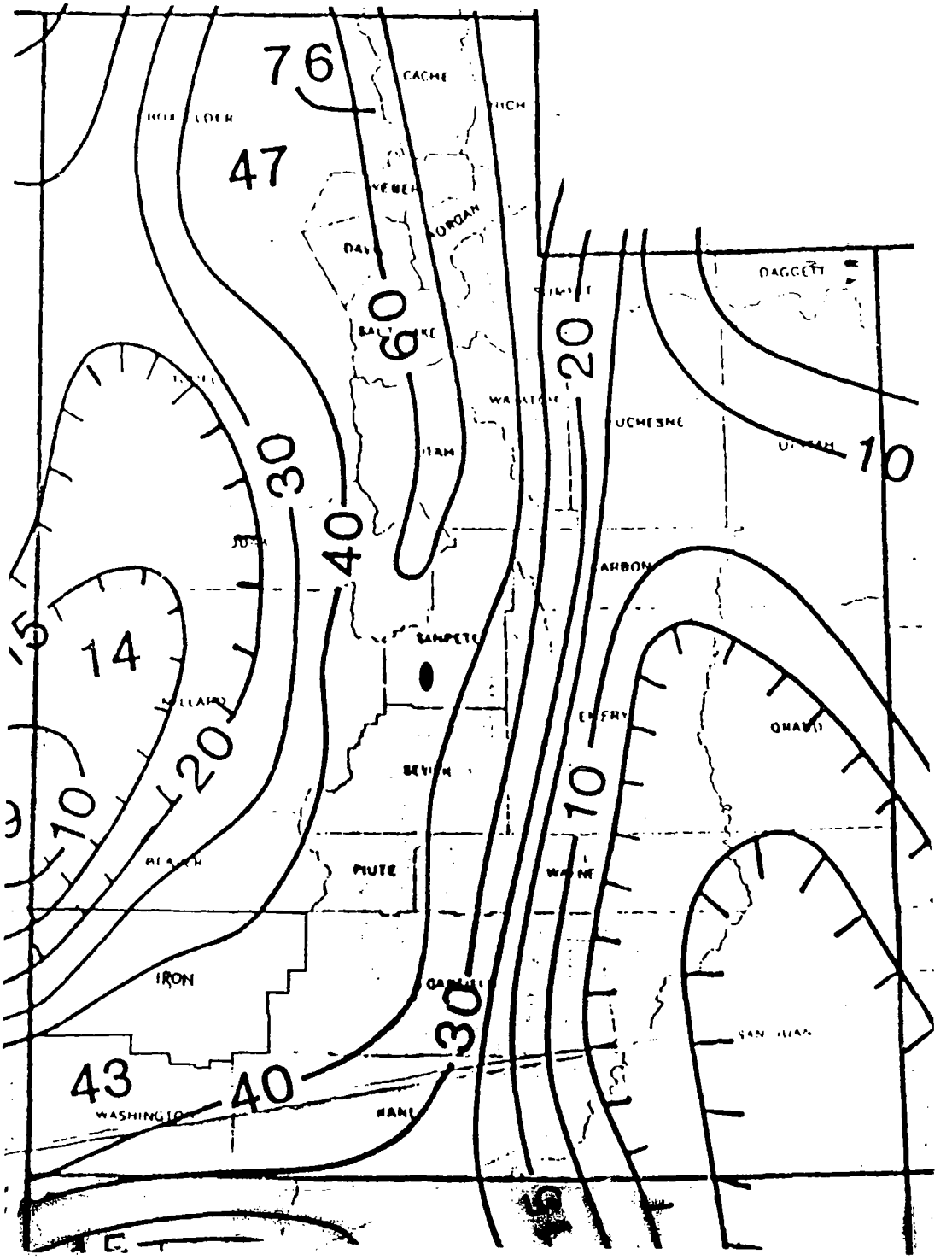
Enclosure: Map of Sanpete County proposed landfill site.
File: K:\CLIENTS\98004-1\LOCATION\ZONING2.LTR

# ATTACHMENT 18

# PREDICTED SEISMIC ACCELERATION MAP

# and

# PEAK GROUND ACCELERATION FOR MAYFIELD, UTAH




**GARY F. PLAYER**

**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

1671 W 546 S, Cedar City, Utah 84720
(435) 867 5637

*Map of Horizontal Acceleration*
*(Expressed as percent of gravity)*
*Sanpete Sanitary Landfill Cooperative*

USGS
Earthquake Hazards Program

The input zip-code is 84643.

| | |
|---|---|
| ZIP CODE | 84643 |
| LOCATION | 39.1132 Lat. -111.7024 Long. |
| DISTANCE TO NEAREST GRID POINT | 1.4790 kms |
| NEAREST GRID POINT | 39.1 Lat. -111.7 Long. |

Probabilistic ground motion values, in %g, at the Nearest Grid point are

| | 10%PE in 50 yr | 5%PE in 50 yr | 2%PE in 50 yr |
|---|---|---|---|
| PGA | 14.260450 | 20.239759 | 32.433010 |
| 0.2 sec SA | 33.671108 | 46.789570 | 74.288521 |
| 0.3 sec SA | 28.181749 | 40.756680 | 61.727638 |
| 1.0 sec SA | 9.132526 | 13.352550 | 20.568661 |

The input zip-code is .
Zip code is zero and we go to the end and stop.

PROJECT INFO: Home Page
SEISMIC HAZARD: Hazard by Zip Code

# ATTACHMENT 19

# SEISMIC RISK ANALYSIS

# TABLE OF CONTENTS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SEISMIC IMPACT ZONE ..... 1

SEISMIC IMPACT ZONE ANALYSIS ..... 1
- INTRODUCTION ..... 1
- METHODOLOGY ..... 1
- ANALYSIS ..... 2
  - Design Earthquakes ..... 2
  - Slope Stability and Deformation Analysis ..... 2
  - Dynamic Materials Properties ..... 3

RESULTS ..... 4

CONCLUSIONS ..... 5

REFERENCES ..... 6


# APPENDICES


A Earthquake Event Record
B Dynamic Properties for Refuse
C Acceleration vs. Time Curve
D. Trench and Area Method Slope Profile

# SEISMIC IMPACT ZONE

A seismic impact zone is defined as a location where the expected peak acceleration from seismic activity is greater then 0.1 times the acceleration due to gravity (g). The site for the White Hills Landfill is in an area where the predicted Maximum Horizontal Acceleration (MHA) would equal 0.5g, which places it in a seismic impact zone.

# SEISMIC IMPACT ZONE ANALYSIS

## INTRODUCTION

To comply with RCRA Subtitle D (258) *Seismic Design Guidance for Municipal Solid Waste Landfill Facilities,* analyses of seismic response and dynamic deformation should be conducted for any Class I landfill within a seismic impact zone. The White Hills landfill may experience peak accelerations as high as 0.5g. Therefore, these analyses have been prepared.

The Landfill has been designed with two types of slopes:

1. Area method refuse slopes of **3:1** (horizontal to vertical) lying on top of compacted trench refuse.

2. Trench method refuse will be contained in an excavated depression, so the integrity of the refuse slopes depends on the gradient of the trench wall, which will be at **1:4**.

The factors of safety for these slopes were found to be greater than 1.0g and the modeled deformations incurred by seismic activity were acceptable.

## METHODOLOGY

A slope stability analysis is used to determine the location of the potential failure surfaces and the corresponding factors of safety. The analysis was done using the Bishops' method of slices to determine where the slope will fail. This slice is used in the earthquake modeling program to determine the response of the site to seismic motion. The design accelerations are then used to calculate the peak acceleration, the yield acceleration, and deformation of the proposed slope configuration due to the activity of the model earthquake. Two failure surfaces were considered for this study: the unconfined refuse slopes of 3:1, and trench slopes confining the refuse at 1:4.

The White Hills Landfill will be constructed without a liner, gas collection system, or leachate collection system. Therefore, failure of the area method refuse slopes would be the only concern for the design of the White Hills Landfill, and this was considered the potential failure surface.

Acceptable deformations for refuse alone have not been defined. Due to the nature of the material, regrading the refuse after a seismic event would be relatively easy and inexpensive if movement was minimal.

# ANALYSIS

## Design Earthquakes

The design earthquake used for the analysis was chosen to have a maximum horizontal acceleration (MHA) of 0.5g. Earthquake data summarized on the published seismic hazard map shows a 90% or greater probability that an acceleration of 0.5g will not be exceeded in 250 years (Algermissen and others, 1990).

An earthquake event with a probable recurrence interval of 490 years and a magnitude of 7.0 was chosen for the model. The model's peak acceleration of 0.282g was then scaled up to 0.5g using the WESHAKE5 computer model develop by the U.S. Army Corps of Engineers. As this event is greater in magnitude than the required model event, a conservative estimate with a greater final deformation on the failure surfaces was obtained.

The design earthquake acceleration history was derived from a published earthquake motion record (see Attachment A). The duration of shaking for this event was not restricted, though historically, the time expected will not exceed 20 seconds.

The White Hills Landfill is located approximately 10 miles from the Sevier fault system, the closest potential location of seismic activity to the landfill site. A 7.0 magnitude earthquake model was a reasonable event to use for this analysis.

## Slope Stability and Deformation Analysis

Static and pseudo static analyses were done for the two slope types in the White Hills Landfill. The Bishop method of slices was used for these calculations. A factor of safety for the slope as a whole and for each slice was calculated and the profile for the least stable slice was used for the dimensions for the soil profile input into the seismic response program. The yield accelerations for the soil and refuse cross sections were calculated according to methods outlined by N. Matasovic.

The failure surface was used as soil layer input for WESHAKE5. Peak accelerations were found using this modeling program for soil profiles both with and without the refuse layer. Plan views and cross section views of the trench and area method slope profiles are shown in Attachment D.

**Dynamic Materials Properties**

To represent the properties of refuse materials we have chosen to use averaged values of peat and clay for the shear modulus and damping ratio required to analyze the accelerations caused by the model earthquake. Attachment B shows the curves for these values. The properties for soil were taken from known values for Mancos Shale deposits which is similar in dynamic material properties to the Arapien Shale. Please see Table 1 for these values.

**TABLE 1: SUMMARY OF MATERIAL PROPERTIES**

| STATIC STABILITY | | |
|---|---|---|
| **Property** | **Shale** | **Refuse** |
| Unit Weight (pounds per cu ft) | 147.5 | 50.73 |
| Cohesion (c', pounds per sq ft) | 3,446 | 100 |
| Angle of Internal Friction (ϕ', degrees) | 22 | 20 |
| Static Factor | *** | *** |
| **DYNAMIC STABILITY** | | |
| **Property** | **Soil** | **Refuse** |
| Yield Acceleration (required to produce a factor of safety = 1.0, (g) | 0.85 | 0.09 |
| Acceleration at Failure Surface (g) | 0.29 | 0.23 |
| Deformation (feet) | 0.92 | 5.60 |

# RESULTS

WESHAKE5 analysis indicates that the accelerations are maximum at the sand and gravel layer of the soil profile, 0.293g, and are minimum at the top soil layer, the refuse, 0.226g (see Table 2). Absolute peak accelerations are shown in the Acceleration vs. Time graph provided as Attachment C.

The critical acceleration is calculated in a separate analytical procedure. This is the acceleration at which the slope will yield. The values for absolute and yield accelerations are used to determine the projected deformation values. The time interval during which the modeled absolute acceleration is greater than the yield acceleration is used as the limits for integration to attain the velocity spectrum. These values are then integrated to find the maximum deformation of the slope.

**TABLE 2: SOIL/ACCELERATION PROFILE**

| Layer | Depth (feet) | Acceleration (g) |
|---|---|---|
| 1 | 0.0 | 0.226 |
| 2 | 37.5 | 0.293 |
| 3 | 42.5 | 0.286 |
| 4 | 370.0 | 0.282 |

The analysis shows that the proposed soil slopes have the potential to deform slightly. The expected movement along the failure surface is less than one foot, and, therefore, within acceptable limits. The deformation of the refuse layer has the potential for a much higher rate of strain, up to 5.6 feet in movement. This should not affect the integrity of the landfill as a whole, as the refuse layer will not affect other structures or surfaces at the site.

All of the initial fourteen trenches will be excavated through sand and gravel soils to the top of the Arapien Shale. Therefore, any motion is dependent on the integrity of the shale and will be minimal.

# CONCLUSIONS

In static conditions, the design of the landfill is very stable.

The annual probability of a 7.0 earthquake occurring in this area is $4.9 \times 10^{-4}$.

To describe likely movement due to seismic activity of the refuse and underlying shale layers, a model was prepared that would represent an event of major proportions. The results indicated that even with induced stresses of this event, the resulting strain is well within tolerable limits. We can therefore conclude that seismic hazard is not a major concern for this landfill site.

If a design seismic event were to occur during the operational or post-closure life of the landfill, the only damage would be from settlement or sliding on side slopes in the area fill and the walls of empty or partially filled trenches. Liners, gas collection systems, and leachate collection systems will not be present, and, therefore, will not be damaged.

K:\SHARE\CLIENTS\98004-1\REPORTS\SEIZMIC\SEISMIC.RPT

# REFERENCES


Algermissen, S.T., D.M. Perkins, P.C. Thenhaus, S.L. Hanson and B.L. Bender, 1990, Probabilistic Earthquake Acceleration and Velocity Maps for the United States and Puerto Rico: U.S. Geol. Survey Map MF 2120.

Arabasz, et al., 1988. "Observational Seismology and the evaluation of Earthquake Hazards and Risk in the Wasatch Front Area, Utah." U. S. Geological Survey, June 1988.

ASTM (American Society of Testing and Materials),1995, "Annual Book of ASTM Standards". American Society for Testing and Materials, Philadelphia.

Goodman, Richard E., 1989 "Introduction to Rock Mechanics." University of California at Berkeley, John Wiley and Sons, New York.

Matasovic, Nevin, 1991, "Selection of Method for Seismic Slope Stability Analysis." University of Missouri, Rulkla, Missouri.

Seed and Idriss, 1970, "Soil Moduli and Damping Factors for Dynamic Response Analyses." Earthquake Engineering Research Center, Report No. EERC 70-10, University of California, Berkeley.

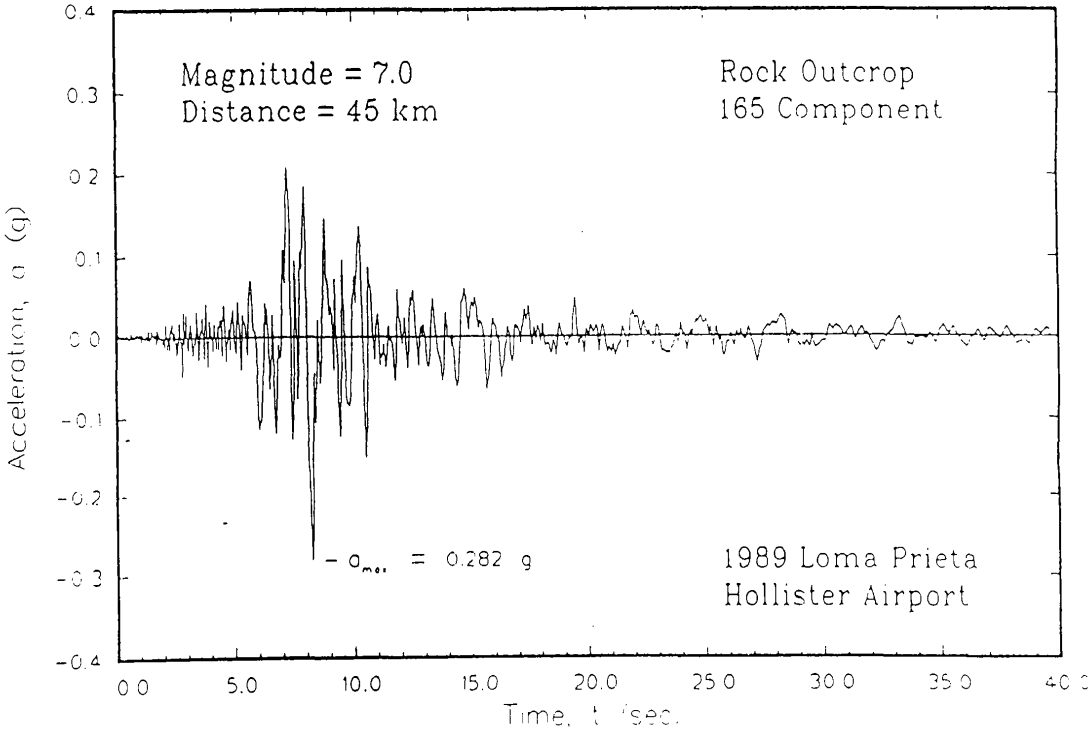
Seed and Bonaparte, 1992, "Seismic Analysis and Design of Lined Waste Fills: Current Practice." University of California, Berkeley.

Sykora and Wahl. "WESHAKE USACE Geotechnical Earthquake Engineering Software." Program based on the original "SHAKE" published December 1972 by Schnabel, Lysmer and Seed, Izzat M. Idriss and J. Sun, Center for Geotechnical Modeling, Department of Civil and Environmental Engineering, University of California, Davis, California, November.

U.S. EPA, 1994, Final Draft RCRA Subtitle D (258) Seismic Design Guidance for Municipal Waste Landfill Facilities.

# ATTACHMENT A

# EARTHQUAKE EVENT RECORD




Hollister Airport record of 1989 Loma Prieta, California, earthquake

**GARY F. PLAYER**

**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

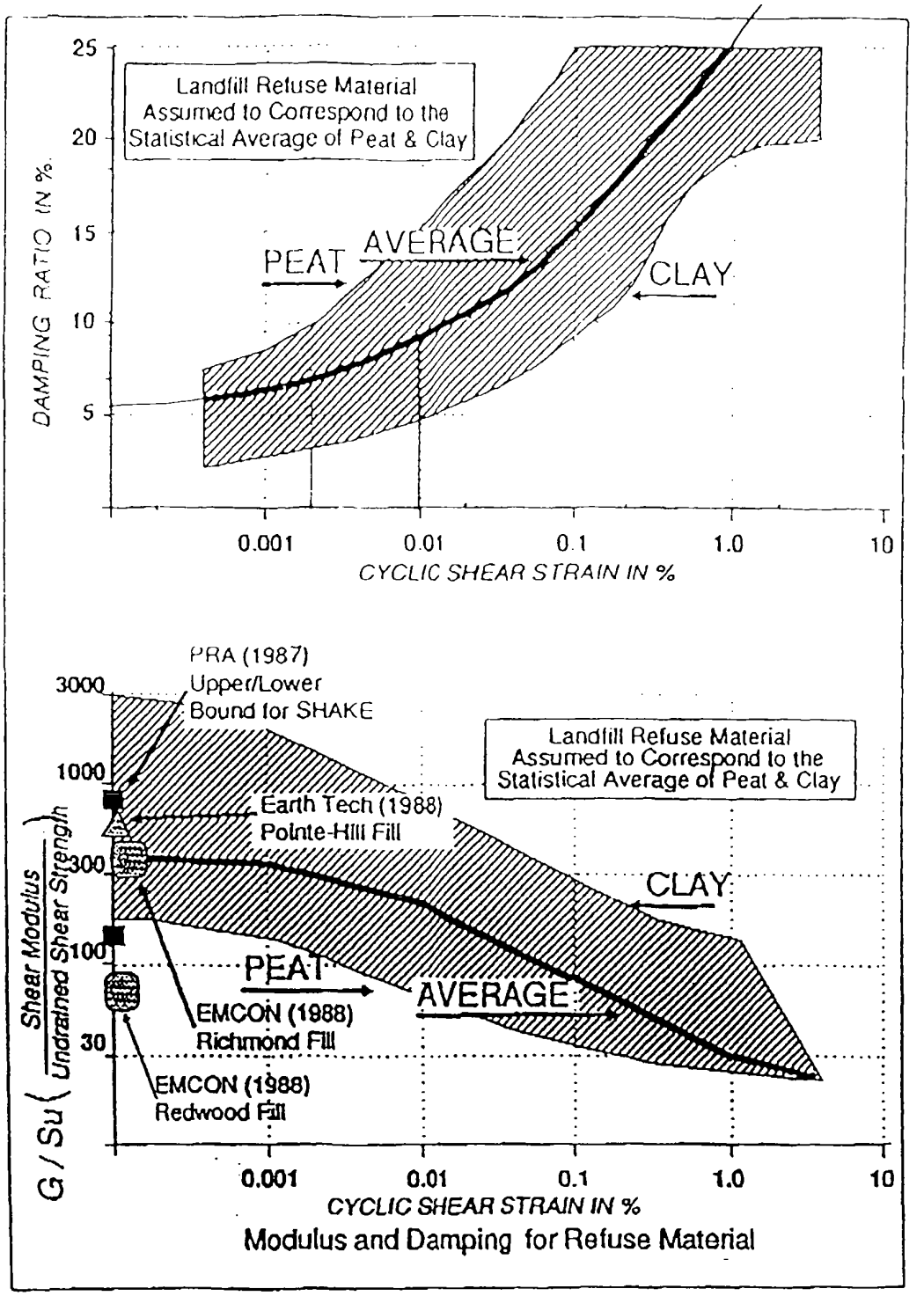
**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**

***Earthquake Event Record***
***Sanpete Sanitary Landfill Cooperative***

# ATTACHMENT B

# DYNAMIC PROPERTIES FOR REFUSE

Dynamic Properties for Refuse (Singh and Murphy, 1990)




Modulus and Damping for Refuse Material

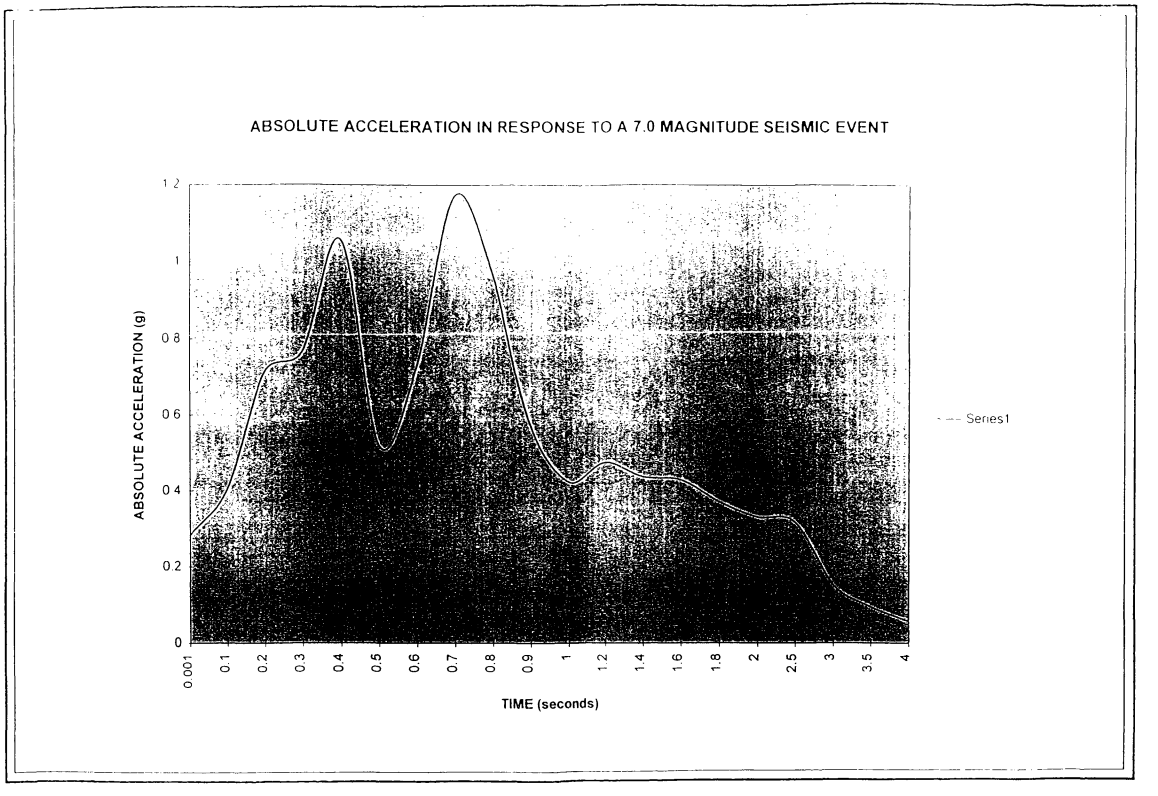
Note: Data Points are estimated average values from shear wave data for Su=143 KN/m$^2$


**GARY F. PLAYER**
**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**
**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**


*Dynamic Properties for Refuse*
*Sanpete Sanitary Landfill Cooperative*

# ATTACHMENT C

# ACCELERATION VS. TIME CURVE




**GARY F. PLAYER**

**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**

| | |
|---|---|
| *Date: August 12, 1998* | ***Acceleration Vs. Time Curve*** |
| *98004.TCW* | ***Sanpete Sanitary Landfill Cooperative*** |
| *Scale: Not to Scale* | |
| *Drawn by: J. Bennet* | |
| *Job No. 98004* | |

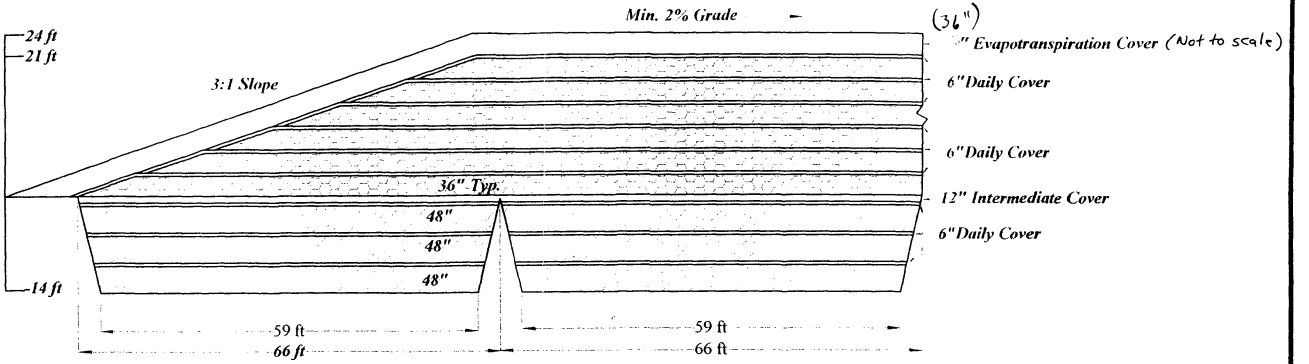
# ATTACHMENT D

# CROSS SECTION OF CLOSED LANDFILL

N — S

## Legend:

- ☐ Compacted Area Method Waste
- ☐ Compacted Trench Method Waste





GARY F. PLAYER

UTAH PROFESSIONAL GEOLOGIST
NO. 5280804-2250

1671 W 546 S, Cedar City, Utah 84720
(435) 867 5637

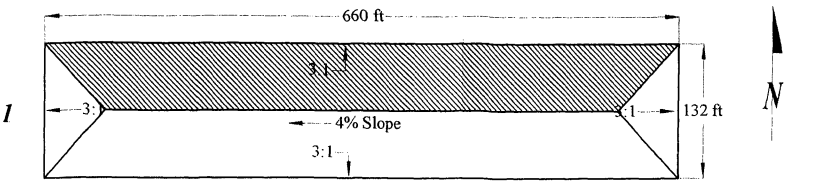

| | |
|---|---|
| Date: April 24, 1998 | **Partial North to South Closed Landfill Cross Section** |
| CLOSEDSPLC.TCW | **Sanpete Sanitary Landfill Cooperative** |
| Scale: 1" = 15' | |
| Drawn by: G. Hatch | |
| Job No. 98004 | |

# ATTACHMENT 20

# PROPOSED SEQUENCING OF WHITE HILLS LANDFILL

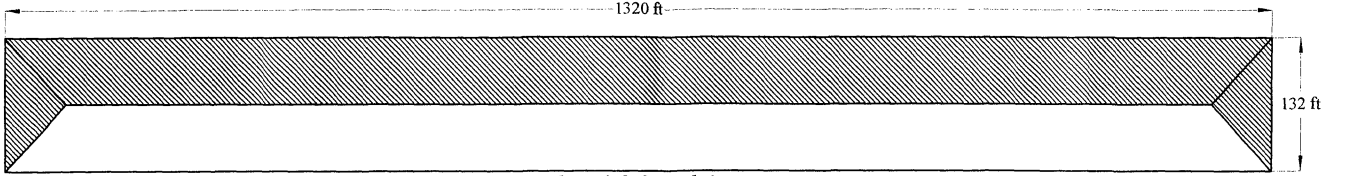
***Legend:***

- *Intermediate Cover*
- *Final Cover*



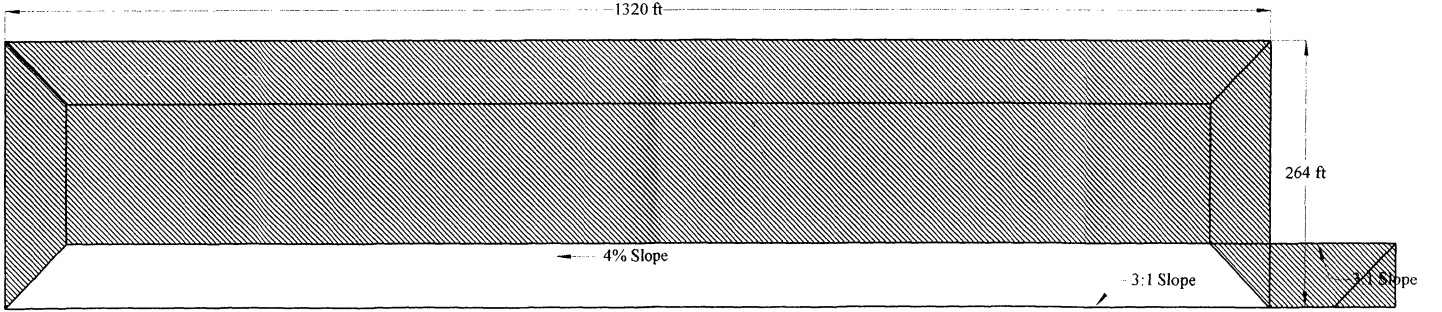

*1*

***Plan View - Area Method Landfill Prism Over Trenches 1 and 2***




*2*

***Plan View - Area Method Landfill Prism Over Trenches 1,2,3 and 4***




*3*

***Plan View - Area Method Landfill Prism Over Trenches 1,2,3,4,5,6,7, and 8***


**GARY F. PLAYER**

**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**

**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**


*Date: May 13, 1998*
*98004-PV.TCW*
*Scale: 1" = 100'*
*Drawn by: G. Hatch*
*Job No. 98004*

# *Landfill Area Sequencing*
# *Sanpete Sanitary Landfill Cooperative*

ATTACHMENT 21

(NOT PROVIDED)

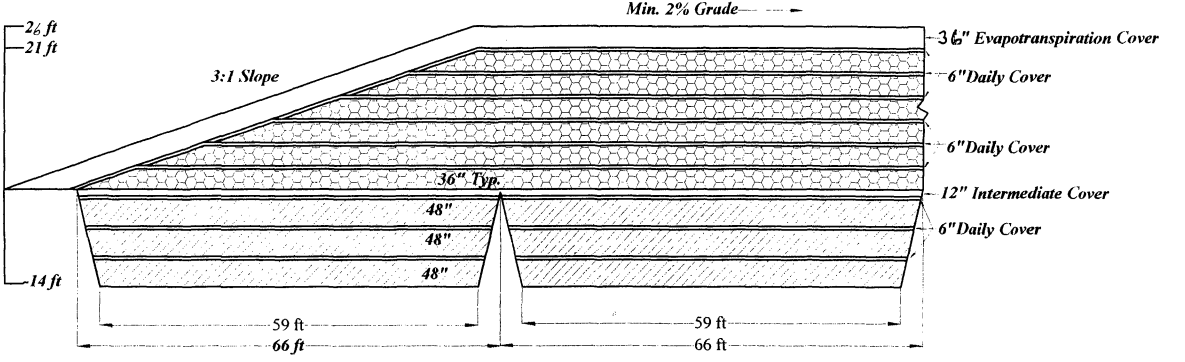
# ATTACHMENT 22

# CROSS SECTION OF PARTIALLY CLOSED LANDFILL

N ——— S

## Legend:

- Compacted Area Method Waste
- Compacted Trench Method Waste





GARY F. PLAYER

UTAH PROFESSIONAL GEOLOGIST
NO. 5280804-2250

1671 W 546 S, Cedar City, Utah 84720
(435) 867 5637


| | |
|---|---|
| Date: April 24, 1998 | **Partial North to South Closed Landfill Cross Section** |
| CLOSEDSPLC.TCW | **Sanpete Sanitary Landfill Cooperative** |
| Scale: 1" = 15' | |
| Drawn by: G. Hatch | |
| Job No. 98004 | |

# ATTACHMENT 23

# DRAINAGE STUDY

# TABLE OF CONTENT

**Page**


1.0 INTRODUCTION ..... 1
2.0 PURPOSES OF THE STUDY ..... 1
3.0 STORM RUN-OFF ..... 1
4.0 STUDY AREAS AND SECTIONS ..... 1
5.0 ANALYTICAL METHODS USED ..... 2
6.0 DESIGN BASIS ..... 2
7.0 RUN-OFF CALCULATIONS ..... 2
8.0 BERM SIZING ..... 3
9.0 CONCLUSIONS ..... 3


## ATTACHMENTS


A. DRAINAGE MAP
B. RUN-OFF CALCULATIONS

## 1.0 INTRODUCTION

This drainage study has been conducted by Tahoma Companies, Incorporated, for the proposed Sanpete Sanitary Landfill Cooperative at White Hills. The landfill is located in the southwest quarter of the southeast quarter of section 25, T. 19 S., R. 1 E., Salt Lake Meridian.

A Drainage Map of the landfill site is included with this drainage study as Attachment A.

## 2.0 PURPOSES OF THE STUDY

The purposes of this study are twofold:

1. To estimate the 25-year maximum storm run-off at and adjacent to the site; and

2. To design ditches and/or berms needed to protect the landfill from run-on and to convey precipitation away from the landfill site.

## 3.0 STORM RUN-OFF

Rainfall values were obtained from maps created by the National Oceanographic and Atmospheric Administration, Atlas 2, Volume 6, Figure 28, *Isopluvials of 25-Year 24 Hour Precipitation in Tenths of an Inch.* The figure shows an expected 25-year storm of approximately 2.10 inches in 24 hours for the White Hills area.

## 4.0 STUDY AREAS AND SECTIONS

The landfill will be situated on a 40 acre parcel of public lands now being obtained by the county through the BLM R&PP process. The area is characterized by semi-arid desert ground cover and some nearly bare bedrock hills of the Arapien Shale to the north and east of the site.

The hillsides that drain toward the landfill site were divided into two (2) study areas. One study area is underlain by Arapien Shale bedrock, and the other is underlain by alluvial fan sediments. These sections are shown on the attached Landfill Drainage Map. See Attachment A.

The two (2) study areas were used solely for the purpose of calculating the total area of each drainage section and are depicted on the Drainage Map. The surface areas and Run-off values for each study area are listed below. The two sections are named Bedrock and Desert.

| RUN-OFF VALUES | | |
|---|---|---|
| **Section Name** | **Total Area (Acres)** | **Run-off (Q) (inches)** |
| Bedrock | 134 | 0.624 |
| Desert | 108 | 0.206 |
| **WEIGHTED** | **242** | **0.438** |

The runoff is calculated using the variables CN, S, and the rainfall in inches expected for the 25 year storm event. CN is based on the soil type and cover, and S is the potential maximum retention after runoff begins. CN is determined for each soil type using Table 2-2d in SCS publication TR 55, *Urban Hydrology for Small Watersheds*. S is calculated using Equation 2-4 of Attachment B. The runoff Q is then calculated for each soil type using Equation 2-3 of Attachment B.

## 8.0 BERM SIZING

The expected rainfall and run-off volume are minimal. If all of the run-off from the entire 202 acres outside the Landfill emptied on to one, up gradient berm, the quantity of water that could run-on would be about 4 cubic feet per second. Soils excavated from landfill trenches will be stored on-site and used in the construction of berms bordering the north and east perimeter of the landfill. Berms will be constructed at least three (3) feet high and will be sufficient to divert any run-on due to rainfall. Each berm would be capable of diverting 20 cubic feet of water per second at a velocity of 10 feet per second to the east and south of the landfill.

Water falling outside the Landfill will be diverted away from the active area by the berm.

## 9.0 CONCLUSIONS

The flooding potential for the proposed Sanpete Sanitary Landfill Cooperative at White Hills is very low. However, it is recommended that berms be constructed around the north and east perimeter of the landfill. Each berm will be at least three feet high with a natural 1:1 slope. Where the access road enters the landfill the ditch/berm system will be enclosed in a minimum 18 inch diameter culvert. All run-off will be diverted into the natural drainage.

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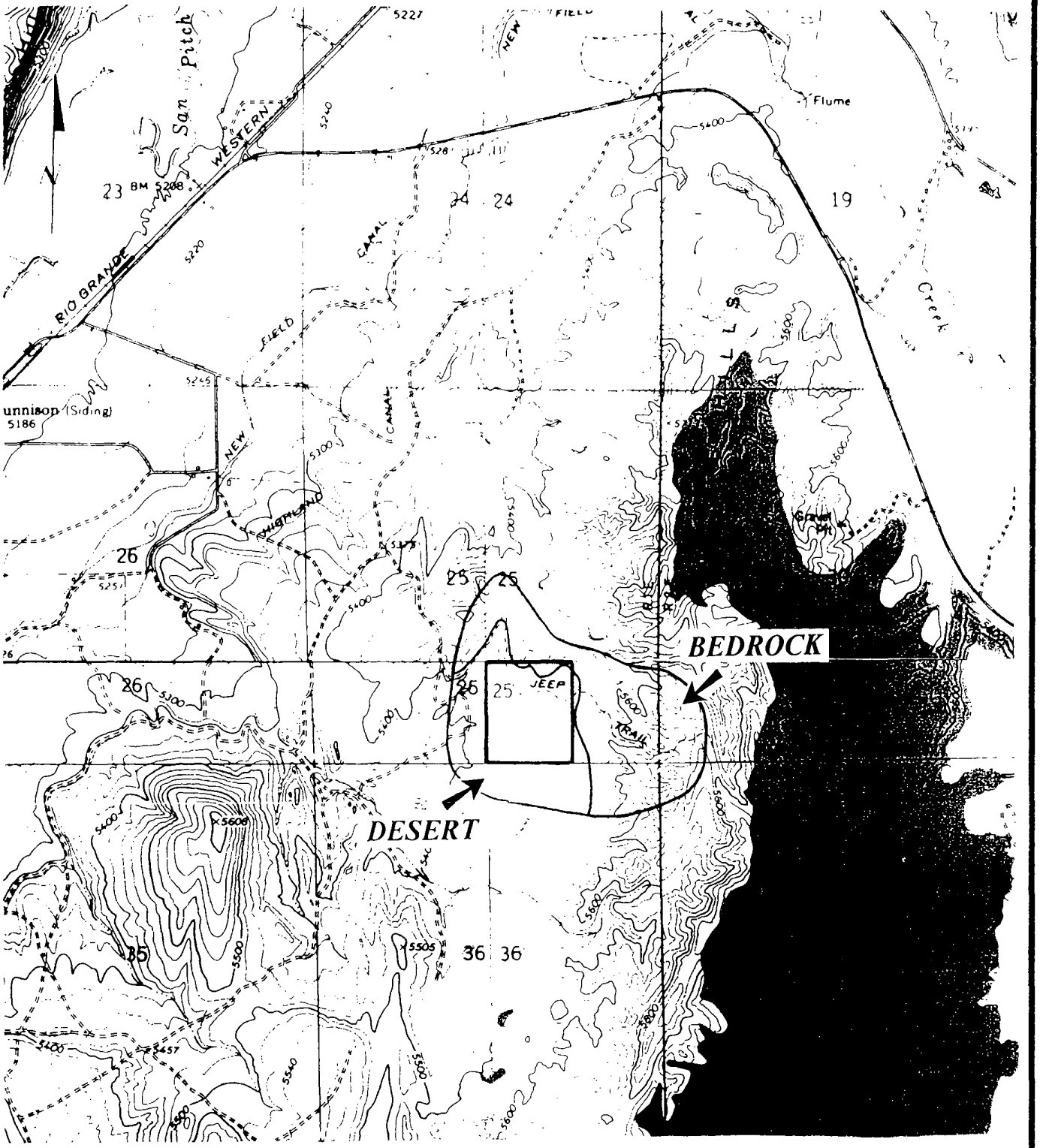
# Attachment A

# DRAINAGE MAP




*Notes:*

*Property Boundary = 1320' x 1320' (approximate--not a survey)*

*Scale: 1" = 2,000'*

*Contour Interval: 40'*

**GARY F. PLAYER**
**UTAH PROFESSIONAL GEOLOGIST**
**NO. 5280804-2250**
**1671 W 546 S, Cedar City, Utah 84720**
**(435) 867 5637**

*White Hills Landfill - Map of Drainage Areas*
*Sanpete Sanitary Landfill Cooperative*

# Attachment B

# RUN-OFF CALCULATIONS

# DRAINAGE STUDY FOR WHITE HILLS LANDFILL

PREPARED BY *TAHOMA COMPANIES, INCORPORATED*
for Sanpete Sanitary Landfill Cooperative

**Estimated 25 year, 24 hour storm** 2.1 **inches**

**Estimating Run-Off: Formulas**

Q = run-off in inches
P = rainfall in inches
S = potential maximum retention after run-off begins in inches

**Equation 2-3:**

$Q = (P-0.2S)^2/(P+0.8S)$

**Equation 2-4:**

$S = (1000/CN) - 10$

**Estimating Run-Off: Runoff Curve Numbers (CN)**

Bedrock Area: CN for Type C, poor sagebrush with grass understory: 80

Desert Area: CN for Type B, poor sagebrush with grass understory: 67

**Estimating Run-Off: Drainage Areas**

| Area Name | Area Acres | Portion of Area | CN (Dimensionless) | S (Dimensionless) | Run-Off (inches) |
|---|---|---|---|---|---|
| Bedrock | 134 | 0.553719 | 80 | 2.5 | 0.62439024 |
| Desert | 108 | 0.446281 | 67 | 4.925 | 0.20579423 |
| **Wt. Average** | **242** | | | | **0.438** |

**Volume of Run-Off from area outside of landfill**

**Area =** 202 **acres**

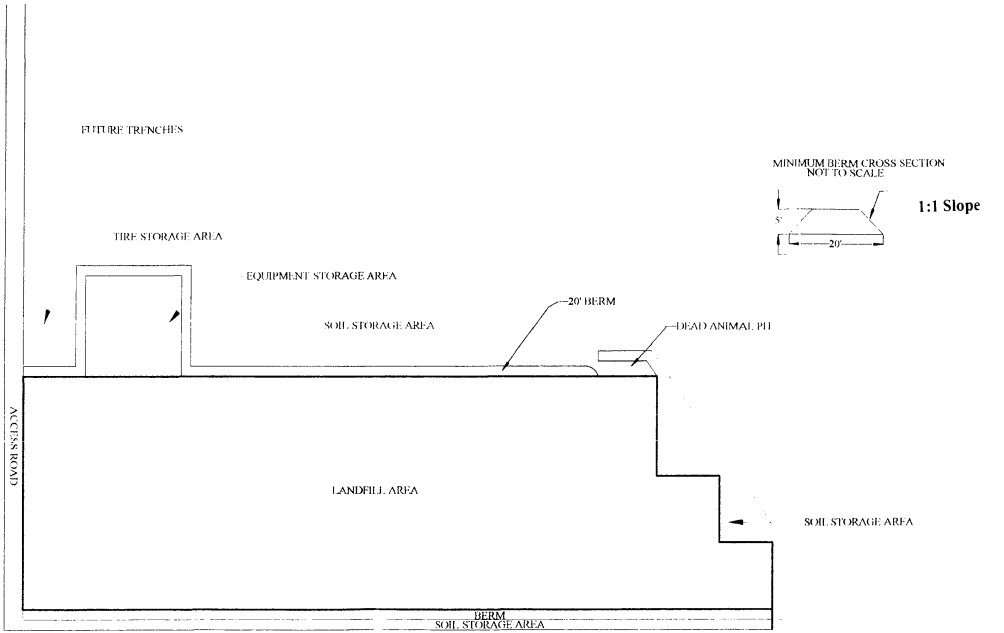
| Area (Sq. Ft.) | Run-Off Depth (Ft.) | Cubic Ft. | Seconds/day | CFS |
|---|---|---|---|---|
| 8799120 | 0.036 | 320859.03 | 86400 | 3.713646193 |

**Trenches and/or berms sized for 4 cubic feet per second on up-gradient sides of landfill**

File:k\client\98004-01\spreadsheet\Tr55.xls

# ATTACHMENT 24

# LOCATION AND TYPICAL CROSS SECTION OF PERIMETER BERMS





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# *Drainage Control System Map*
# *Sanpete Sanitary Landfill Cooperative*

# ATTACHMENT 25

# MATERIALS BALANCE TABLE FOR COVER SOILS

# MATERIAL BALANCE FOR COVER SOILS
# PROPOSED WHITE HILLS LANDFILL SITE
# SANPETE COUNTY SANITARY LANDFILL COOPERATIVE

| ITEM | VOLUME (CUBIC YARDS) |
|---|---|
| Fourteen Trenches To Be Excavated | 322,000 |
| Cover Soils for Use in Trenches | 48,000 |
| Soil Remaining | 274,000 |
| Cover Soils for Area Method Prism | 34,000 |
| Soil Remaining | 240,000 |
| Soil for Perimeter Berms | 11,000 |
| Soil remaining | 229,000 |
| Final Cover if Five (5) Feet Thick | 125,000 |
| Soil Remaining | 104,000 |

*Note: All volumes are rounded to the nearest thousand cubic yards.*

# ATTACHMENT 26

# LETTER OF COOPERATION FROM SEVIER COUNTY COMMISSION

Rec. 11/6/99

NOV 06 1999

# Sevier County

COMMISSIONERS:
Tex R. Olsen
Gary B. Mason
Ralph Okerlund

County Courthouse
250 North Main
Richfield, Utah 84701
(435) 896-9262
FAX (435) 896-8888

Steven C. Wall - Clerk/Auditor
Gail DeMille - Assessor
Shawn M. Fuellenbach - Treasurer
Jayrene B. Nielsen - Recorder

November 2, 1999

Gary F. Player, Vice President
Tahoma Companies, Inc.
P.O. Box 486, Mile 5 Hwy. 14
Cedar City, UT 84721

RE: Sanpete Sanitary Landfill Cooperative

Dear Mr. Player:

The Sevier County Commission reviewed your correspondence of October 29, 1999 concerning your proposal that reciprocal use of Sevier County Landfill and Sanpete Sanitary Landfill be authorized in the event of emergencies.

Since it appears the reciprocal agreement will be advantageous to both landfill systems, the Sevier County Commission has authorized the use of the Sevier County facility in case of emergency closure of the Sanpete Cooperative White Hills facility. It is our understanding the Sanpete Cooperative will authorize the same consideration in the event of emergency closure of the Sevier County facility.

Since we are not familiar with the makeup of the Sanpete Sanitary Landfill Cooperative, we will appreciate it if you will identify the Sanpete units of government who are a part of the cooperative.

Sincerely yours,

SEVIER COUNTY COMMISSION

By

Tex R. Olsen, Chairman

TRO:jmm
cc: Steve Wall, Clerk