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FINAL REPORT

ARCHAEOLOGICAL SALVAGE EXCAVATIONS FOR V-33
(EXTERNAL TANK PROCESSING AND STORAGE FACILITY),
VANDENBERG AIR FORCE BASE,
SANTA BARBARA COUNTY, CALIFORNIA

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by
Jeffery B. Serena

submitted by
Michael A. Glassow, Ph.D.
Principal Investigator
Pandora E. Snethkamp, Ph.D.
Co-Principal Investigator

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Office of Public Archaeology
University of California
Santa Barbara

March 1981

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ABSTRACT

During April 1981, the Office of Public Archaeology conducted salvage excavations at archaeological site SBA-1686, Vandenberg Air Force Base, Santa Barbara County, California, to mitigate impacts from the Vandenberg STS related construction of V-33 (External Tank Processing and Storage Facility).

> The emergency field program resulted in the recovery of a large flaked stone assemblage representing a variety of aboriginal activities including reduction of cores to bifacial preforms, biface thinning, and tool maintenance. The excavations yielded neither ground stone tools nor faunal remains associated with the prehistoric occupation.

Preliminary analysis of site function and depositional context suggests that the site may represent a locus of diverse activities, including hunting and flintknapping, from which all organic remains may have been removed by weathering. Duration, date, and season of occupation have not been determined.

Full analysis of the collection will be integrated with the study of other excavations conducted for the STS program.

PREFACE

(by Michael A. Glassow)

The archaeological investigations at the location of V-33 (External Tank Processing and Storage Facility) were carried out as part of a program to mitigate the impacts to cultural resources of the construction of Space Transportation System facilities on the southern portion of Vandenberg Air Force Base. Other segments of this program focused on portions of sites affected by the construction of the shuttlecraft towroute. In contrast to these other segments, the investigations at V-33 were of an emergency nature since archaeological surveys undertaken in 1974 failed to identify archaeological resources in the V-33 project area, thus preventing anticipation of impacts to archaeological resources prior to the initiation of construction.

The V-33 investigations add an interesting dimension to the knowledge of archaeological site distributions in this region of Vandenberg. It is now apparent that archaeological resources may be relatively abundant and extensive at some depth below surface in stabilized older dune sands characterizing this portion of the coastal zone.

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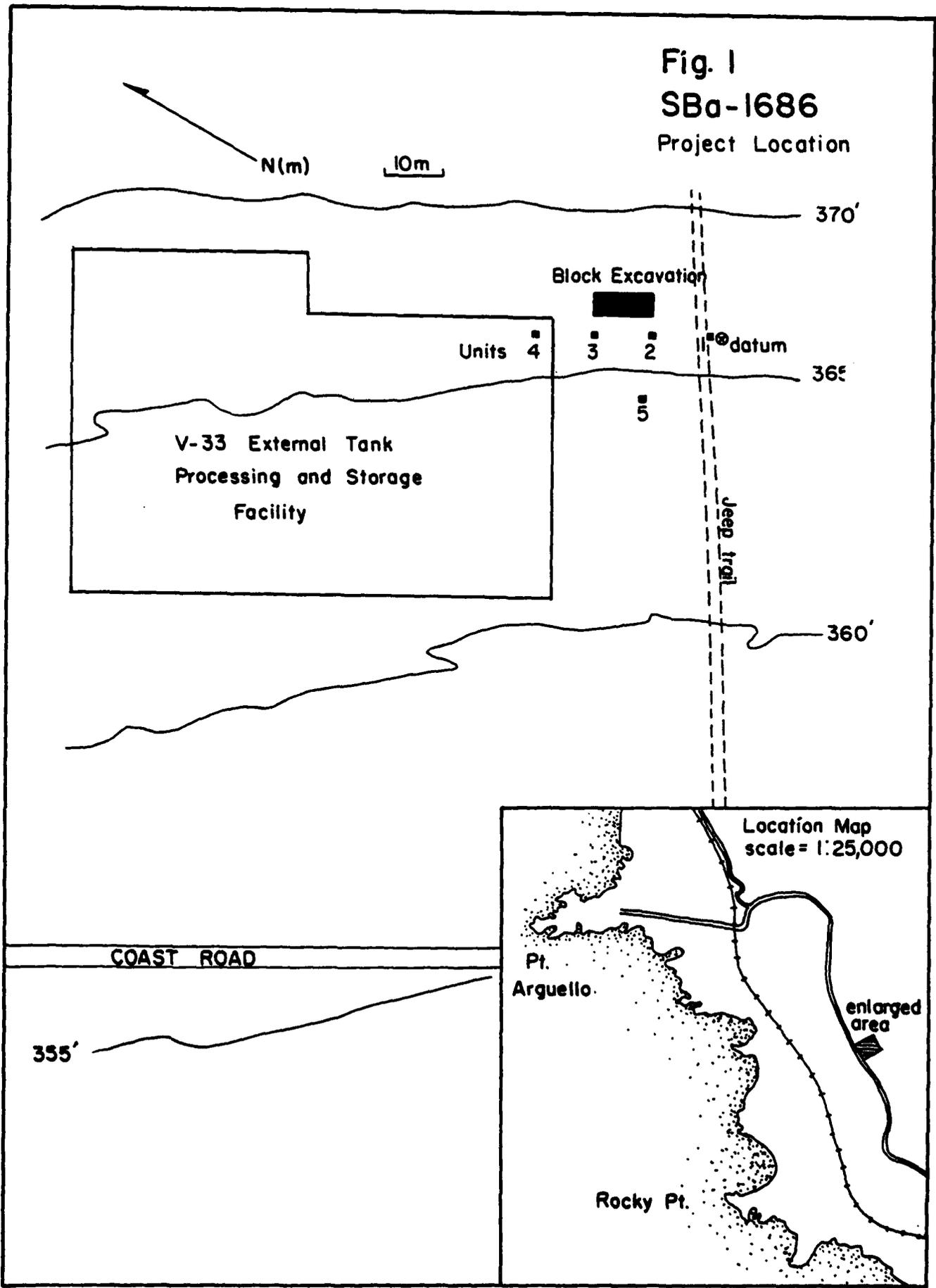
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1.0 INTRODUCTION

This report describes the excavation and preliminary analysis of portions of archaeological site SBa-1686, Santa Barbara County, California. The project was conducted to mitigate impacts resulting from the Vandenberg Space Transportation System (STS) related construction of V-33 (External Tank Processing and Storage Facility). The excavation was conducted by the Office of Public Archaeology (OPA), University of California, Santa Barbara (UCSB), under Purchase Order number A52020(81) awarded by Interagency Archeological Services Division (IASD), San Francisco. The excavation was performed as an emergency salvage operation precipitated by the discovery, shortly before the scheduled start of V-33 construction, of a significant archaeological resource within the development area. The archaeological fieldwork was conducted by OPA personnel on April 18, 19, 20, and 27, 1981. Dr. Michael Glassow of the Anthropology Department, UCSB, acted as Principal Investigator; Dr. Pandora Snethkamp of OPA served as Co-Principal Investigator.

SBa-1686 is an extensive aboriginal site composed of one or more occupational components. It is located in a modified, stabilized sand dune formation that slopes gently toward the west, at an elevation of 360 to 370 feet above sea level (Figure 1). The site area is currently dominated by a mixed flora of stable dune and soft chaparral plant

Fig. 1
SBa-1686
Project Location



communities. A variety of subsistence and raw material resources are available near the site, including extensive shellfish beds along the nearby, west-facing coastline; a large and varied terrestrial fauna including deer, lagomorphs, and true rodents; marine mammals and seabirds; and large deposits of Monterey chert that were intensively exploited by the aborigines for the production of chipped stone tools.

Excavations conducted by OPA at S9a-1686 included five isolated 1 x 1 meter units and a single 4 x 10 meter block comprised of forty 1 x 1 meter subunits. Excavated soils were processed through 8-mesh (8 meshes per inch) and 16-mesh (16 meshes per inch) screens in the field. Screen residues were processed at the archaeology laboratories of the Anthropology Department, UCSB, and all artifacts tabulated and cataloged.

This report presents a preliminary description of the fieldwork and collection. Full analysis of the collection will be integrated with the study of collections obtained from other excavations related to the STS program on Vandenberg Air Force Base.

2.0 PREVIOUS RESEARCH

The existence of site SBA-1686 was first disclosed on April 13, 1981, during archaeological monitoring of STS construction by Laurence Spanne of VTN. Spanne noted a concentration of chert flaking detritus on the surface in the southeast portion of V-33 (External Tank Processing and Storage Facility) construction area. With construction scheduled to begin within one week, Spanne conducted during the period April 13 to 15 a limited subsurface testing program in the area of the surface artifact cluster. This program included the excavation of twenty-two shovel test pits to varying depths, and the processing of excavated soils through 8-mesh screen. The subsurface tests were aimed at the generation of information on the depth of the archaeological deposit, the content of the deposit (artifacts and features), and the areal extent of the site.

Spanne determined three major characteristics of the archaeological deposit on the basis of the subsurface testing program. First, it was shown that the site contained Monterey chert flaking debris, but few if any recognizable faunal remains. Second, Spanne isolated from distributional data a concentration of lithic detritus in the southeastern corner of the development area corresponding roughly to the area of greatest surface artifact density. Third, Spanne's shovel test pits indicated that artifact densities along the southeast margin of the development area increased with

depth, and were greatest at about 40 to 60 centimeters below surface. These observations have been partly corroborated by the subsequent mitigation of impacts program. Spanne's testing program is the subject of a separate report prepared by VTN Consolidated, Inc. (Spanne 1981).

Some confusion exists with regard to the identification of SBa-1686 and the previously recorded site SBa-1114 (Glassow 1981:4; Laurence Spanne, personal communication). The latter site was recorded by W. B. Sawyer in June, 1974 (site survey record form on file at the State Regional Office, Anthropology Department, UCSB). Sawyer described SBa-1114 as a small surface cluster of chert flaking detritus without associated faunal remains or midden development. The site location data and description place SBa-1114 a small distance south of the dense surface artifact concentration at SBa-1686, but a careful search of this area during the mitigation program failed to reveal the presence of SBa-1114. Visibility in the indicated site location was hampered by surface vegetation, perhaps accounting for the failure to find the site. It is not known if SBa-1114 represents a southerly extension of SBa-1686 or a discrete archaeological deposit.

3.0 DESCRIPTION OF FIELDWORK

3.1 Overview

The excavation phase of V-33 construction impacts on SBa-1686 was planned and implemented as an emergency salvage program. Eight days elapsed from the discovery of the site to its partial destruction by grading. It is to the credit of all involved that subsurface testing and salvage excavations were organized and completed in the extraordinarily brief time available.

The testing program conducted by Spanne indicated that the area of SBa-1686 subject to construction impacts was located in the southeastern corner of the project area (see Section 2.0; Spanne 1981). A mitigation plan for this part of the site was developed in conversations between Spanne, IASD personnel, and the Principal Investigator. This plan called for the excavation of five small test units in the southeastern corner of the impact area. These were specified as 0.5 x 1 meter units in Purchase Order A52020(81) received by OPA after completion of excavations.

The salvage effort as perceived by the OPA field crew was broadly directed at the explication of site function and depositional context from analysis of the artifact assemblage and soil characteristics, with more specific research questions to be developed on site. The complete lack of faunal remains from Spanne's testing program and the pres-

ence of extensive Monterey chert outcrops at Point Arguello and on the hillside east of the site suggested initially that SBa-1686 might be a specialized quarry or chert-processing site.

The field program was begun on April 18 by establishing a row of four 1 x 1 meter units from the site datum (see Figure 2 and Section 3.3). The unit size was selected to satisfy the requirements of the verbal work scope and for reasons of excavation efficiency and accuracy.

The first units excavated--Units 1 and 3--provided considerable information about the site. First, the diversity of the chipped stone detritus (minute "retouch" flakes, large and small biface reduction flakes, obsidian, etc.) and the paucity of large decortication flakes, cores, and stone hammers demonstrated that the quarry hypothesis was probably not correct. Instead, the excavated remains revealed a pattern of variation more closely resembling lithic assemblages known from local sites interpreted as settlements or residential sites. It was suggested that SBa-1686 might thus represent an area of temporary or even semipermanent settlement from which the usual organic remains had been removed by weathering.

Second, evidence of extreme bioturbation coupled with the friable texture of the soil suggested that features would not be preserved in any conventional sense. It was suspected, however, that the contents of features or

specific activity areas might be discernible as clusters of related artifacts (e.g., flakes struck from a single biface, fire cracked stones from hearths) in the horizontal dimension, even if their vertical structure has been disorganized.

Units 2, 4, and 5 were excavated, reinforcing the ideas developed from Units 1 and 3 and indicating more precisely the nature of the artifact density gradient observed by Spanne (1981). Upon completion of these units, it was decided in consultation with the Principal Investigator to expose a larger area in order to test the hypothesis regarding the residual evidence of features and activity areas, and to obtain a larger sample of artifacts. Accordingly, a 4 x 10 meter block was opened on April 20. This block exposure was not authorized by IASD; costs of this excavation were eventually disallowed.

3.2 Mapping and Surface Collection

All OPA excavation units and Spanne's shovel test pits were recorded with a transit and metric tape or stadia from a datum stake placed at the location of Spanne's test pit DE2, near the southeast corner of the impact area. Two additional datum stakes were placed east of the instrument station at the locations of shovel test pits DE3 and DE5, 10 meters and 30 meters east of DE2, respectively. Each datum was marked by a labeled, 1.5 x 1.5 x 18 inch wooden stake driven into the soil until flush with the ground surface.

Topographic features and standing structures in the area were located with the transit from datum DE2 to provide permanent reference points.

A single artifact, a large flake of Monterey chert showing possible evidence of edge retouch, was recovered on April 18, 1981, from the surface along the eastern margin of the impact area. Its location was recorded with a transit and stadia from datum DE2. Four additional flakes of Monterey chert were recovered during the monitoring phase of fieldwork on April 27, from the vicinity of the excavation units. Precise locations were not recorded for these items because they were found in soils redeposited by earthmoving equipment.

Transit records are on permanent file at the State Regional Office, Anthropology Department, UCSB.

3.3 Excavation of 1 x 1 Meter Units

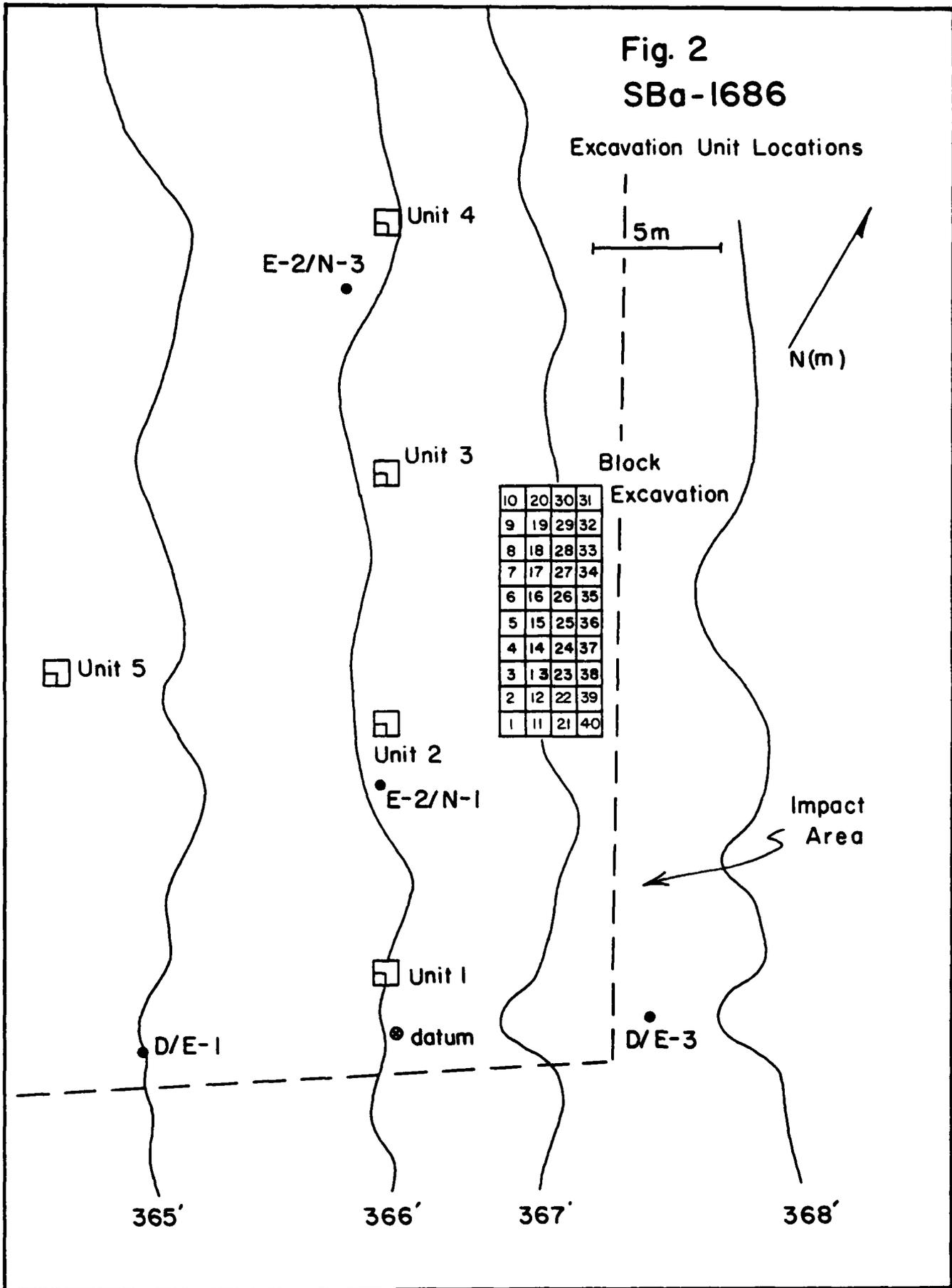
Five 1 x 1 meter squares were excavated in the southeastern corner of the impact area. Excavation Units 1 through 4 were placed in a line approximately parallel to the east side of the construction zone, oriented 30° west of magnetic north from a transit datum placed at shovel test pit DE2. The southeast corner of Unit 1 was taped 2 meters from the datum stake, and the southeast corners of Units 2 through 4 were then spaced at 10 meter intervals beyond Unit 1. These four units were placed so as to bisect the area of

highest artifact density within the impact zone, as this area was defined by Spanne's shovel test pits and by surface observation. Excavation Unit 5 was placed 12 meters west and two meters north of Unit 2, and helped to assess better the subsurface artifact density gradient as one moved away from the area of highest surface artifact density. Figure 2 illustrates the layout of the 1 x 1 meter squares.

Excavation of Units 1 through 5 proceeded in 10 centimeter levels from vertical control data placed on the surface at the highest corner of each unit. The relative elevation of each unit datum was recorded with a transit and stadia from the site datum established at shovel test pit DE2. There were three exceptions made to the 10 centimeter vertical level rule. First, because microtopographic variation at the surface of the units exceeded 10 centimeters, it was decided to begin excavation of each unit with a 20 centimeter level. This procedure reduced the number of levels with irregular volumes to one per unit rather than two, thereby easing future analysis. In addition, the employment of a 20 centimeter top level allowed the bulk of the surface vegetation and duff to be removed at once, speeding the screening process.

The second exception to the 10 centimeter level rule occurred in Unit 1, from which two 15 centimeter levels were removed between 30 and 50 centimeters below datum, rather than three 10 centimeter levels. This deviation was due to

Fig. 2
SBa-1686



excavator error. The third exception, in Unit 3, involved the removal of a 12 centimeter level (90 to 102 centimeters below datum) while troweling the final unit floor in preparation for photography.

Excavation of Units 1 and 3, the first squares opened, indicated that the hard, yellow-brown soil layer (Stratum 2) occurring primarily between 80 and 115 centimeters below surface was sterile, although artifacts were present in rodent burrows, fissures, and root casts intruded into this subsoil from the superincumbent soil horizon Stratum 1 (see Figure 3 and Section 4.0). The constraints of limited time and resources led to the decision to confine the excavation of Units 2, 4, and 5 to Stratum 1 above the hard subsoil. A summary of excavated levels from the 1 x 1 meter squares is available in Table 2.

Each excavation unit was divided into two smaller units: the first composed of a 0.5 x 0.5 meter column placed in the southwest quadrant of each square, and the second comprising the remainder of the unit. The former was screened in the field through 16-mesh screen, while the latter was sifted in 8-mesh screen. The excavation of these subunits proceeded simultaneously within identical levels, and the resulting screen residues were bagged and labeled separately. The field days--April 18 and 19--were expended in the excavation of the 1 x 1 meter units.

3.4 Block Excavation

Following completion of Units 1 through 5, it was felt that further work at the site was warranted. The vertical mixing evident in each 1 x 1 meter square indicated that feature and activity area definition was probably not possible in small, isolated test pits. Instead, it was suggested that features and activity areas had been dispersed throughout the profile, and now existed as diffuse clusters of related items haphazardly mixed in vertical space but retaining a degree of horizontal integrity. To test this hypothesis, and to increase the sample of recovered remains from the impact area, a small block of contiguous 1 x 1 meter subunits was opened with the permission of the Principal Investigator.

The block was placed 4 meters east of the line formed by Excavation Units 1 through 4 (see Figure 2). In the absence of detailed information on site structure, two major criteria were employed in locating the excavation: presence of relatively large amounts of flaking debris on the surface, suggesting a high subsurface artifact population; and lack of deep-rooted vegetation that would significantly hinder excavation in the few hours remaining before destruction of the site.

The block was designed as a 4 x 10 meter quadrangle composed of forty 1 x 1 meter block subunits (see Figure 2). The block size and shape were selected to achieve maximum

areal exposure while allowing the excavators to shovel soils directly into screens located around the block. It was hoped that problems resulting from the expected rapid accumulation of spoil earth around the block--particularly wind transport of screened soils into the excavation--would be ameliorated by the wet weather experienced during the first two days of fieldwork and predicted for April 20 as well.

In consultation with the Principal Investigator it was decided to concentrate on the excavation of a 2 x 10 meter section of the block, excavating a 1 x 10 meter subunit row to the base of Stratum 1 (see Section 4) and removing as much of an adjacent row as possible in the time remaining. This plan later proved impracticable and was modified in the field.

After staking the block subunit corners and stripping vegetation by hand from the surface, excavation commenced in the row of Subunits 1 through 10. Twenty-centimeter levels were employed in the excavation of each subunit, with excavation floors following the contour of the ground surface. Soils were sifted through 8-mesh screens; screen residues were bagged and labeled by subunit and level.

Upon completion of the 40-60 centimeter levels of Subunits 1 through 10 further excavation in the row was discontinued for two reasons. First, that part of the spoil heap on the west side of the block began to collapse into the excavation, a process stimulated in part by a strong

on-shore breeze in the absence of the expected rain. Second, the size of the spoil heap interfered with the placement of screens. Under normal circumstances these problems could have been alleviated by shoveling the collapsing portions of the spoil heap away from the excavation. However, with grading already in progress on site, the employment of excavators to move the spoil heap was deemed a poor use of time. The excavation was instead refocused on the exposure of the entire 4 x 10 meter block. Accordingly, one 20 centimeter level was removed and screened from Subunits 11 through 40 before the progress of grading brought excavation to a halt shortly after noon. One-half crew day was expended in the block excavation.

3.5 Monitoring

Two person-days were expended on April 27, 1981 to monitor the excavation of a large culvert trench about the perimeter of the V-33 facility. The reasons for this monitoring were to examine the culvert trench for evidence of intact archaeological features, and to gather further information on the soil profile at the site.

As expected, no features were observed during the monitoring operation. Soil profiles were mapped along the east side of the culvert trench, providing confirming evidence of the uniform soil structure across the site. Four Monterey chert flakes were collected from disturbed contexts in the area of the archaeological excavation. Transit records for

the mapping of the soil profile exposed in the culvert
trench are on file at the State Regional Office,
Anthropology Department, UCSB.

4.0 SOILS AT SBA-1686

The soil profile at SBA-1686 is composed of three strata which occur in strikingly uniform thicknesses wherever they are encountered. Despite considerable disturbance by rodents, the strata are easily identified on the basis of soil color, texture, hardness, amount of organic admixture, artifact content, and depth of occurrence.

Stratum 1 is the primary artifact-bearing soil layer at the site. It is composed of medium brown, coarse to very fine sand and moderate amounts of organic matter derived from decayed vegetation. A loose surface layer 20 to 30 centimeters in thickness is underlain by very friable soil extending downward to about 80 centimeters below surface. Stratum 1 soils are transported to greater depths in rodent tunnels. The rodent disturbance in Stratum 1, presumably attributable to the Pacific kangaroo rat, Dipodomys agilis, is so severe that the stratum on close inspection appears mottled by innumerable overlapping tunnels, both active and abandoned. The large existing population of these rodents was evident on site; no fewer than five live kangaroo rats were removed from Unit 1 alone during excavation.

Stratum 2 is composed of hard or partly indurated, light yellow-brown coarse and fine sand. It occurs primarily from 80 to 115 centimeters below surface, although pieces apparently transported by rodents and other pedoturbational agents are found from the surface to at least 140

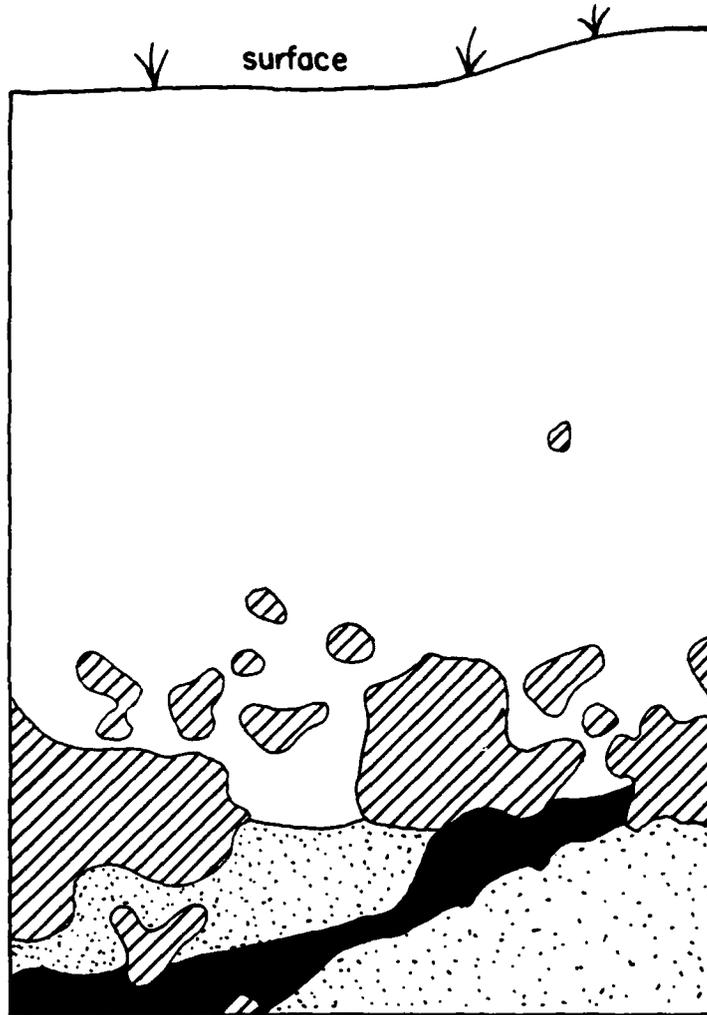
centimeters below surface. The stratum is riddled with active and abandoned rodent burrows.

Considerable effort is required to crush Stratum 2 soils in the hand; some large pieces can be reduced only by recourse to a hammer. The cementing agent is unknown. The soil is unreactive with hydrochloric acid.

Stratum 2 is devoid of cultural materials, although artifacts were found in rodent tunnels, fissures, and root casts throughout the 80 to 115 centimeter zone. This point was tested by the systematic reduction and processing through 16-mesh screen of all Stratum 2 soils recovered in the column samples from Excavation Units 1 and 3. This process was completed without recovery of any cultural materials.

Stratum 3, encountered only in the deepest levels of Unit 1, is composed of tan, coarse sand. This extremely friable soil is probably sterile, but some lithic detritus was found in the lowest levels of Unit 1 having been transported from Stratum 1 by rodents. Stratum 3 is devoid of observable organic matter except in rodent tunnels partly filled with Stratum 1 soil. Figure 3 illustrates the relative positions of Strata 1, 2, and 3 in Excavation Unit 1, the soil profile of which is representative of the soil structure encountered across the site.

Fig. 3
SBa-1686
Unit I
West Wall Section



lower limit of excavation

- Stratum 1
- ▨ Stratum 2
- ▩ Stratum 3
- Rodent Burrow (not shown in Stratum 1)

30 cm.

5.0 LABORATORY PROCESSING

Five kinds of collected materials were returned from the field for processing in the laboratory. These were: 16-mesh screen residues from 0.5 x 0.5 meter columns within Excavation Units 1 through 5; 8-mesh screen residues from Excavation Units 1 through 5; 8-mesh screen residues from Block Subunits 1 through 40; artifacts collected from the surface of the site; and soil samples from Unit 1. The procedures used in processing each of these items are described below.

5.1 Column Sample Screen Residues (16-mesh)

One 0.5 x 0.5 meter column sample was excavated in the southwest quadrant of each 1 x 1 meter excavation unit, and sifted in 16-mesh screens in the field. The resulting screen residues, representing a total of forty-two levels from five units, were returned to the archaeology laboratories at UCSB for processing.

The screen residues from each column sample level were poured into 16-mesh screens, washed with tap water, and air-dried. Lithic artifacts and debitage, modern objects, osseous remains, shell fragments, and stones believed not to be natural soil constituents were sorted by hand from the washed screen residues, and all remaining materials, with but one exception, were discarded. Stratum 2 soil, which proved insoluble in the water-screening process, was tem-

porarily retained from Columns 1 and 3 (the column samples from Excavation Units 1 and 3, respectively). These pieces of hardened soil were crushed with a hammer and sifted through 16-mesh screens in order to obtain corroborative evidence of the sterility of Stratum 2. No cultural materials were found in the screened Stratum 2 soil.

After sorting, cultural materials were divided into 8-mesh and 16-mesh fractions by placing them in 8-mesh screens which were then gently agitated. Materials remaining in the screens were cataloged separately from those that passed through the screen.

5.2 Excavation Unit Screen Residues (8-mesh)

All soils from Excavation Units 1 through 5 not included in the column samples were sifted in 8-mesh screens in the field. The resulting screen residues, representing forty-two excavated levels, were washed in the laboratory in 8-mesh screens and air-dried. All lithic artifacts and debitage, modern objects, faunal remains, and erratic stones were sorted by hand from the washed screen residues. The remaining materials, composed largely of Stratum 2 soil, weathered chert, and roots, were discarded. Curated materials were cataloged.

5.3 Block Excavation Screen Residues (8-mesh)

Sixty 20 centimeter levels were excavated from forty 1 x 1 meter block subunits and sifted in 8-mesh screens in the field. Screen residues were washed in the laboratory in 8-mesh screens and air dried. Lithic artifacts and debitage, modern objects, faunal remains, and erratic stones were sorted by hand from the washed screen residues; other materials were discarded. Curated materials were cataloged.

5.4 Surface Collection

Five flakes of Monterey chert were collected from the surface of the site: one during the excavation fieldwork and four during the later monitoring phase. These items were washed by hand in the laboratory, dried, and cataloged.

5.5 Soil Samples

Soil samples, each approximately 0.3 liters in volume, were collected from the west unit sidewalls of Excavation Units 1 and 3. Precise provenience information for these samples is on file with the excavation records at UCSB.

After examination and cataloging, the soil samples from Unit 3 were discarded. Soil samples from Unit 1 are stored with the artifact collections from the site.

5.6 Cataloging and Disposition of Collections

All items retained after laboratory processing were cataloged using the standard UCSB Archaeological Catalog system. Data were recorded on IBM scoring sheets, keypunched, and compiled in tabular format using the Wylbur program available through the UCSB computer system. The collection is stored, along with written and photographic records of the excavation, in the Anthropology Department, UCSB, under Accession Number 291. The catalog for the collection is reproduced as Appendix 1.

6.0 DESCRIPTION OF THE COLLECTION

The collection from the mitigation program at SBA-1696 comprises 6,641 items of aboriginal manufacture or use, plus one modern artifact, two rodent bones, and a mollusk shell fragment not associated with the aboriginal remains. Objects derived from the prehistoric occupation include lithic tools and debitage and an erratic stone. The latter is defined here as a stone showing no definite evidence of use or deliberate modification, but found in a geologic context suggesting possible human transport. These various classes of remains are discussed below.

6.1 Tools and Tools-in-Process

Items considered to be tools or tools-in-process include two large bifaces, two small bifaces, a probable drill or borer, and six utilized flakes. All are made of locally available Monterey chert. Together, they indicate a number of activities on site including cutting, scraping, and piercing of yet unknown materials; and biface manufacture.

The two large bifaces, one from the 60-70 centimeter level of Unit 2 and one from Block Subunit 33, represent early stages of biface manufacture. Both may have been broken in process and abandoned on site. The piece from Unit 2 has a thick solution cortex on both faces; probably a remnant of the weathered surfaces of the tabular core from

which the biface was chipped. Both pieces are within the general size and formal range of the preforms described by Spanne (1975).

Two small, finely chipped biface fragments probably represent pieces of projectile points. The first, from Block Subunit 19, may be a tip fragment or perhaps a piece broken from a sharp ear or tang. The second, from Block Subunit 33, is a very thin point tip broken and spalled by heat.

A probable drill or borer fragment was found in the 0-20 centimeter level of Block Subunit 9. The only working edge present shows the crushed, irregularly beveled wear pattern typical of stone artifacts subject to rotational stresses. It was probably bifacial, but a trifacial form cannot be ruled out.

Utilized flakes were identified on the basis of macroscopic edge morphology, without the benefit of microscopic use-wear analysis. All show diminutive unifacial retouch on one or more working edges. Utilized flakes were recovered from the 90-102 centimeter level of Excavation Unit 3, the 0-20 and 30-40 centimeter levels of Unit 5, the 0-20 centimeter level of Block Subunit 1, the 40-60 centimeter level of Block Subunit 2, and Block Subunit 33.

Table 1 summarizes the distribution of lithic items by unit.

Table 1: Lithic Tools and Debitage by Unit

UNIT	ARTIFACT CLASS					All Non-Util. Flakes
	Bifaces	Drills	Utilized Flakes	Obsidian Flakes	Misc. Flakes*	
1	-	-	-	-	3	619
2	1	-	-	1	2	349
3	-	-	1	1	-	449
4	-	-	-	1	-	273
5	-	-	2	-	-	296
Block	3	1	3	5	7	4,638
TOTAL	4	1	6	8	12	6,624

*Misc. Flakes includes andesite, quartz, and shale debitage.

6.2 Lithic Debitage

Non-utilized flakes totaling 6,629 items were recovered from SBa-1686: five from the surface collection, 1,986 from the 1 x 1 meter excavation units (including column samples), and 4,638 from the block. All but twenty of these are Monterey chert; the remainder are obsidian (8), shale (6), andesite (5), and quartz (1).

The spatial distribution of lithic detritus changes in a patterned way in both horizontal and vertical space. Table 2 summarizes the distribution of debitage in Excavation Units 1 through 5. Although the trend is not as clear as was anticipated by the results of Spanne's shovel test pit program, there is a tendency for flake density to increase with increasing depth in Stratum 1, from the surface to about 60 centimeters below surface. Below this depth, flake densities decrease to a low density of fifty items per cubic meter in the 130-140 centimeter level of Unit 1. It is probable that some detritus is to be found at even lower levels, transported by rodents and other pedoturbational agents. The distribution of flakes vertically sheds little light on the original vertical position of the cultural deposit; the rate and mechanics of settling of lithic detritus in the sandy soil are unknown. It is, however, virtually certain on the basis of soil contents that the original deposit was located above Stratum 2, within the upper 80 centimeters of the profile.

Table 2: Lithic Debitage from 1 x 1 Meter Units by Level (Flakes retained only in 16-mesh screen shown in parentheses)

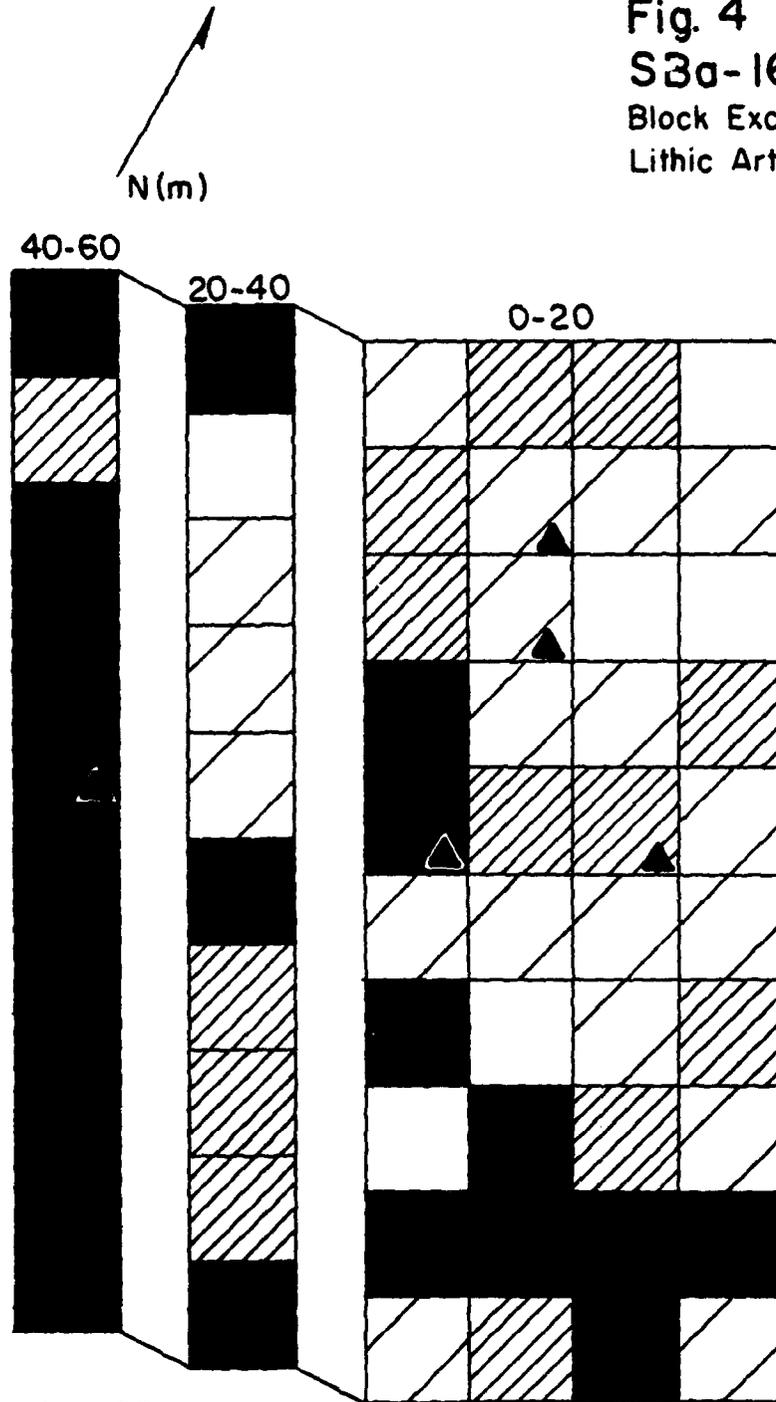
LEVEL	UNIT				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
000-020	85 (20)	65 (20)	49 (12)	38 (5)	63 (28)
020-030	67 (14)	41 (8)	38 (10)	35 (11)	37 (10)
030-040	-	40 (8)	44 (12)	46 (10)	43 (15)
030-045	42 (16)	-	-	-	-
040-050	-	69 (16)	59 (13)	34 (11)	28 (7)
045-060	61 (22)	-	-	-	-
050-060	-	41 (7)	59 (24)	40 (17)	44 (25)
060-070	74 (32)	66 (20)	39 (8)	44 (14)	40 (18)
070-080	71 (35)	27 (7)	59 (16)	36 (14)	41 (11)
080-090	74 (14)	-	66 (24)	-	-
090-100	63 (25)	-	-	-	-
090-102	-	-	36 (9)	-	-
100-110	30 (6)	-	-	-	-
110-120	22 (10)	-	-	-	-
120-130	20 (8)	-	-	-	-
130-140	3 (2)	-	-	-	-
TOTAL	619 (204)	349 (86)	449 (128)	273 (82)	296 (114)

The horizontal distribution of lithic detritus is poorly understood. It is clear that there is a reduction of flake density as one proceeds west, north, and east of the vicinity of Excavation Units 1, 2, and 3. This is demonstrated by the results of excavation of Units 4 and 5 (see Table 2) and the block. Figure 4 is a graphic representation of the reduction of lithic detritus toward the northeast in the 4 x 10 meter exposure. It suggests that horizontal spatial patterning in sites like SBa-1686 can best be resolved in relatively large excavation units, as was suspected during fieldwork.

Figure 4 also illustrates the distribution of obsidian flakes in the block. Although the small sample size makes any conclusive statement impossible, it appears that the obsidian detritus is clustered near the northwest corner of the block. This may represent the location of a particular activity area within the site.

The flake assemblage reveals a number of different kinds of knapping activities on site. Primary reduction of cores is represented by the presence of a few large cortical flakes. Both solution and water-worn pebble cortices occur, indicating the use of bedrock deposits and beach or stream gravels as flint sources. Broad, thin biface reduction flakes occur, often with platforms that preserve intact a portion of the biface edge from which they were struck. Tool maintenance and edge rejuvenation are indicated by very

Fig. 4
 S3a-1686
 Block Excavation
 Lithic Artifact Density



- Less than 60
- ▧ 60-69
- ▨ 70-79
- More than 80
- ▲ Obsidian flake

small flakes which occur in large numbers in the collection. Table 3 shows that well over half of the flakes from the column samples are retained in 16-mesh screen, but pass through 8-mesh screen. Although many of these are only small pieces of broken flakes, a large number are whole or nearly whole flakes removed by edge retouch and perhaps tool use.

An interesting pattern of flake size distribution from the 1 x 1 meter excavation units is revealed in Table 3. Although the columns comprised only 25 percent of the excavated volume of these squares, they yielded over 35 percent of the 8-mesh flakes. This indicates that, while screen mesh size is constant, different screening techniques can produce significant differences in the amounts of retained cultural materials. The 8-mesh fraction from column samples was obtained by the separation of 16-mesh screen residues into 8-mesh and 16-mesh fractions. This procedure involved a single dry-screening episode in the laboratory, with limited agitation of materials in the screen. The non-column sample portions of Units 1 through 5 were dry-screened in the field and later water-screened in the laboratory, with a much greater degree of in-screen agitation. It seems certain that the multiple screening process and greater agitation of the non-column sample materials allowed far more flakes to be presented to the screen, in such a way as to

Table 3: Lithic Debitage from 1 x 1 Meter Units by Screen Mesh Size

UNIT	SCREEN MESH		8-Mesh	%	TOTAL
	16-Mesh CS*	8-Mesh CS*			
1	204	149	266	43.0	619
2	86	80	183	52.4	349
3	128	122	199	44.3	449
4	82	63	128	46.9	273
5	114	68	114	38.5	296
TOTAL	614	482	890	44.8	1,986

*CS = Column Sample

fall through the screen, than was the case with the column samples.

6.3 Erratic Stone

A single, large fragment of porphyritic rhyolite or andesite was found in the 70-80 centimeter level of Unit 5. Although the object is spalled and broken on every face, it is not a core nor flaking detritus of any kind. It may be fire-altered. The stone is assumed to have been brought to the site because it is not a natural constituent of the dune soil, and could not have originated in the shale bedrock currently eroding downslope from the elevated terrain east of the project area.

6.4 Modern Artifacts

The single artifact of modern provenience recovered from the excavation of SBa-1686 is a .22 caliber rimfire cartridge shell made of brass. It was found in the 0-20 centimeter level of Excavation Unit 2. Shells of this caliber are ubiquitous in sites along the coast on south base; several were recovered during the major salvage mitigation project at sites along the shuttle towroute in 1978-79.

6.5 Faunal Remains

The total faunal assemblage comprises two pieces of bone and one mollusk shell fragment. Both bones--a partial

mandible and an unidentified piece--are ascribed to rodents. The minute shell fragment is identifiable as Mytilus californianus. It is believed that these faunal remains are not associated with the prehistoric occupation of SBa-1686.

The current soil conditions at the site probably have low potential for the long-term preservation of faunal remains. First, the action of rodents in the friable soil tends to move objects continually through the vertical dimension, sometimes depositing them on the surface where they are quickly destroyed by the elements. Rodent action may also cause mechanical breakage of organic remains (thereby exposing more surface area of individual bones and shells to chemical weathering). Second, it is possible that aeolian mass-wasting has periodically exposed parts of the site through deflation, destroying faunal remains. This is particularly likely after brush fires or during periods of drought. Third, and perhaps most importantly, the current paucity of faunal remains in the soil makes the preservation of only a few pieces unlikely. When large amounts of faunal remains are deposited on a site, as in some local shell middens, the incipient chemical dissolution of the remains is gradually slowed by the changing chemical environment. When sufficiently large amounts of calcium salts from bone and shell decomposition are present, destruction of intact remains slows dramatically. When sites originally have few faunal remains, the destruction of these remains by chemical

action does not sufficiently alter the soil chemistry to preserve any part of the faunal assemblage. Thus two kinds of sites are created: those with initial faunal assemblages large enough to modify significantly their soil chemistry and thus facilitate long-term preservation; and those with so few faunal remains that the preservation "threshold" is never reached, and all the faunal materials are quickly destroyed. If this scenario is accurate, it could account for the dearth of faunal remains at SBa-1686. Insufficient information is available currently to address this question in depth, but it might be the subject of hypothesis testing in future research.

Other variables are important as well. For example, in fast-draining soils such as Stratum 1 at SBa-1686, the rapid percolation of water tends to flush calcium salts out of the profile, thereby preventing a concentration sufficient to facilitate significantly the preservation of organic remains. The mechanical movement of midden materials downward through the soil is also important. At SBa-1686, the sterile nature of Stratum 2 and Stratum 3 soils indicates that the original cultural deposit was located in Stratum 1. At present, however, cultural materials are spread to at least 140 centimeters below surface in considerable amounts, reducing the density of materials and the potential concentration of calcium salts.

If faunal remains were once part of the prehistoric deposit at SBa-1686, a point that is by no means certain, the accumulative effects of mechanical disturbance, rapid water percolation, and the vertical spreading of the deposit have destroyed the faunal assemblage. The bones recovered in the excavation are believed to be recent relics of the rodent population on site. The Mytilus fragment is probably a contaminant from one of the screens used during the excavation, or from a recycled cloth bag.

7.0 PRELIMINARY INTERPRETATIONS AND RECOMMENDATIONS FOR ANALYSIS

7.1 Deposition Models and Site Function

The full analysis of data from the excavations at SBA-1686, to be integrated with the study of collections from other STS related mitigation excavations, will focus on the role of the site within a regional subsistence/settlement pattern. The explication of this role requires that two basic research questions be addressed. First, it is necessary to determine what kinds of activities were performed at the site. This requires knowledge of the specific functions of tools and debris in the excavated assemblage, and an understanding of the paleoenvironmental context of the site's occupation or use. Second, the way in which SBA-1686 articulated with other sites in the system must be understood.

Some information on activities is already available. The most cursory inspection of the lithic debitage is sufficient to indicate a broad range of flintknapping tasks, including the primary reduction of cores to bifacial preforms, the thinning of large bifaces, and the maintenance of tools through rejuvenation of edges dulled and broken by use. Large flakes with solution and waterworn pebble cortices show that SBA-1686 served as a locus to which some unmodified or minimally modified pieces of chert were brought for reduction, without extensive core or preform

preparation at the quarry. The willingness to transport large pieces of stone without previous preparation to reduce bulk and weight suggests that the exploited chert sources were nearby, perhaps including those at Point Arguello. The site thus operated in part as a workshop for the preparation of bifacial preforms which were either further modified and used on site or transported elsewhere for eventual finishing and/or use.

There is some evidence that S3a-1686 served as a hunting station. Pieces of two small, finely chipped bifaces, probably representing projectile points, were found in the excavations. Precise functional analysis of these implements must await the study of edge wear patterns.

The collection from S3a-1686 presents three major difficulties for the interpretation of site function. First, many constituents of the original site deposit may be missing because of poor preservation. For example, no remains of features such as hearths and shelters were found. These may not have been present at the site, but the degree and kind of postdepositional disturbances make it difficult to judge whether such features could have been present without leaving unrecoverable remains. It has been hypothesized above that organic remains including shell and bone might once have been present but have been eliminated by chemical dissolution.

The second major problem is that the nature of the excavated sample relative to the sampling universe is unknown. Site boundaries are poorly understood, and monitoring of construction showed occupational debris present in virtually the entire impact area. The excavated assemblage may not be representative of the site as a whole, and thus may bias the analysis and interpretation of activities. This problem is highlighted by the discovery during monitoring by VTN personnel of artifact types not recovered in the excavations. These include a mano, hammerstones, and large chert cores from the impact area north and west of the OPA excavations (Spanne 1981:2).

The third major problem for functional analysis is the inability to distinguish occupational components within the site. There are essentially two kinds of depositional models to account for the presence of cultural materials at SBa-1686. The first is that the site is the product of a single major occupation, or perhaps a series of related occupations, by a particular group of people over a relatively short time. In this scenario, the various remains would be interpreted as representing a number of different activities that occurred more or less simultaneously. All of these activities would be considered together in assessing the place of SBa-1686 in a regional subsistence/settlement system.

The second depositional model holds that SBa-1685 is the product of a number of unrelated occupations widely separated in time. For example, the site could have once been used as a base camp for deer hunting, and then reoccupied centuries later by aborigines engaged in the processing of quarried stone. These components would be functionally dissimilar and have very different implications for the structure of the settlement system but could not be separated in the ground. This is a problem that is manifest at many sites where both good chronological markers and resolvable stratigraphy are missing. A partial solution in the field may be to expose large areas during excavation of these kind of sites, on the assumption that multiple components will not precisely overlap in horizontal space, and can thus be at least partly distinguished by spatial analysis of artifact distributions in relatively "unmixed" areas.

7.2 Recommendations for Analysis

The definition of the function of SBa-1685 and its role in a regional subsistence/settlement system will proceed through five basic analyses. These have been set forth by Glassow (1981:9); the present discussion is drawn largely from his proposal.

Obsidian Sourcing and Hydration Layer Analysis: The eight pieces of obsidian recovered in the excavations should, if possible, be identified as to source and dated by

obsidian hydration analysis. Sourcing the stone will not only provide requisite data on the rate of hydration layer formation for dating, but will also serve to identify one element of the long-range exchange network. Obsidian dating will set the site, or at least one component, in a temporal framework that will allow it to be related to other dated sites in the region.

Analysis of Flake Morphology: Analysis of the characteristics of lithic debitage from the site will enable definition of the kinds and relative intensity of flintknapping activities. This will reflect upon the function of the site as a workshop associated with local quarries, a locus of specialized biface production, and a place where chipped stone tools were used and maintained. This analysis can also be expected to yield technical information on the nature of aboriginal flaked stone industries.

Edge Wear Analysis: The study of microwear patterns on chipped stone tools should help to define specific activities at the site, and perhaps indicate some of the subsistence resources that were locally exploited. Six utilized flakes, four bifaces, and a probable drill or borer should be studied for indications of use-wear. The analysis of biface edges will be integrated with the larger study of bifacial implements undertaken as part of the Vandenberg STS related research effort.

Analysis of Chert Characteristics: The cortical characteristics and colors of the Monterey chert used in tool production should be analyzed to determine the locations of lithic sources utilized by the site's occupants. This analysis may allow the site to be linked to other sites in the region on the basis of chert source utilization, and may help to describe the intensity and importance of the preform-based lithic exchange network that operated in the Vandenberg region.

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APPENDIX I

ARTIFACT CATALOG FOR
ACCESSION NUMBER 291

SBa-1686

CATALOG FOR ACCESSION NO. 291
 1981 VANDENBERG-SLC 6 ARCHAEOLOGICAL PROJECT

C A T A L O G N O.	U N I T	L E V E L	S C R E E N	E X P R O V	D I S C A R D	S A M P L E	O B J E C T	N O D E I P	H O D I P	F R A G
1	1	000020	4				FLAKE	.	.	.
2	1	000020	4				FLAKE	.	.	.
3	1	020030	4				FLAKE	.	.	.
4	1	020030	4				FLAKE	.	.	.
5	1	030045	4				FLAKE	.	.	.
6	1	030045	4				FLAKE	.	.	.
7	1	045060	4				FLAKE	.	.	.
8	1	045060	4				FLAKE	.	.	.
9	1	060070	4				FLAKE	.	.	.
10	1	060070	4				FLAKE	.	.	.
11	1	070080	4				FLAKE	.	.	.
12	1	070080	4				FLAKE	.	.	.
13	1	070080	4				FLAKE	.	.	.
14	1	080090	4				FLAKE	.	.	.
15	1	080090	4				FLAKE	.	.	.
16	1	080090	4				FLAKE	.	.	.
17	1	090100	4				FLAKE	.	.	.
18	1	090100	4				FLAKE	.	.	.
19	1	100110	4				FLAKE	.	.	.

C A T A L O G N O.	M A T E R I A L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N I T S I Z E
1	MONT. CHERT			HT. TRTD.	6	15.0	.
2	MONT. CHERT				38	38.0	.
3	MONT. CHERT			HT. TRTD.	16	24.0	.
4	MONT. CHERT				26	18.0	.
5	MONT. CHERT			HT. TRTD.	2	2.8	.
6	MONT. CHERT				10	19.8	.
7	MONT. CHERT			HT. TRTD.	5	10.0	.
8	MONT. CHERT				15	16.4	.
9	MONT. CHERT			HT. TRTD.	6	13.4	.
10	MONT. CHERT				17	12.4	.
11	MONT. CHERT			HT. TRTD.	1	1.2	1
12	MONT. CHERT				17	13.9	.
13	ANDESITE				1	1.9	1
14	MONT. CHERT			HT. TRTD.	4	7.3	.
15	MONT. CHERT				34	41.7	.
16	IGN. ROCK				2	1.1	.
17	MONT. CHERT			HT. TRTD.	3	10.1	.
18	MONT. CHERT				24	13.3	.
19	MONT. CHERT			HT. TRTD.	4	1.2	.

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C A T H U N	U N I T	L E V E L	S C R E E N	E X P R O V	D I S C A R D	S A M P L E	O B J E C T	M O D I F I
20	1	100110	4				FLAKE	.
21	1	110120	4				FLAKE	.
22	1	110120	4				FLAKE	.
23	1	120130	4				FLAKE	.
24	1	120130	4				FLAKE	.
25	1	130140	4				FLAKE	.
26	1	130140	4				FLAKE	.
27	2	000020	4				FLAKE	.
28	2	000020	4				FLAKE	.
29	2	000020	4				CARTRIDGE	.
30	2	020030	4				FLAKE	.
31	2	020030	4				FLAKE	.
32	2	020030	4				FLAKE	.
33	2	030040	4				FLAKE	.
34	2	030040	4				FLAKE	.
35	2	030040	4				FLAKE	.
36	2	040050	4				FLAKE	.
37	2	040050	4				FLAKE	.
38	2	040050	4				FLAKE	.

C A T H U N	M O D I F I C A T I O N	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N S I Z E
20	.	.	MONT. CHERT				13	15.7	.
21	.	.	MONT. CHERT			HT. IRTD.	1	1.5	.
22	.	.	MONT. CHERT				6	6.7	.
23	.	.	MONT. CHERT			HT. IRTD.	2	2.4	.
24	.	.	MONT. CHERT				8	2.0	.
25	.	.	MONT. CHERT			HT. IRTD.	2	1.2	.
26	.	.	MONT. CHERT				3	0.5	.
27	.	.	MONT. CHERT			HT. IRTD.	5	14.0	.
28	.	.	MONT. CHERT				30	90.5	.
29	.	.	BRASS				1	5.7	.
30	.	.	MONT. CHERT			HT. IRTD.	3	8.3	.
31	.	.	MONT. CHERT		Y		1	206.0	.
32	.	.	MONT. CHERT				21	13.8	.
33	.	.	OBSIDIAN				1	0.3	.
34	.	.	MONT. CHERT			HT. IRTD.	5	10.1	.
35	.	.	MONT. CHERT				18	73.3	.
36	.	.	MONT. CHERT			HT. IRTD.	6	12.0	.
37	.	.	MONT. CHERT				24	25.5	.
38	.	.	IGN. ROCK				1	0.6	.

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C A T A L O G N O	U N I T	L E V E L	S C R E E N	E X P R O V	D I S C A R D	S A M P L E	O B J E C T	M O D I F Y	N O D I F Y
39	2	050060	4				FLAKE	.	.
40	2	050060	4				FLAKE	.	.
41	2	060070	4				FLAKE	.	.
42	2	060070	4				FLAKE	.	.
43	2	060070	4				FLAKE	.	.
44	2	070080	4				FLAKE	.	.
45	2	070080	4				FLAKE	.	.
46	3	000020	4				FLAKE	.	.
47	3	000020	4				FLAKE	.	.
48	3	020030	4				FLAKE	.	.
49	3	020030	4				FLAKE	.	.
50	3	030040	4				FLAKE	.	.
51	3	030040	4				FLAKE	.	.
52	3	040050	4				FLAKE	.	.
53	3	040050	4				FLAKE	.	.
54	3	050060	4				FLAKE	.	.
55	3	050060	4				FLAKE	.	.
56	3	060070	4				FLAKE	.	.
57	3	060070	4				FLAKE	.	.

C A T A L O G N O	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N I T S
39	.	MONT. CHERT			HT. TRTD.	3	9.0	.
40	.	MONT. CHERT				16	15.7	.
41	2	MONT. CHERT		Y		1	1437.8	.
42	.	MONT. CHERT			HT. TRTD.	7	12.1	.
43	.	MONT. CHERT				25	41.1	.
44	.	MONT. CHERT			HT. TRTD.	4	1.7	.
45	.	MONT. CHERT				13	9.1	.
46	.	MONT. CHERT			HT. TRTD.	5	15.3	.
47	.	MONT. CHERT				21	42.7	.
48	.	MONT. CHERT			HT. TRTD.	6	15.4	.
49	.	MONT. CHERT				12	7.7	.
50	.	MONT. CHERT			HT. TRTD.	6	68.4	.
51	.	MONT. CHERT				12	2.6	.
52	.	MONT. CHERT			HT. TRTD.	5	9.5	.
53	.	MONT. CHERT				15	19.3	.
54	.	MONT. CHERT			HT. TRTD.	7	5.1	.
55	.	MONT. CHERT				22	41.4	.
56	.	OBSDIAN				1	2.7	.
57	.	MONT. CHERT			HT. TRTD.	2	3.9	.

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 =====

C A T H	U N I T	L E V E L	S C R E E N	E X P R O V	D I S C A R D	S A M P L E	O B J E C T	U S E I P 1
58	3	060070	4				FLAKE	.
59	3	070080	4				FLAKE	.
60	3	070080	4				FLAKE	.
61	3	080090	4				FLAKE	.
62	3	080090	4				FLAKE	.
63	3	090102	4				FLAKE	.
64	3	090102	4				FLAKE	UTILIZED
65	3	090102	4				FLAKE	.
66	4	000020	4				FLAKE	.
67	4	000020	4				FLAKE	.
68	4	020030	4				FLAKE	.
69	4	020030	4				FLAKE	.
70	4	030040	4				FLAKE	.
71	4	020030	4				FLAKE	.
72	4	040050	4				FLAKE	.
73	4	040050	4				FLAKE	.
74	4	050060	4				FLAKE	.
75	4	050060	4				FLAKE	.
76	4	060070	4				FLAKE	.

C A T H	M O D I F 2	P R A G G	M A T L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N S I Z E
58	.	.	MONT. CHERT				14	23.8	.
59	.	.	MONT. CHERT			HT. FRTD.	3	7.4	.
60	.	.	MONT. CHERT				22	14.5	.
61	.	.	MONT. CHERT			HT. FRTD.	5	7.9	.
62	.	.	MONT. CHERT				23	19.6	.
63	.	.	MONT. CHERT			HT. FRTD.	4	2.1	.
64	.	.	MONT. CHERT				1	30.3	.
65	.	.	MONT. CHERT				14	55.2	.
66	.	.	MONT. CHERT			HT. FRTD.	5	14.8	.
67	.	.	MONT. CHERT				21	75.4	.
68	.	.	MONT. CHERT			HT. FRTD.	4	19.8	.
69	.	.	MONT. CHERT				13	10.3	.
70	.	.	MONT. CHERT			HT. FRTD.	10	15.9	.
71	.	.	MONT. CHERT				20	31.8	.
72	.	.	MONT. CHERT			HT. FRTD.	2	3.7	.
73	.	.	MONT. CHERT				9	4.9	.
74	.	.	MONT. CHERT			HT. FRTD.	3	7.2	.
75	.	.	MONT. CHERT				7	7.4	.
76	.	.	MONT. CHERT			HT. FRTD.	5	6.2	.

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C A T A L O G N U M	U N I T	L E V E L	S C R E E N	E X P O S U R E	D I S C A R D	S A M P L E	J B J E C T	M O D I F I
77	4	060070	4				FLAKE	.
78	4	070080	4				FLAKE	.
79	4	070080	4				FLAKE	.
80	5	000020	4				FLAKE	.
81	5	000020	4				FLAKE	UTILIZED
82	5	000020	4				FLAKE	.
83	5	020030	4				FLAKE	.
84	5	020030	4				FLAKE	.
85	5	030040	4				FLAKE	.
86	5	030040	4				FLAKE	UTILIZED
87	5	030040	4				FLAKE	.
88	5	040050	4				FLAKE	.
89	5	040050	4				FLAKE	.
90	5	050060	4				FLAKE	.
91	5	050060	4				FLAKE	.
92	5	060070	4				FLAKE	.
93	5	060070	4				FLAKE	.
94	5	070080	4				FLAKE	.
95	5	070080	4				FLAKE	.

C A T A L O G N U M	M O D I F I C A T I O N	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R T E X	H E A T T R E A T M E N T	Q U A N T I T Y	W E I G H T	U N I T S
77	.	.	MONT. CHERT				14	9.2	.
78	.	.	MONT. CHERT			HT. TRTD.	4	4.0	.
79	.	.	MONT. CHERT				11	4.7	.
80	.	.	MONT. CHERT			HT. TRTD.	5	2.5	.
81	.	.	MONT. CHERT				1	3.2	.
82	.	.	MONT. CHERT				17	11.8	.
83	.	.	MONT. CHERT			HT. TRTD.	5	5.9	.
84	.	.	MONT. CHERT				10	12.9	.
85	.	.	MONT. CHERT			HT. TRTD.	5	2.9	.
86	.	.	MONT. CHERT				1	15.3	.
87	.	.	MONT. CHERT				15	8.7	.
88	.	.	MONT. CHERT			HT. TRTD.	4	2.3	.
89	.	.	MONT. CHERT				8	19.5	.
90	.	.	MONT. CHERT			HT. TRTD.	5	2.7	.
91	.	.	MONT. CHERT				5	2.4	.
92	.	.	MONT. CHERT			HT. TRTD.	2	1.0	.
93	.	.	MONT. CHERT				13	31.9	.
94	.	.	MONT. CHERT			HT. TRTD.	5	1.9	.
95	.	.	MONT. CHERT				15	6.9	.

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C	D	A	S	W	U				
A	S	S	C	E	N				
T	E	O	P	I	S				
N	R	B	H	A	I				
U	E	J	A	E	G				
I	R	I	T	A	H				
N	P	R	L	N	Z				
T	A	A	C	T	E				
	P	P							
	C	P							
	H	P							
	V	A							
	D	D							
	E	F							
	R	G							
	A	L							
	T								
96	1	000020	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	5	14.2	.
97	1	000020	4	CS FLAKE . . .	MONT. CHERT		15	4.9	.
98	1	020030	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	3	1.1	.
99	1	020030	4	CS FLAKE . . .	MONT. CHERT		8	1.5	.
100	1	020045	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	5	12.3	.
101	1	020045	4	CS FLAKE . . .	MONT. CHERT		8	7.6	.
102	1	045060	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	2	0.8	.
103	1	045060	4	CS FLAKE . . .	MONT. CHERT		17	3.0	.
104	1	060070	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	6	4.6	.
105	4	070080	4	CS FLAKE . . .	MONT. CHERT		13	5.6	.
106	1	070090	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	3	1.3	.
107	1	070080	4	CS FLAKE . . .	MONT. CHERT		14	3.9	.
108	1	080090	4	CS FLAKE . . .	MONT. CHERT		20	16.7	.
109	1	090100	4	CS FLAKE . . .	MONT. CHERT		11	2.7	.
110	1	100110	4	CS FLAKE . . .	MONT. CHERT		7	2.1	.
111	1	110120	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	2	0.6	.
112	1	110120	4	CS FLAKE . . .	MONT. CHERT		3	6.1	.
113	1	120130	4	CS FLAKE . . .	MONT. CHERT		2	0.6	.
114	1	130140	4	CS FLAKE . . .	MONT. CHERT		3	1.8	.
115	1	130140	4	CS SHELL . . .	NYTILUS SP.		1	0.3	.
116	1	000020	5	CS FLAKE . . .	MONT. CHERT		20	0.8	.
117	1	020030	5	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	1	0.2	.
118	1	020030	5	CS FLAKE . . .	MONT. CHERT		13	0.7	.
119	1	030045	5	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	2	0.3	.
120	1	030045	5	CS FLAKE . . .	MONT. CHERT		14	1.0	.
121	1	045070	5	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	3	0.3	.
122	1	045070	5	CS FLAKE . . .	MONT. CHERT		19	0.9	.
123	1	060070	5	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	4	0.3	.
124	1	060070	5	CS FLAKE . . .	MONT. CHERT		28	1.3	.
125	1	070080	5	CS FLAKE . . .	MONT. CHERT		35	2.6	.
126	1	080090	5	CS FLAKE . . .	MONT. CHERT		14	1.0	.
127	1	090100	5	CS FLAKE . . .	MONT. CHERT		25	1.5	.
128	1	100110	5	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	1	0.1	.
129	1	100110	5	CS FLAKE . . .	MONT. CHERT		5	0.1	.
130	1	110120	5	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	1	0.1	.
131	1	110120	5	CS FLAKE . . .	MONT. CHERT		9	0.4	.
132	1	120130	5	CS FLAKE . . .	MONT. CHERT		8	1.1	.
133	1	130140	5	CS FLAKE . . .	MONT. CHERT		2	0.2	.
134	2	000020	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	3	8.1	.
135	2	000020	4	CS FLAKE . . .	MONT. CHERT		7	28.0	.
136	2	020030	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	2	4.3	.
137	2	020030	4	CS FLAKE . . .	MONT. CHERT		7	13.6	.
138	2	030040	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	5	2.3	.
139	2	020030	4	CS FLAKE . . .	MONT. CHERT		3	2.4	.
140	2	040050	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	3	3.0	.
141	2	040050	4	CS FLAKE . . .	MONT. CHERT		19	33.1	.
142	2	050060	4	CS FLAKE . . .	MONT. CHERT	HT. TRTD.	7	19.1	.
143	2	050060	4	CS FLAKE . . .	MONT. CHERT		9	2.6	.

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C A T H U M	U N I T	L E V E L	S C R E E N	E X P R O V	D I S C A R D	S A M P L E	O B J E C T	M O D I F 1
192	3	020030	4			CS	FLAKE	.
193	4	030040	4			CS	FLAKE	.
194	4	030040	4			CS	FLAKE	.
195	4	040050	4			CS	FLAKE	.
196	4	040050	4			CS	FLAKE	.
197	4	050060	4			CS	FLAKE	.
198	4	050060	4			CS	FLAKE	.
199	4	060070	4			CS	FLAKE	.
200	4	060070	4			CS	BLADELET	.
201	4	060070	4			CS	FLAKE	.
202	4	070080	4			CS	FLAKE	.
203	4	070080	4			CS	FLAKE	.
204	4	000020	5			CS	FLAKE	.
205	4	020030	5			CS	FLAKE	.
206	4	020030	5			CS	FLAKE	.
207	4	030040	5			CS	FLAKE	.
208	4	030040	5			CS	FLAKE	.
209	4	040050	5			CS	FLAKE	.
210	4	040050	5			CS	FLAKE	.

C A T H U M	M O D I F 2	F R A G	M A T L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N S I Z E
192	.	.	MONT. CHERT				4	1.6	.
193	.	.	MONT. CHERT			HT. TRFD.	1	7.0	.
194	.	.	MONT. CHERT				5	1.1	.
195	.	.	MONT. CHERT			HT. TRFD.	4	1.6	.
196	.	.	MONT. CHERT				8	4.1	.
197	.	.	MONT. CHERT			HT. TRFD.	2	3.8	.
198	.	.	MONT. CHERT				11	2.8	.
199	.	.	MONT. CHERT			HT. TRFD.	1	4.8	.
200	.	3	MONT. CHERT				1	9.3	.
201	.	.	MONT. CHERT				9	1.6	.
202	.	.	MONT. CHERT			HT. TRFD.	1	3.5	.
203	.	.	MONT. CHERT				6	3.9	.
204	.	.	MONT. CHERT				5	0.2	.
205	.	.	MONT. CHERT			HT. TRFD.	2	0.2	.
206	.	.	MONT. CHERT				9	0.6	.
207	.	.	MONT. CHERT			HT. TRFD.	2	0.3	.
208	.	.	MONT. CHERT				8	0.5	.
209	.	.	MONT. CHERT			HT. TRFD.	2	0.4	.
210	.	.	MONT. CHERT				9	0.2	.

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C A T A L O G N O.	U N I T	L E V E L	S C R E E N	E X P O S E D	D I S C A R D	S A M P L E	O B J E C T	M O D I F I C A T I O N
211	4	050060	5			CS	FLAKE	.
212	4	050060	5			CS	FLAKE	.
213	4	060070	5			CS	FLAKE	.
214	4	070080	5			CS	FLAKE	.
215	4	070080	5			CS	FLAKE	.
216	5	000020	4			CS	FLAKE	.
217	5	000020	4			CS	FLAKE	.
218	5	020030	4			CS	FLAKE	.
219	5	020030	4			CS	FLAKE	.
220	5	030040	4			CS	FLAKE	.
221	5	030040	4			CS	FLAKE	.
222	5	040050	4			CS	FLAKE	.
223	5	040050	4			CS	FLAKE	.
224	5	050060	4			CS	FLAKE	.
225	5	050060	4			CS	FLAKE	.
226	5	060070	4			CS	FLAKE	.
227	5	060070	4			CS	FLAKE	.
228	5	070080	4			CS	FLAKE	.
229	5	070080	4			CS	FLAKE	.

C A T A L O G N O.	M O D I F I C A T I O N	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R R E C T I O N	H E A D	Q U A N T I T Y	W E I G H T	U N I T
211	.	.	OBSIDIAN				1	0.1	.
212	.	.	MONT. CHERT				16	0.5	.
213	.	.	MONT. CHERT				14	0.9	.
214	.	.	MONT. CHERT			HT. TRTD.	2	0.1	.
215	.	.	MONT. CHERT				12	0.3	.
216	.	.	MONT. CHERT			HT. TRTD.	4	3.5	.
217	.	.	MONT. CHERT				9	5.5	.
218	.	.	MONT. CHERT			HT. TRTD.	2	1.6	.
219	.	.	MONT. CHERT				10	3.4	.
220	.	.	MONT. CHERT			HT. TRTD.	3	1.9	.
221	.	.	MONT. CHERT				5	5.6	.
222	.	.	MONT. CHERT			HT. TRTD.	1	0.2	.
223	.	.	MONT. CHERT				8	8.1	.
224	.	.	MONT. CHERT			HT. TRTD.	1	5.2	.
225	.	.	MONT. CHERT				8	2.9	.
226	.	.	MONT. CHERT				1	0.6	.
227	.	.	MONT. CHERT				6	4.3	.
228	.	.	MONT. CHERT			HT. TRTD.	3	0.2	.
229	.	.	MONT. CHERT				7	4.1	.

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C A T A L O G N U M	U N I T	L E V E L	S C R E E N	E X P O S U R E	D I S C A R D	S A M P L E	O B J E C T	M O D I F Y
230	5	070080	4			CS	STONE/GRAVEL	.
231	5	000020	5			CS	FLAKE	.
232	5	000020	5			CS	BIFACE	.
233	5	020030	5			CS	FLAKE	.
234	5	030040	5			CS	FLAKE	.
235	5	040050	5			CS	FLAKE	.
236	5	040050	5			CS	FLAKE	.
237	5	050060	5			CS	FLAKE	.
238	5	050060	5			CS	FLAKE	.
239	5	060070	5			CS	FLAKE	.
240	5	070080	6			CS	FLAKE	.
241	0	000000	0	Y			FLAKE	.
242	0	000000	0	Y			FLAKE	.
243	1	000020	4				FLAKE	.
244	1	000020	4				FLAKE	.
245	1	000020	4				FLAKE	UTILIZED
246	1	020040	4				FLAKE	.
247	1	020040	4				FLAKE	.
248	1	040060	4				FLAKE	.

C A T A L O G N U M	M O D I F Y	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R T E X T	H E A T T R E M E N T	Q U A N T I T Y	W E I G H T	U N I T S I Z E
230	.	2	RHYOLITE			HT. ALF.	1	973.7	.
231	.	.	MONT. CHERT			HT. TRTD.	5	0.2	.
232	.	.	MONT. CHERT				23	0.9	.
233	.	.	MONT. CHERT				10	0.5	.
234	.	.	MONT. CHERT				15	0.7	2
235	.	.	MONT. CHERT			HT. TRTD.	1	0.1	.
236	.	.	MONT. CHERT				6	0.5	.
237	.	.	MONT. CHERT			HT. TRTD.	4	0.1	.
238	.	.	MONT. CHERT				21	1.1	.
239	.	.	MONT. CHERT				18	0.8	.
240	.	.	MONT. CHERT				11	0.9	.
241	.	.	MONT. CHERT			HT. TRTD.	2	33.5	.
242	.	.	MONT. CHERT				3	26.7	.
243	.	.	MONT. CHERT			HT. TRTD.	14	16.1	.
244	.	.	MONT. CHERT				52	46.3	.
245	11	2	MONT. CHERT				1	3.0	.
246	.	.	MONT. CHERT			HT. TRTD.	21	29.0	.
247	.	.	MONT. CHERT				59	62.4	.
248	.	.	MONT. CHERT			HT. TRTD.	23	26.9	.

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C A T H	U N I T	L E V E L	S C R E E N	E X P O S U R E	D I S C A R D	S A M P L E	O B J E C T-	M O D I F 1	M O D I F 2
249	1	040060	4				FLAKE		
250	1	040060	4				FLAKE		
251	2	000020	4				FLAKE		
252	2	000020	4				FLAKE		
253	2	020040	4				FLAKE		
254	2	020040	4				FLAKE		
255	2	040060	4				FLAKE		
256	2	040060	4				FLAKE		
257	2	040060	4				FLAKE	UTILIZED	
258	2	040060	4				FLAKE		
259	3	000020	4				FLAKE		
260	3	000020	4				FLAKE		
261	3	000020	4				FLAKE		
262	3	020040	4				FLAKE		
263	3	020040	4				FLAKE		
264	3	020040	4				FLAKE		
265	3	020040	4				FLAKE		
266	3	040060	4				FLAKE		
267	3	040060	4				FLAKE		

C A T H	F R A G	M A T L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N S I Z E
249	.	MONT. CHERT		Y		2	58.1	.
250	.	MONT. CHERT				79	39.8	.
251	.	MONT. CHERT				16	22.3	.
252	.	MONT. CHERT			HT. FRTD.	66	43.2	.
253	.	MONT. CHERT				12	19.8	.
254	.	MONT. CHERT				67	104.6	.
255	.	MONT. CHERT			HT. FRTD.	17	100.2	.
256	.	MONT. CHERT		Y		1	1328.0	.
257	.	MONT. CHERT				1	14.1	.
258	.	MONT. CHERT				85	92.0	.
259	.	MONT. CHERT				11	48.9	.
260	.	MONT. CHERT		Y		1	69.0	.
261	.	MONT. CHERT				41	93.6	.
262	.	MONT. CHERT			HT. FRTD.	17	27.5	2
263	.	MONT. CHERT		Y		1	3.2	.
264	.	MONT. CHERT				55	52.7	.
265	.	SED. ROCK				1	2.6	.
266	.	MONT. CHERT			HT. FRTD.	15	33.9	.
267	.	MONT. CHERT				81	90.4	.

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C A T A L O G N O.	U N I T	L E V E L	S C R E E N	E X P O S E	D I S C A R D	S A M P L E	O B J E C T	M O D I F I	M O D I F I	F R A G
								1	2	
268	4	000020	4				FLAKE	.	.	.
269	4	000020	4				FLAKE	.	.	.
270	4	020040	4				FLAKE	.	.	.
271	4	020040	4				FLAKE	.	.	.
272	4	020040	4				FLAKE	.	.	.
273	4	040060	4				FLAKE	.	.	.
274	4	040060	4				FLAKE	.	.	.
275	5	000020	4				FLAKE	.	.	.
276	5	000020	4				FLAKE	.	.	.
277	5	020040	4				FLAKE	.	.	.
278	5	020040	4				FLAKE	.	.	.
279	5	040060	4				FLAKE	.	.	.
280	5	040060	4				FLAKE	.	.	.
281	5	040060	4				FLAKE	.	.	.
282	6	000020	4				FLAKE	.	.	.
283	6	000020	4				FLAKE	.	.	.
284	6	000020	4				FLAKE	.	.	.
285	6	000020	4				FLAKE	.	.	.
286	6	020040	4				FLAKE	.	.	.

C A T A L O G N O.	M A T E R I A L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N I T S
268	MONT. CHERT			HT. TRTD.	17	15.5	.
269	MONT. CHERT				76	65.4	.
270	MONT. CHERT			HT. TRTD.	17	38.4	.
271	IGN. ROCK				1	3.9	.
272	MONT. CHERT				57	77.3	.
273	MONT. CHERT			HT. TRTD.	28	88.4	.
274	MONT. CHERT				88	714.8	.
275	MONT. CHERT			HT. TRTD.	19	62.6	.
276	MONT. CHERT				50	182.6	.
277	MONT. CHERT			HT. TRTD.	31	40.3	.
278	MONT. CHERT				53	67.4	.
279	MONT. CHERT			HT. TRTD.	46	114.7	.
280	SED. ROCK				2	6.2	.
281	MONT. CHERT				82	95.4	.
282	OBSIDIAN				1	0.4	.
283	MONT. CHERT			HT. TRTD.	20	56.5	.
284	MONT. CHERT		Y		1	2.5	.
285	MONT. CHERT				58	62.9	.
286	MONT. CHERT			HT. TRTD.	11	23.6	.

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C A T H	U N I T	L E V E L	S C R E E N	E X P H O V	D I S C A R D	S A M P L E	O B J E C T	M O D I F 1	M O D I F 2	F R A G
287	6	020040	4				FLAKE	.	.	.
288	6	040060	4				FLAKE	.	.	.
289	6	040060	4				FLAKE	.	.	.
290	6	040060	4				FLAKE	.	.	.
291	6	040060	4				FLAKE	.	.	.
292	7	000020	4				FLAKE	.	.	.
293	7	000020	4				FLAKE	.	.	.
294	7	000020	4				FLAKE	.	.	.
295	7	000020	4				FLAKE	.	.	.
296	7	020040	4				FLAKE	.	.	.
297	7	020040	4				FLAKE	.	.	.
298	7	040060	4				FLAKE	.	.	.
299	7	040060	4				FLAKE	.	.	.
300	7	040060	4				FLAKE	.	.	.
301	8	000020	4				FLAKE	.	.	.
302	8	000020	4				FLAKE	.	.	.
303	8	020040	4				FLAKE	.	.	.
304	8	020040	4				FLAKE	.	.	.
305	8	040060	4				FLAKE	.	.	.

C A T H	N A T L	A S P H A L T	C O R T E X	H E A T	Q J A N T	W E I G H T	U N S I Z E
287	MONT. CHERT				56	65.7	.
288	OBSDIAN				1	0.3	.
289	MONT. CHERT			HT. TRTD.	21	44.3	.
290	MONT. CHERT		Y		1	43.7	.
291	MONT. CHERT				76	82.2	.
292	MONT. CHERT			HT. TRTD.	21	26.2	.
293	SED. ROCK				4	1.9	.
294	MONT. CHERT		Y		1	1.9	.
295	MONT. CHERT				63	70.7	.
296	MONT. CHERT			HT. TRTD.	19	105.0	.
297	MONT. CHERT				42	40.4	.
298	MONT. CHERT			HT. TRTD.	22	40.3	.
299	MONT. CHERT		Y		1	86.8	.
300	MONT. CHERT				78	95.1	.
301	MONT. CHERT			HT. TRTD.	10	26.9	.
302	MONT. CHERT				69	89.0	.
303	MONT. CHERT				13	27.1	.
304	MONT. CHERT				51	32.8	.
305	MONT. CHERT			HT. TRTD.	91	40.3	.

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C A T H U M	U N I T	L E V E L	S C R E E N	E X P R O V	D I S C A R D	S A M P - L E	O B J E C T	M O D I F 1	M O D I F 2	F R A G
306	8	040060	4				FLAKE	.	.	.
307	8	040060	4				FLAKE	.	.	.
308	9	000020	4				FLAKE	.	.	.
309	9	000020	4				BORE/DRILL	.	.	.
310	9	000020	4				FLAKE	.	.	.
311	9	020040	4				FLAKE	.	.	.
312	9	020040	4				FLAKE	.	.	.
313	9	040060	4				FLAKE	.	.	.
314	9	040060	4				FLAKE	.	.	.
315	9	040060	4				FLAKE	.	.	.
316	10	000020	4				FLAKE	.	.	.
317	10	000020	4				FLAKE	.	.	.
318	10	000020	4				FLAKE	.	.	.
319	10	020040	4				FLAKE	.	.	.
320	10	020040	4				FLAKE	.	.	.
321	10	040060	4				FLAKE	.	.	.
322	10	040060	4				FLAKE	.	.	.
323	10	040060	4				FLAKE	.	.	.
324	11	000020	4				FLAKE	.	.	.

C A T H U M	M A T L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N S I Z E
306	MONT. CHERT		Y		1	31.3	.
307	MONT. CHERT				54	69.9	.
308	MONT. CHERT			HT. TRTD.	25	73.2	.
309	MONT. CHERT				1	19.9	.
310	MONT. CHERT				49	39.0	.
311	MONT. CHERT			HT. TRTD.	19	10.2	.
312	MONT. CHERT				35	37.9	.
313	MONT. CHERT			HT. TRTD.	19	40.0	.
314	MONT. CHERT				1	0.1	.
315	MONT. CHERT				59	44.7	.
316	MONT. CHERT				18	45.6	.
317	MONT. CHERT		Y		1	432.2	.
318	MONT. CHERT				42	65.6	.
319	MONT. CHERT				32	47.7	.
320	MONT. CHERT				80	75.6	.
321	MONT. CHERT			HT. TRTD.	25	42.8	.
322	MONT. CHERT		Y		1	55.7	.
323	MONT. CHERT				57	70.9	.
324	MONT. CHERT			HT. TRTD.	20	214.2	.

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C A T A L O G N O. N O.	U N I T	L E V E L	S C R E E N	E X P O S U R E	D I S C A R D	S A M P L E	O B J E C T	M O D I F I C A T I O N
325	11	000020	4				FLAKE	.
326	12	000020	4				FLAKE	.
327	12	000020	4				FLAKE	.
328	13	000020	4				FLAKE	.
329	13	000020	4				FLAKE	.
330	14	000020	4				FLAKE	.
331	14	000020	4				FLAKE	.
332	15	000020	4				FLAKE	.
333	15	000020	4				FLAKE	.
334	16	000020	4				FLAKE	.
335	16	000020	4				FLAKE	.
336	17	000020	4				FLAKE	.
337	17	000020	4				FLAKE	.
338	18	000020	4				FLAKE	.
339	18	000020	4				FLAKE	.
340	18	000020	4				FLAKE	.
341	19	000020	4				FLAKE	.
342	19	000020	4				FLAKE	.
343	19	000020	4				FLAKE	.

C A T A L O G N O. N O.	M O D I F I C A T I O N	F R A G	M A T E R I A L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N I T S
325	.	.	MONT. CHERT				58	87.7	.
326	.	.	MONT. CHERT				36	43.3	.
327	.	.	MONT. CHERT				50	57.1	.
328	.	.	MONT. CHERT			HT. TRFD.	28	31.0	.
329	.	.	MONT. CHERT				61	55.5	.
330	.	.	MONT. CHERT			HT. TRFD.	17	62.3	.
331	.	.	MONT. CHERT				36	64.0	.
332	.	.	MONT. CHERT			HT. TRFD.	21	49.4	.
333	.	.	MONT. CHERT				43	71.9	.
334	.	.	MONT. CHERT				31	105.2	.
335	.	.	MONT. CHERT				40	71.1	.
336	.	.	MONT. CHERT			HT. TRFD.	25	85.6	.
337	.	.	MONT. CHERT				44	89.5	.
338	.	.	OBSIDIAN				1	1.6	.
339	.	.	MONT. CHERT			HT. TRFD.	20	41.5	.
340	.	.	MONT. CHERT				45	120.8	.
341	.	.	OBSIDIAN				1	0.1	.
342	.	.	MONT. CHERT			HT. TRFD.	29	95.8	.
343	.	.	MONT. CHERT				35	53.4	.

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C A T H	U N I T	L E V E L	S C R E E N	E X P O S E D	D I S C R I M I N A T O R	S A M P L E	O B J E C T	M O D I F I C A T I O N
344	19	000020	4				BIFACE<3GM.	.
345	20	000020	4				FLAKE	.
346	20	000020	4				FLAKE	.
347	20	000020	4				FLAKE	.
348	21	000020	4				FLAKE	.
349	21	000020	4				FLAKE	.
350	22	000020	4				FLAKE	.
351	22	000020	4				FLAKE	.
352	23	000020	4				FLAKE	.
353	23	000020	4				FLAKE	.
354	24	000020	4				FLAKE	.
355	24	000020	4				FLAKE	.
356	25	000020	4				FLAKE	.
357	25	000020	4				FLAKE	.
358	25	000020	4				FLAKE	.
359	26	000020	4				FLAKE	.
360	26	000020	4				FLAKE	.
361	26	000020	4				FLAKE	.
362	27	000020	4				FLAKE	.

C A T H	M O D I F I C A T I O N	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R R E X T	H E A T	Q U A N T	W E I G H T	U N I T S I Z E
344	.	10	MONT. CHERT				1	0.5	.
345	.	.	MONT. CHERT			HT. TRFD.	24	54.2	.
346	.	.	MONT. CHERT		Y		1	2.2	.
347	.	.	MONT. CHERT				47	34.4	.
348	.	.	MONT. CHERT			HT. TRFD.	24	29.2	.
349	.	.	MONT. CHERT				69	140.8	.
350	.	.	MONT. CHERT			HT. TRFD.	25	44.9	.
351	.	.	MONT. CHERT				71	231.6	.
352	.	.	MONT. CHERT			HT. TRFD.	24	67.8	.
353	.	.	MONT. CHERT				49	42.4	.
354	.	.	MONT. CHERT			HT. TRFD.	21	52.4	.
355	.	.	MONT. CHERT				45	35.1	.
356	.	.	MONT. CHERT			HT. TRFD.	15	37.2	.
357	.	.	MONT. CHERT		Y		1	10.9	.
358	.	.	MONT. CHERT				47	103.5	.
359	.	.	OBSIDIAN				1	0.1	.
360	.	.	MONT. CHERT			HT. TRFD.	26	24.2	.
361	.	.	MONT. CHERT				48	83.2	.
362	.	.	MONT. CHERT			HT. TRFD.	23	69.6	.

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C A T A L O G N U M	U N I T	L E V E L	S C R E E N	E X P O S U R E	D I S C O V E R Y	S A M P L E	J O B E C T	M O D I F I C A T I O N
363	27	000020	4				FLAKE	
364	28	000020	4				FLAKE	
365	28	000020	4				FLAKE	
366	28	000020	4				BONE	
367	29	000020	4				FLAKE	
368	29	000020	4				FLAKE	
369	30	000020	4				FLAKE	
370	30	000020	4				FLAKE	
371	31	000020	4				FLAKE	
372	31	000020	4				FLAKE	
373	32	000020	4				FLAKE	
374	32	000020	4				FLAKE	
375	33	000020	4				BIFACE<33M.	
376	33	000020	4				BIFACE	
377	33	000020	4				FLAKE	UTILIZED
378	33	000020	4				FLAKE	
379	33	000020	4				FLAKE	
380	34	000020	4				FLAKE	
381	34	000020	4				FLAKE	

C A T A L O G N U M	H O D I F I C A T I O N	F R A G M E N T	M A T E R I A L	A S P H A L T	C O R T E X	H E A D	Q U A N T I T Y	W E I G H T	U N I T S
363	.	.	MONT. CHERT				46	35.8	.
364	.	.	MONT. CHERT		HT. TRTD.		18	35.2	.
365	.	.	MONT. CHERT				40	23.5	.
366	.	.	SM. MAN.				1	0.5	.
367	.	.	MONT. CHERT				19	58.9	.
368	.	.	MONT. CHERT				47	265.9	.
369	.	.	MONT. CHERT		HT. TRTD.		25	53.0	.
370	.	.	MONT. CHERT				52	40.2	.
371	.	.	MONT. CHERT		HT. TRTD.		13	43.2	.
372	.	.	MONT. CHERT				32	38.5	.
373	.	.	MONT. CHERT		HT. TRTD.		18	27.7	.
374	.	.	MONT. CHERT				42	119.7	.
375	.	10	MONT. CHERT		HT. TRTD.		1	4.8	.
376	.	11	MONT. CHERT				1	259.9	.
377	.	.	MONT. CHERT				1	220.3	.
378	.	.	MONT. CHERT		HT. TRTD.		18	39.8	.
379	.	.	MONT. CHERT				32	64.8	.
380	.	.	MONT. CHERT		HT. TRTD.		25	160.1	.
381	.	.	MONT. CHERT				47	50.4	.

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C A T A L O G N U M	U N I T	L E V E L	S C R E E N	E X P O S U R E	D I S C A R D	S A M P L E	O B J E C T	M O D I F 1	M O D I F 2	F R A G
382	35	000020	4				FLAKE	.	.	.
383	35	000020	4				FLAKE	.	.	.
384	36	000020	4				FLAKE	.	.	.
385	36	000020	4				FLAKE	.	.	.
386	36	000020	4				FLAKE	.	.	.
387	37	000020	4				FLAKE	.	.	.
388	37	000020	4				FLAKE	.	.	.
389	38	000020	4				FLAKE	.	.	.
390	38	000020	4				FLAKE	.	.	.
391	39	000020	4				FLAKE	.	.	.
392	39	000020	4				FLAKE	.	.	.
393	40	000020	4				FLAKE	.	.	.
394	40	000020	4				FLAKE	.	.	.
395	1	090100	0			2	MISCELLANY	.	.	.
396	1	050060	0			2	MISCELLANY	.	.	.
397	1	076086	0			2	MISCELLANY	.	.	.
398	1	020030	0			2	MISCELLANY	.	.	.
399	1	130140	0			2	MISCELLANY	.	.	.

C A T A L O G N U M	M A T E R I A L	A S P H A L T	C O R T E X	H E A T	Q U A N T	W E I G H T	U N S I Z E
382	MONT. CHERT			HT. TRTD.	22	29.9	.
383	MONT. CHERT				45	48.1	.
384	MONT. CHERT			HT. TRTD.	23	23.9	.
385	MONT. CHERT		Y		1	0.8	.
386	MONT. CHERT				44	44.0	.
387	MONT. CHERT			HT. TRTD.	20	74.3	.
388	MONT. CHERT				53	6.0	.
389	MONT. CHERT			HT. TRTD.	23	31.8	.
390	MONT. CHERT				38	75.5	.
391	MONT. CHERT			HT. TRTD.	32	125.7	.
392	MONT. CHERT				48	55.7	.
393	MONT. CHERT			HT. TRTD.	22	32.7	.
394	MONT. CHERT				40	20.9	.
395	MISC/UNID.				1	.	.
396	MISC/UNID.				1	.	.
397	MISC/UNID.				1	.	.
398	MISC/UNID.				1	.	.
399	MISC/UNID.				1	.	.

APPENDIX II

SBA-1686 SITE FORM

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE SURVEY RECORD

SITE No. SBA-1686

1. Previous Site Designation SBA01114 NORTH 2. Temporary Field No. None
3. USGS Quad Point Arguello 7 1/2' X 15' Year 1959
4. UTM Coordinates Zone 10 E717280 N3827860
5. Twp. _____ Range _____; _____ % of _____ % of Sec. _____
6. Location 100 m. east of Coast Road, at location of V-33 External
Tank Processing and Storage Facility on South Vandenberg Air Force Base.

7. Contour 360'-370' 8. Owner & Address Vandenberg Air Force Base
9. Prehistoric X Ethnographic _____ Historic _____ 10. Site Description Deep
deposit of chert debitage and tools; sandstone manos and hammerstones;
obsidian, andesite, and shale debitage
11. Area unknown x _____ meters, _____ square meters. 12. Depth of Midden over 140 cm.
13. Site Vegetation soft chaparral Surrounding Vegetation soft chaparral, stable
dune plant community
14. Location & Proximity of Water Pacific Ocean ~ 500 m. west
15. Site Soil fine sand Surrounding Soil fine sand
16. Previous Excavation Office of Public Archaeology, UCSB 1981; VTN 1981
17. Site Disturbance All but SE corner of site destroyed by construction, April 1981
18. Destruction Possibility No imminent threat to remaining site area
19. Features None observed
20. Burials None observed
21. Artifacts Monterey chert and obsidian debitage; chert bifacial tools;
hammerstones; manos; chert cores; andesite and shale flakes

22. Faunal Remains None observed

23. Comments _____

24. Accession No. 291 25. Sketch Map _____ by _____ where _____
26. Date Recorded 27 April 1981 27. Recorded By J. Serena
28. Photo Roll No. _____ Frame No. _____ Film Type(s) _____ Taken By _____

SITE STATUS: Unknown

% Destroyed _____ How _____ Test Excavated _____ %, if known.

National Register Status: Listed _____ Potential _____ Nominated _____ Ineligible _____

State Historical Landmark (No.) _____ Point of Historical Interest _____

SPECIAL ATTRIBUTES (Place an X in only those spaces which pertain to the site)

Midden/Habitation Debris _____, Lithic and/or Ceramic Scatter _____

Bedrock Mortars/Milling Surfaces _____, Petroglyphs/Pictographs _____, Stone Features _____

Burials _____, Caches _____, Hearths/Roasting Pits _____, Housepits _____, Structure Remains _____,

Underwater _____, Open Air , Rockshelter _____, Cave _____, Quarry _____, Trails _____

REMARKS _____

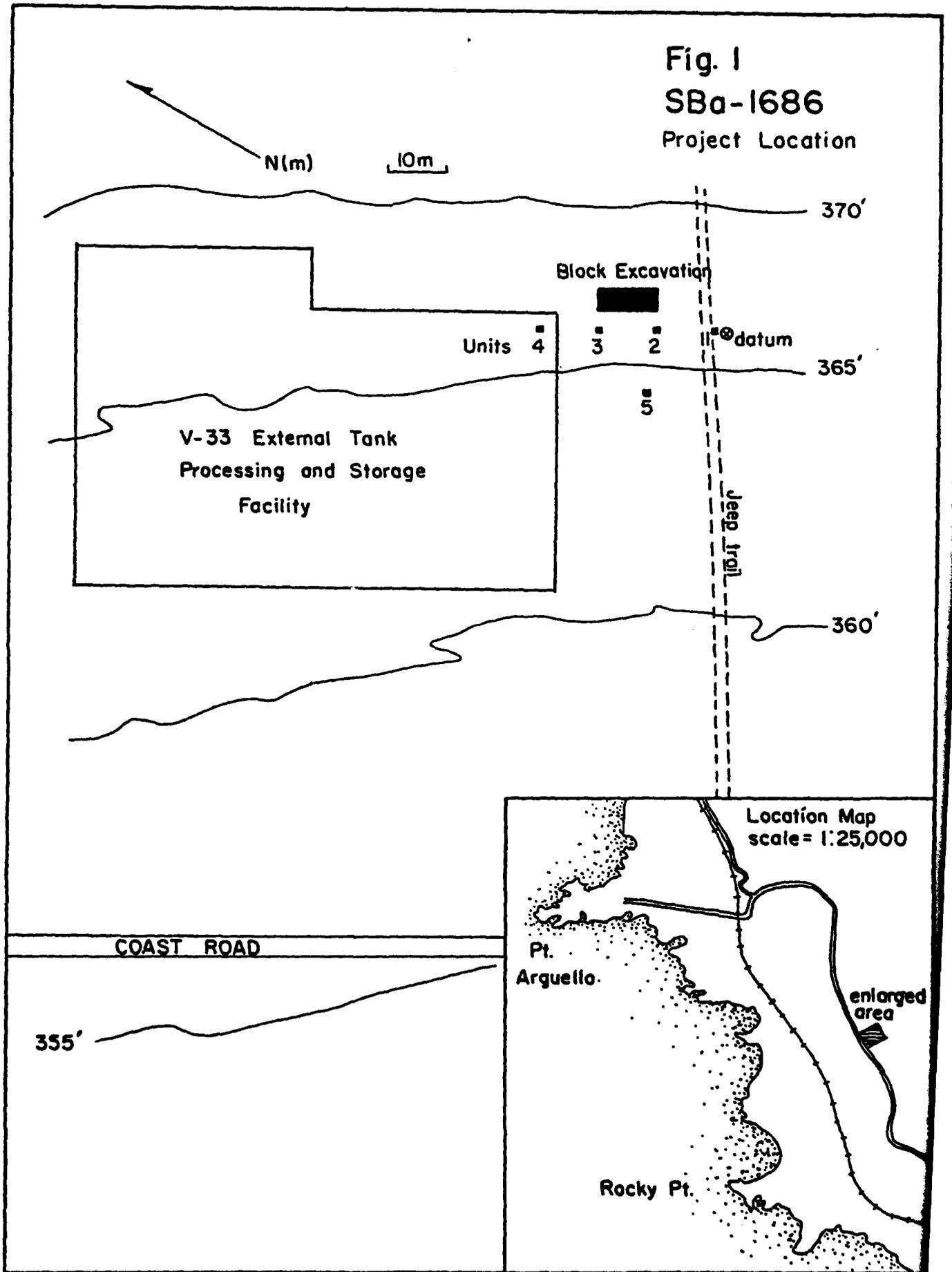
SKETCH LOCATION MAP (Include permanent reference markers, North Arrow, and Scale)

See Attached

SKETCH SITE MAP (Same criteria as above)

See Attached

Fig. 1
SBa-1686
Project Location



FILM

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