AK-G70-00#34

Notification

To be covered under the General NPDES Permit AK-G70-0000 for Log Transfer Facilities in Alaska

(see Part V of the permit)

Submission of this document constitutes a request that certain discharges into waters of the United States resulting from the operation of the log transfer facility identified herein be authorized under General NPDES Permit AK-G70-0000.

Previously Assigned NPDES Permit No. (if applicable): N/A	NPDES Permit No. AK-G70-0_____ (to be assigned by EPA)

Landowner Information

Landowner Name: USDA Forest Service Alaska Region Tongass National Forest

Address: 648 Mission Street, Federal Building Ketchikan, AK 99901	Phone: (907) 228-6200 FAX: (907) 228-6292

Representative: THOMAS PUCHLERZ

Operator Information

Teresa Truelock
828-3212

Company Name: Gateway Forest Products

Address: P.O. Box 779 Ward Cove, Alaska 99928	Phone: (907) 247-1647 FAX: (907) 247-1646

Representative: Kent Nicholson

Company Name: Pacific Log & Lumber LTD

Address: P.O. Box 5183 Ketchikan, Alaska 99901	Phone: (907) 247-6731 FAX: (907) 225-5990

Representative: Frank Age, Steve Seley

Facility Information

Section 404 Permit No., Facility Name on Permit, and Issuance Date: 071-OYD-1-720177, Whale Pass, 10/05/1972

Waterway Name: Kashevrof Pass 2 & 7

Facility Name: Whale Pass

Address: Sec. 1, T.67S., R.79E., C.R.M.	Phone: N/A FAX: N/A

Latitude/Longitude: 56°05'44" N / 133°07'38" W

Distance/Direction to nearest town/city: 36 miles N of Klawock, AK, 36 miles NW of Thorne Bay, AK

Attachments: [X] Nautical Chart [X] Vicinity Map [X] Plan Drawing [X] Elevation/Cross Section View

Description of operations: The facility is designed to have log bundles placed in the water by either A-frame or crane lift systems and a low -angle 17% drive down ramp. The facility is designed with a bulkhead to accommodate the A-frame or crane lift systems. Both systems are designed to utilize the same zone of deposit. The A-frame/crane lift systems lift log bundles from the truck and place the log bundles in the saltwater body. The low-angle drive down ramp is configured to use a front-end loader to lift the log bundles from the truck and drive down the ramp and place the log bundles in the water. In both systems, the log bundles are moved to a raft storage area until the raft is towed to the manufacturing site. Direct loading to barges is not feasible due to the shallow nature of the bathymetry off shore of the site.

Demonstration that operations constitute important or social or economic development in the area and that a zone of deposit is necessary to accommodate operation of the LTF: The purpose and need for the operation of the LTF is to implement the direction in the Tongass Land and Resource Management Plan, to seek to meet market demand for timber as prescribed in the Tongass Timber Reform Act (1990), to contribute to providing a sustained volume of wood to meet local and national demand, and to provide local and regional employment opportunities.

The movement of logs from uplands to the water creates bark deposition at all log transfer facilities. The extent of the deposit is determined by the amount of timber volume crossing the facility, the frequency of projects utilizing the site, the tidal characteristics immediately adjacent to the LTF, and the methods utilized in transferring logs.

Describe known existing uses of the receiving water where the LTF is located, and demonstrate that those uses will be fully protected by the proposed operation of the LTF: Land based activities include fish, wildlife, and timber harvest for personal use, and commercial logging. There has been development of private lands for small commercial businesses. Commercial recreation and sport harvest of fish and wildlife by tourists are growing activities. Waterway uses related to these upland uses include small pleasure boat traffic and charter fishing, Neck Lake terminal fisheries operation, float plane traffic, and protected anchorage for larger vessels.

None of the waterway uses identified above should be hindered by the continued operation and use of the LTF. All reasonable practices will be implemented to avoid the discharge of bark, wood debris, and other pollutants to the receiving waters, and to contain the discharge to the smallest area that is practicable and is consistent with the safe and orderly operation of the LTF.

Facility Classification

Category: [X] Shore-based [ ] Off-shore	Method of Log Transfer: A-Frame/Crane Lift Off and 17% Low-Angle Ramp

Use Description (Type I, II, III, IV or V): IV II ? up to 40 mmbf/yr; less than 20 yr ops

Production Data

Expected facility lifespan: 25 years	Projected Months of Operation: March to December

Volume to be transferred (board feet, Scribner scale)

Maximum over life of permit:	35 mmbf
Average per year:	8 mmbf
Maximum per year:	15 mmbf
Approximate volume of timber (mmbf) previously transferred over the facility, if known:	Unknown

Receiving Water Information

ATTACHMENTS (for Type I-IV shore-based LTFs)

[X] Bark monitoring surveys not previously submitted to EPA

Signature and Certification

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 fine and imprisonment for knowing violations

Signature of Principal Corporate or Executive Officer/General Proprietor Thomas Puckley FOR	Printed Name RICK D. CABLES
Title/Company Regional Forester/ USDA Forest Service Alaska Region	Date 12-5-00

Submit this Notice of Intent to:

U.S. Environmental Protection Agency Region 10 1200 Sixth Avenue, OW-130 Seattle, Washington 98101 Attn: LTF Reporting	Alaska Dept. of Environmental Conservation Division of Air and Water Quality 410 Willoughby Avenue, Suite 105 Juneau, AK 99801 Attention: LTF Reporting

Qualified applicants will be authorized to discharge under this general NPDES permit upon receipt of written authorization from EPA.

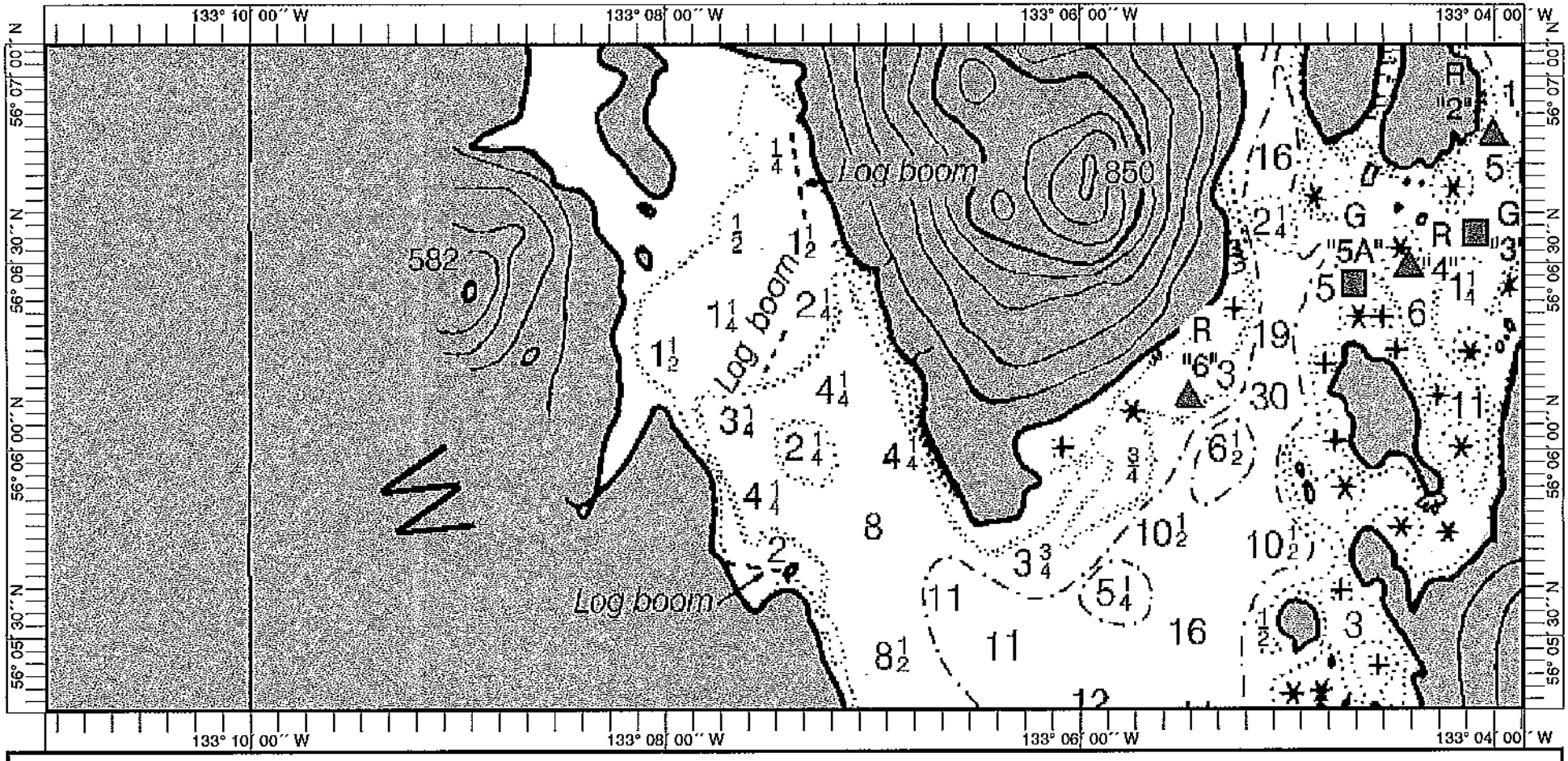

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Chart ID: 17382_1
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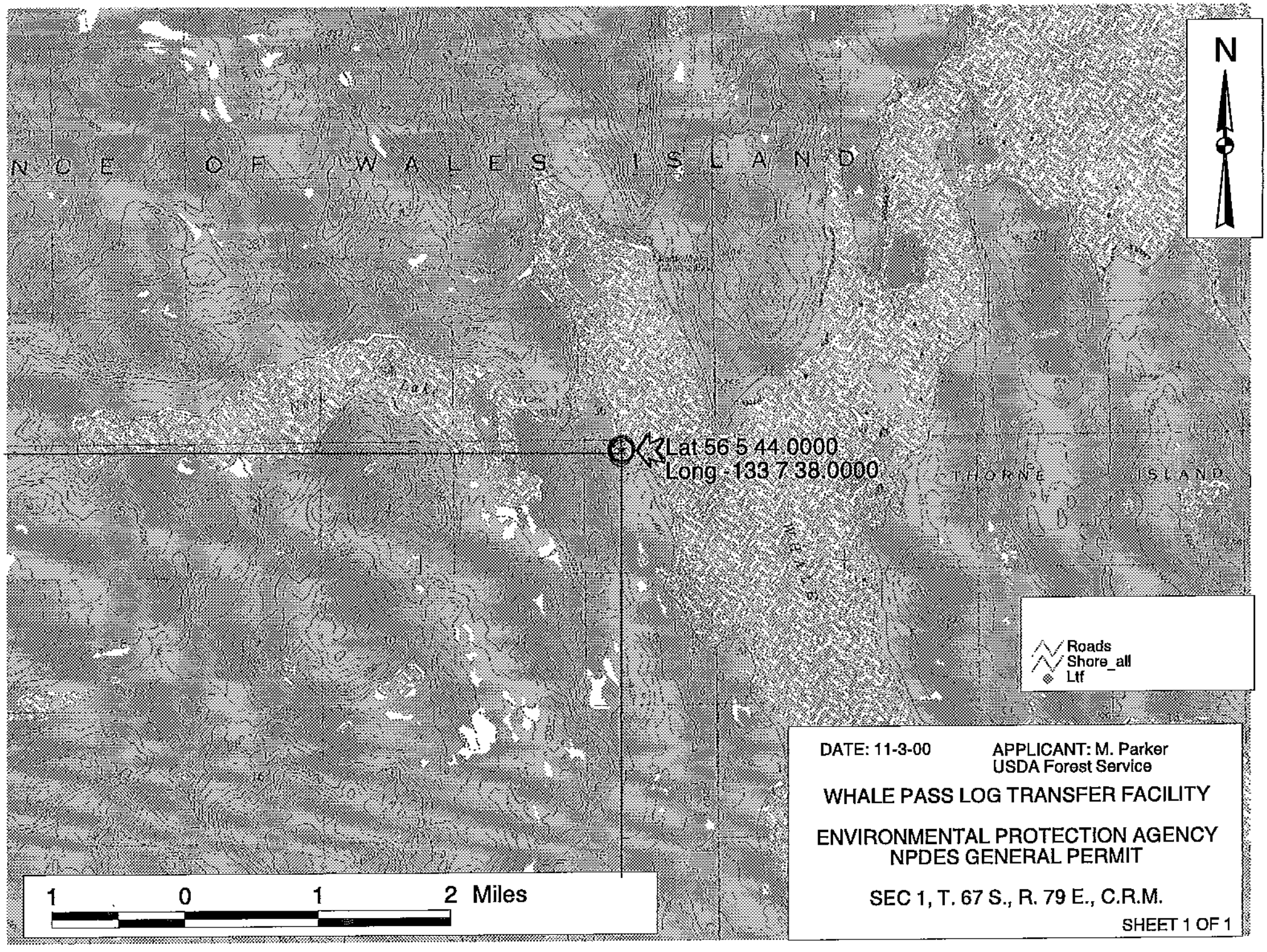
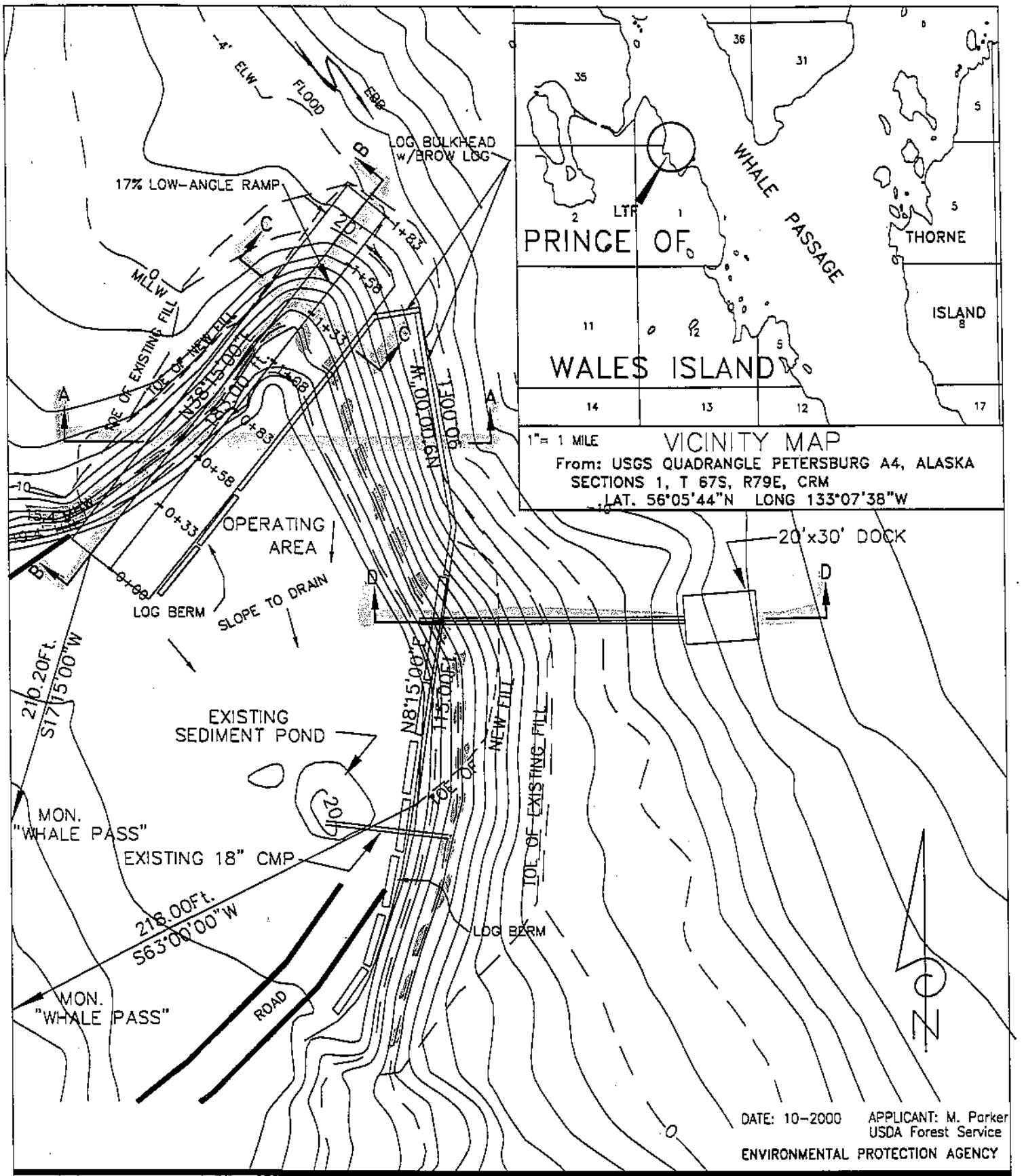
Bottom Right: 56° 05′ 18″ N 133° 03′ 51″ W


N
N O E O F W A L E S I S L A N D
Lat 56 5 44.0000
Long -133 7 38.0000
THORNE ISLAND
Roads
Shore_all
Ltf
1 0 1 2 Miles
DATE: 11-3-00
APPLICANT: M. Parker
USDA Forest Service
WHALE PASS LOG TRANSFER FACILITY
ENVIRONMENTAL PROTECTION AGENCY
NPDES GENERAL PERMIT
SEC 1, T. 67 S., R. 79 E., C.R.M.
SHEET 1 OF 1



PURPOSE:
TRANSFER LOGS TO WATER, and FLOATING DOCK

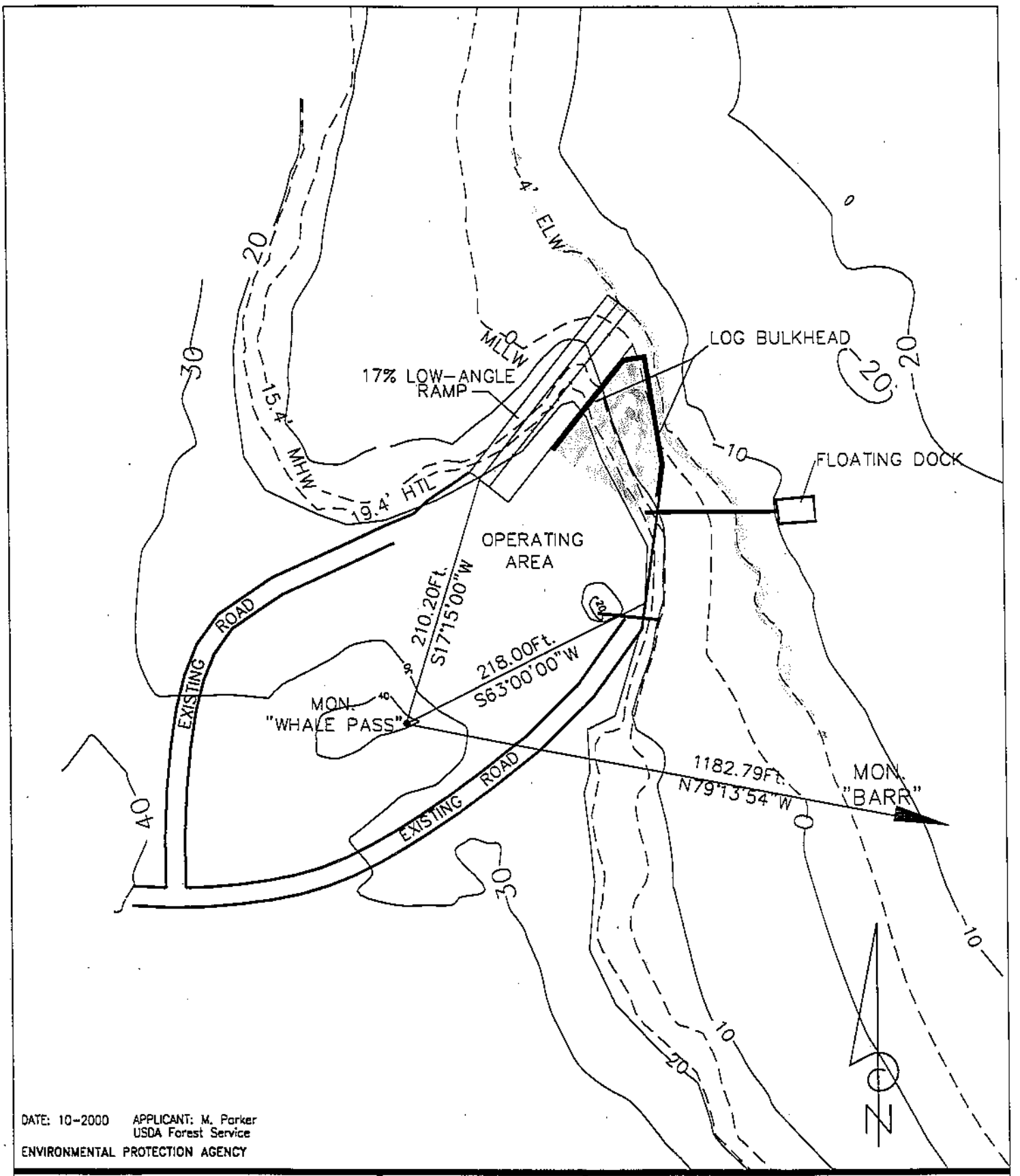
drawn by: martini

DEVELOPMENT PLAN

0 50
1 inch = 50 feet

WHALE PASS
LOG TRANSFER FACILITY
SECTIONS 1, T67S, R79E, CRM
PRINCE OF WALES ISLAND, S.E. ALASKA

Sheet 1 of 8



DATE: 10-2000 APPLICANT: M. Parker
USDA Forest Service
ENVIRONMENTAL PROTECTION AGENCY

PURPOSE:
TRANSFER LOGS TO WATER, and FLOATING DOCK

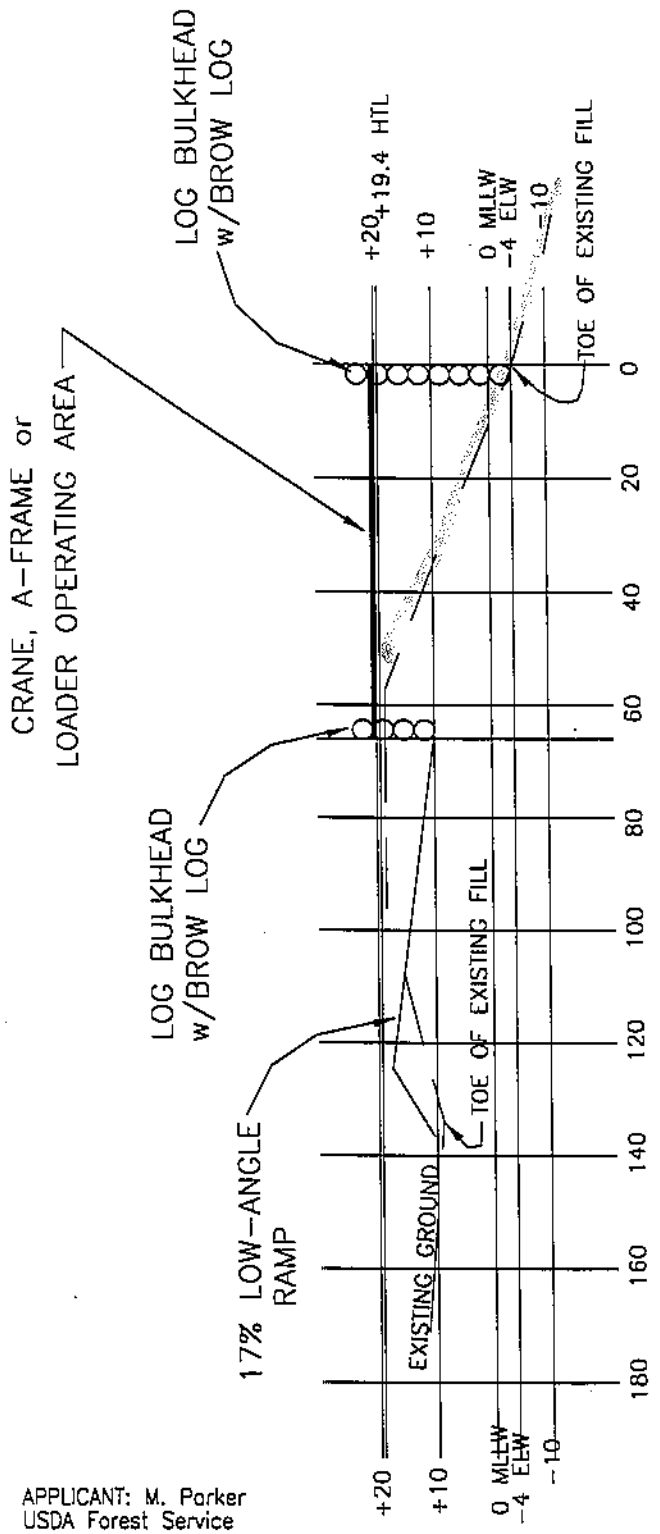
drawn by: martini

PLAN VIEW

0 100
1 inch = 100 feet

WHALE PASS
LOG TRANSFER FACILITY
SECTIONS 1, T67S, R79E, CRM
PRINCE OF WALES ISLAND, S.E. ALASKA .

Sheet 2 of 8



SECTION A-A

DATE: 10-2000 APPLICANT: M. Parker
USDA Forest Service

ENVIRONMENTAL PROTECTION AGENCY

PURPOSE:
TRANSFER LOGS TO WATER, and FLOATING DOCK

drawn by: martini

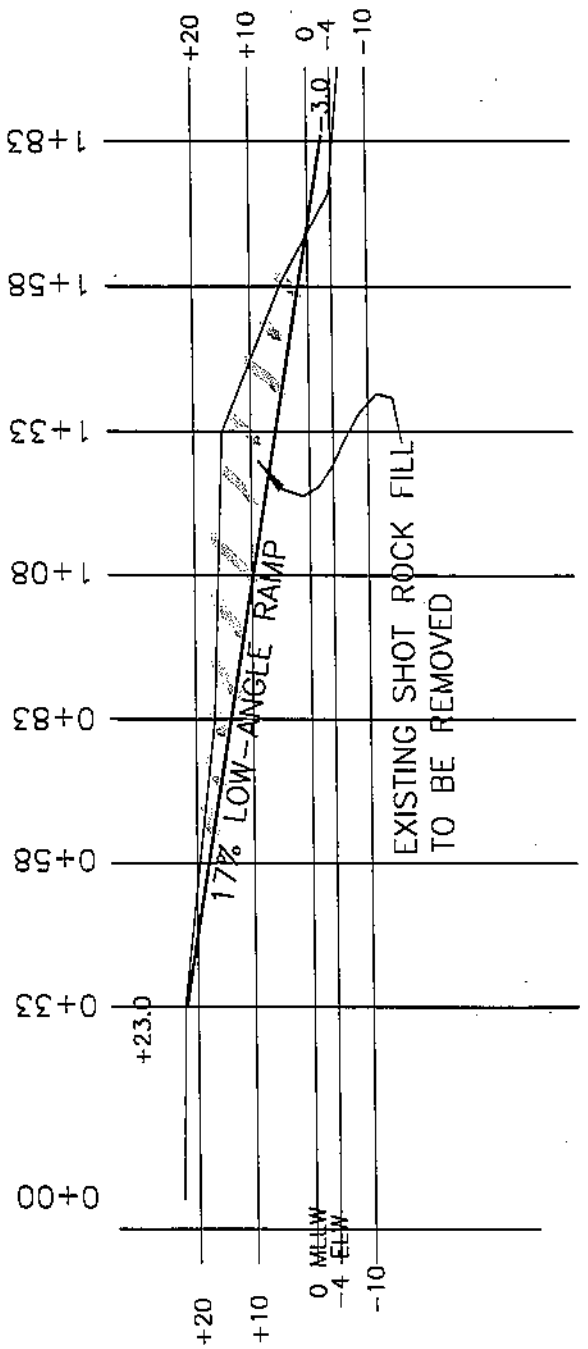
SECTION A-A

0 30
1 inch = 30 feet

WHALE PASS
LOG TRANSFER FACILITY

SECTIONS 1, T67S, R79E, CRM
PRINCE OF WALES ISLAND, S.E. ALASKA

Sheet 3 of 8



SECTION B–B

DATE: 10–2000 APPLICANT: M. Parker
USDA Forest Service

ENVIRONMENTAL PROTECTION AGENCY

PURPOSE:
TRANSFER LOGS TO WATER, and FLOATING DOCK

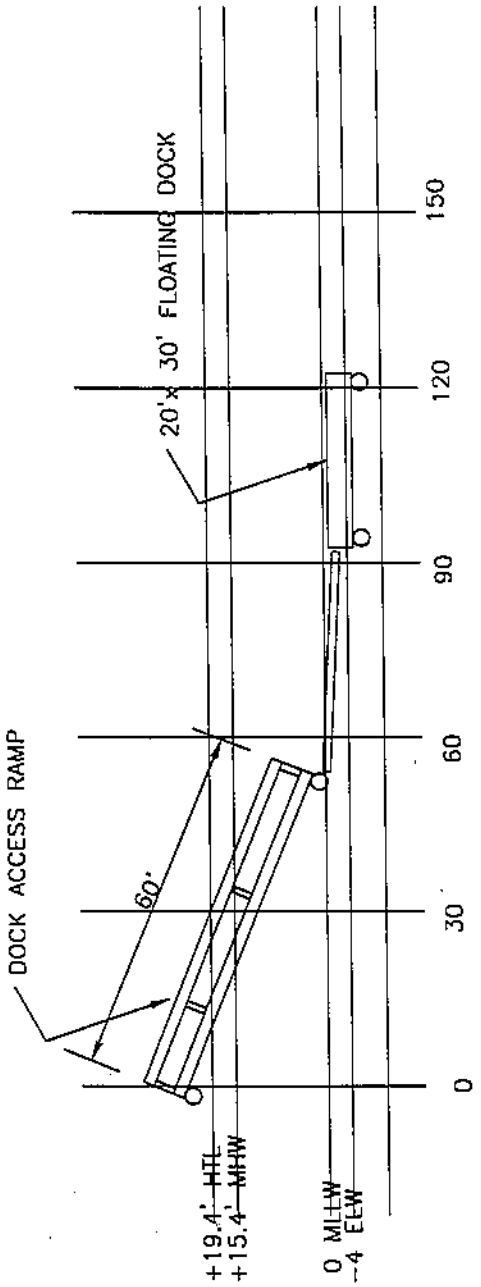
drawn by: martini

SECTION B–B

0 30
1 inch = 30 feet

WHALE PASS
LOG TRANSFER FACILITY
SECTIONS 1, T67S, R79E, CRM
PRINCE OF WALES ISLAND, S.E. ALASKA

Sheet 4 of 8



SECTION D–D

DATE: 10–2000 APPLICANT: M. Parker
USDA Forest Service

ENVIRONMENTAL PROTECTION AGENCY

PURPOSE:
TRANSFER LOGS TO WATER, and FLOATING DOCK

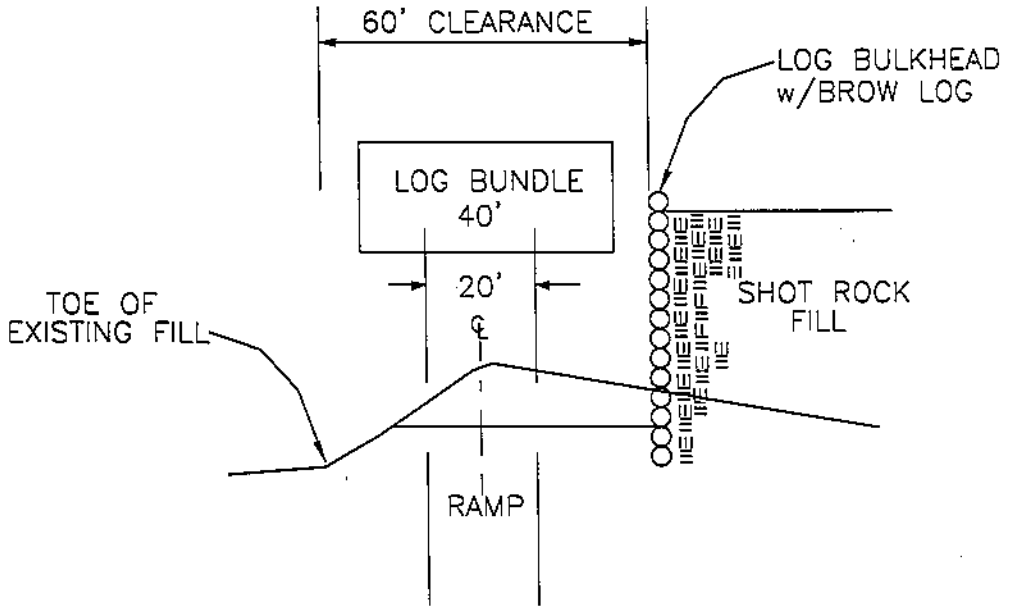
drawn by: martini

SECTION D–D

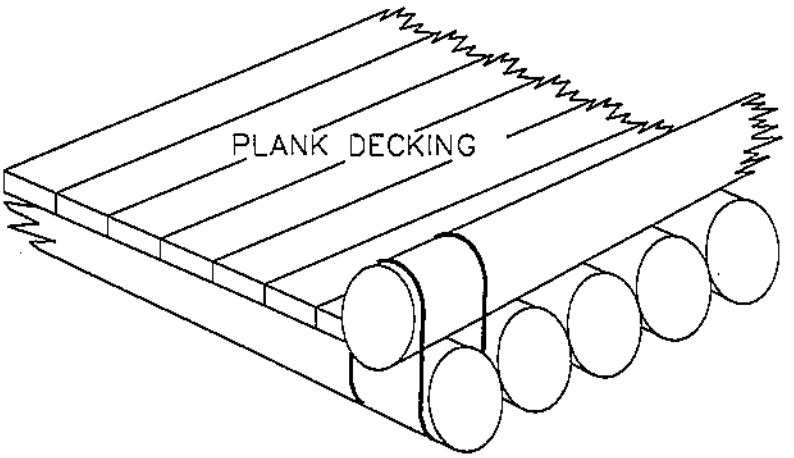
0 30
1 inch = 30 feet

WHALE PASS
LOG TRANSFER FACILITY
SECTIONS 1, T67S, R79E, CRM
PRINCE OF WALES ISLAND, S.E. ALASKA

Sheet 5 of 8



SECTION C – C
17% LOW–ANGLE RAMP

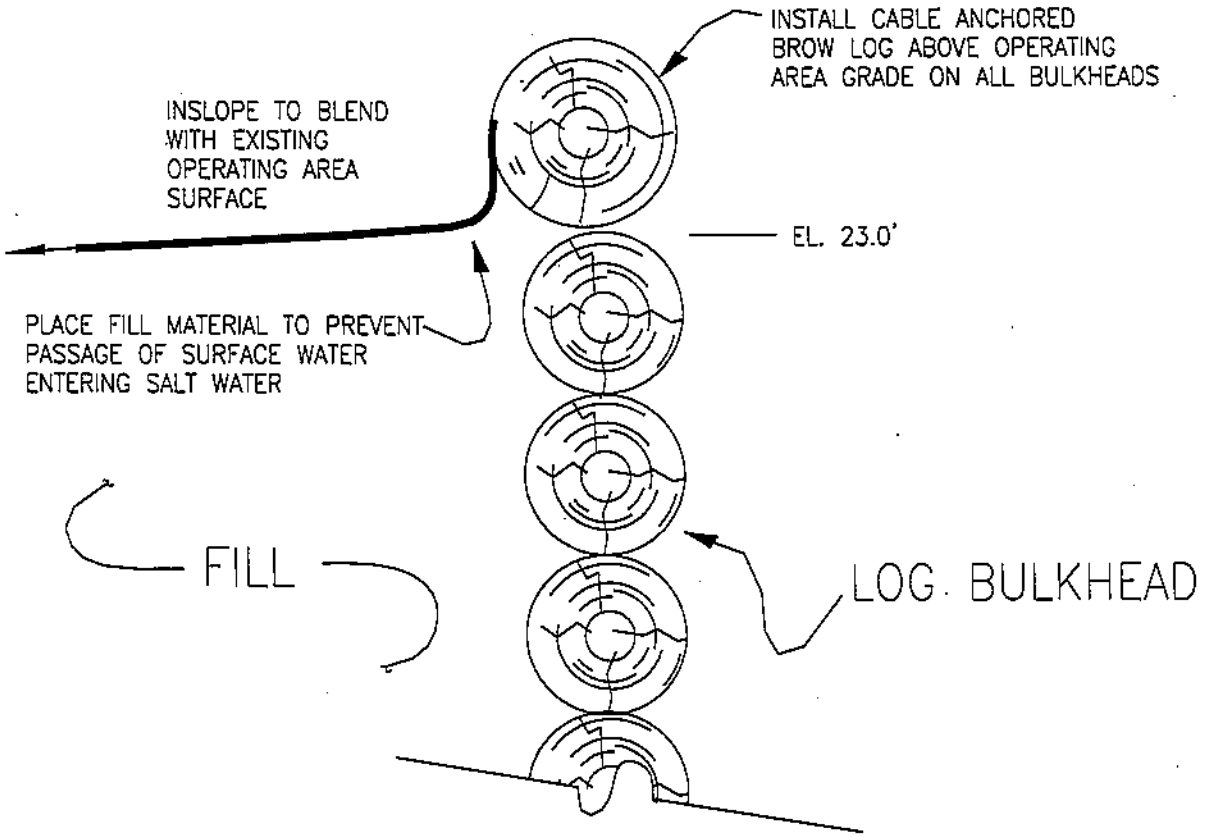


FLOATING DOCK

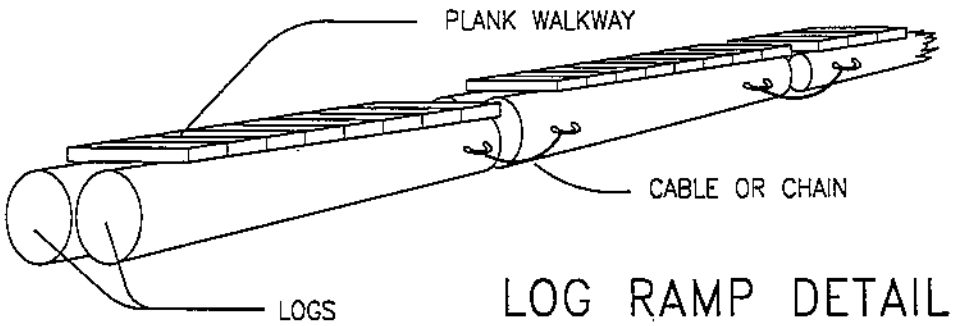
DATE: 10–2000 APPLICANT: M. Parker
USDA Forest Service

ENVIRONMENTAL PROTECTION AGENCY

PURPOSE: TRANSFER LOGS TO WATER, and FLOATING DOCK drawn by: martini	SECTION C–C and DOCK DETAIL NO SCALE	WHALE PASS LOG TRANSFER FACILITY SECTIONS 1, T67S, R79E, CRM PRINCE OF WALES ISLAND, S.E. ALASKA Sheet 6 of 8



BROW LOG DETAIL

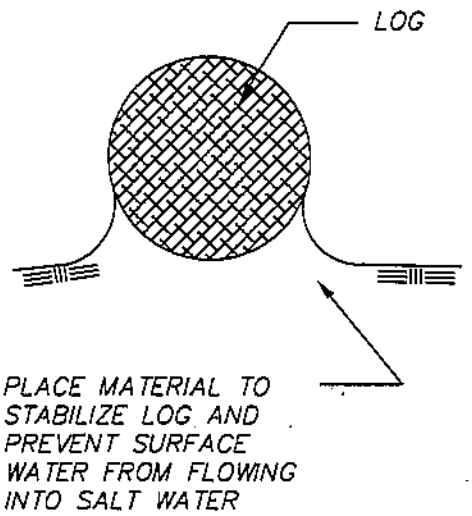


LOG RAMP DETAIL

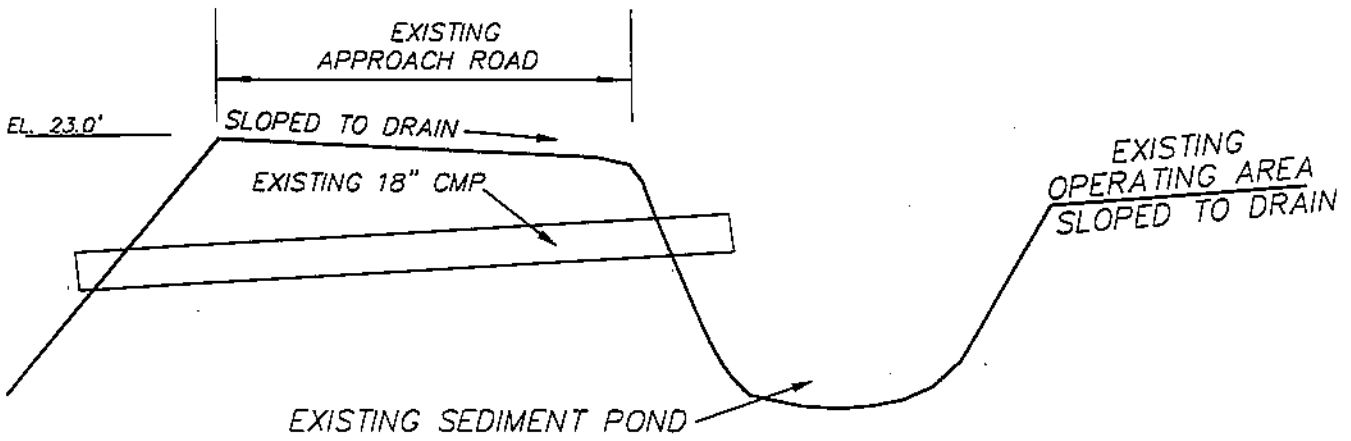
DATE: 10-2000 APPLICANT: M. Parker
USDA Forest Service

ENVIRONMENTAL PROTECTION AGENCY

PURPOSE: TRANSFER LOGS TO WATER, and FLOATING DOCK drawn by: martini	BROW LOG DETAIL and LOG RAMP DETAIL NO SCALE	WHALE PASS LOG TRANSFER FACILITY SECTIONS 1, T67S, R79E, CRM PRINCE OF WALES ISLAND, S.E. ALASKA Sheet 7 of 8



LOG BERM



SEDIMENT POND

DATE: 10-2000 APPLICANT: M. Parker
USDA Forest Service
ENVIRONMENTAL PROTECTION AGENCY

PURPOSE: TRANSFER LOGS TO WATER, and FLOATING DOCK drawn by: martini	DETAILS	WHALE PASS LOG TRANSFER FACILITY SECTIONS 1, T67S, R79E, CRM PRINCE OF WALES ISLAND, S.E. ALASKA
	NO SCALE	Sheet 8 of 8

Underwater Bark Debris Survey

Whale Pass Log Transfer Facility

Prince of Wales Island, Alaska

Submitted to: USDA Forest Service, Region 10
Ketchikan Area, Tongass National Forest
648 Mission Street
Ketchikan, AK 99901

Prepared by: Craig's Dive Center
P.O. Box 796
107 Main Street
Craig, AK 99921

August 12, 2000

Introduction:

An underwater survey requested to determine the extent of bark debris accumulation at the Whale Pass Log Transfer Facility, Prince of Wales Island, Alaska, was performed on August 12, 2000. The purpose of the survey is to satisfy the requirement for a bark monitoring program specified by the NPDES permit. The protocol for operating a bark monitoring program is given in the new EPA General Permit, which became effective March 21, 2000.

Methods:

Once on site, the layout of the facility is evaluated to best adapt the standard survey method to the individual site characteristics. A permanent reference point location is selected, ideally in the center of the log bundle input structure. The reference point is positioned as close as possible to the exact center of the structure (regardless of type: bulkhead with A-frame, drive-down ramp, low-angle slide, etc.) and close to the estimated Mean Low Low Water (MLLW) depth to facilitate relocation for future surveys. Initially, five transects are established, radiating from the reference point origin at 30-degree intervals. The center transect is located perpendicular to the face of a bulkhead structure, or in line with the centerline of a drive-down ramp/low-angle slide. Additional transects are added if 100 % bark coverage extends more than 15 feet perpendicular to an edge transect. Magnetic compass bearings are selected for the transects by referencing the transects to the center of the log transfer device. The magnetic compass bearing is also the identifying label for that transect.

Each transect is sampled at 15-foot intervals starting from the origin at the permanent reference point. Debris depth measurements are made with a hand-held ruler at the sample point. The measurement is taken by vertically inserting the ruler into the debris until the natural substrate is felt or its location estimated as closely as possible. Periodically, when the confidence level in the measurement decreases due to the substrate type and/or bark amount, the bark depth is confirmed by digging by hand through the bark layer to the natural substrate. Percentage of areal coverage by bark debris is determined by using the ruler, which is randomly dropped at the sample point, as the base of a visually estimated 3-foot square. The percent bark cover within that square is visually estimated.

Sample points are established along a transect until a water depth of 60 feet MLLW is reached or the measured bark debris depth becomes insignificant (usually interpreted to mean that less than one inch of bark depth, less than 10 % cover, and a clear decreasing trend is apparent towards the end of the transect). At each sample location several data points are recorded by the diver: water depth; debris depth; percent coverage of debris; debris composition and character; substrate type; species abundance, condition and diversity; direction and strength of current; visibility; and the presence of any significant operational debris. A qualitative assessment of species abundance is made for the overall survey area.

Photographs are taken of representative sample points along the transects (usually the middle and two side transects) to document substrate, bark debris, algal and animal life, and any other debris/objects that may be of concern. Water depth measurements are taken from a Suunto dive computer with an accuracy of +/- 1%. A Suunto compass is attached to a 4-foot measuring ruler and is used to navigate the transect compass headings.

The total survey surface area is determined by calculating the total area of triangles formed by adjacent transects, and the total square footage of the debris field area is a summation of all the triangle areas for the number of transects performed. This figure is converted to acres as required by the guidelines. The calculation method used in this report is outlined in the ADEC publication "**Required Method for Bark Monitoring Surveys under the LTF General Permits**", **June 9, 2000**. The method for calculating continuous and discontinuous areas also follows this prescribed method.

Results:

Reference Point Location: 56°05.732 N, 133°07.709 W DGPS position. The DGPS position was taken on the top edge of the fill surface, above the reference point on the lower edge of the fill rock slope.

Weather conditions at survey time were a high overcast cloud layer, with northwesterly winds at ten knots; air temperature was in the low sixties. The diving started at 1520, taking place during the last half of an ebbing tide cycle. Low tide occurred at 1804 with a height of 3.9 feet (corrected to subordinate station # 1507, Thorne Island, Whale Passage, from the Ketchikan reference station) and a tidal range of 9.0 feet. No noticeable current was experienced during the survey dive. Water temperature was measured at 53 degrees. Underwater visibility was estimated to be 4 to 6 feet in the surface layer, increasing to 10 feet at the maximum depths of the survey.

A total of 97 sample points were taken on the six transects, and all sample points had at least a trace of bark debris, except for four sample points that went up and over the edge of the fill rock on transect 315. The total area covered by the dive survey was 1.6 acres. The area covered by 100 % bark cover was 0.3 acres, and the discontinuous cover was 1.3 acres. An extra lateral transect (315) was added to investigate the small bight created by the extension of the fill rock platform out from the shoreline.

Bark Deposition Summary		
Total Survey Area	Area with Continuous Bark Cover	Area with Discontinuous Bark Cover
1.6 Acres	0.3 Acres	1.3 Acres

Observations:

The LTF has been decommissioned, with no transfer structure in place at the time of the survey. The LTF is situated on the western shoreline of Whale Passage, near the mouth of the bay to the northwest of the Passage. The underwater topography consists of a very slight slope, almost flat in spots, over the entire survey area. The substrate consists of sand close in to the natural shoreline, grading to silt a short distance away from shore and continuing on out over the entire area.

The zone of deposit covers the entire dive survey area. The 100% bark cover area encompasses the area in front of the fill platform. The amount, character, and size of the observed bark debris varied with no discernible pattern. The debris in some areas varied greatly in size, from small bark chips to large bark chunks. Overall, the debris was a more uniform bark chips and chunks. Many of the sample points in the 100% bark zone exhibited a "jiggling" of the debris surface when the ruler was inserted into the debris. The most important feature of this site is the apparently natural silty conditions. At a distance of approximately five to eight sample points out from the reference point on all transects, the 100% bark debris becomes mixed enough with the silt to reduce the estimate of continuous cover to below 100%. Progressing out further, the mixing with silt becomes even greater, reducing the bark percentage rapidly. No sunken logs were encountered during the survey.

My impression of the survey area is that the marine life observed appears to be generally healthy and is not being adversely affected by the bark, other than the smothering effect on benthic infauna when bark accumulation reaches a depth of approximately ten centimeters or more. Overall, abundance and diversity of biota at this location appeared to be low.

The abundance and diversity of plant life observed in the survey area were low. On the lower edge of the fill rock, green algae cover was low. On the bark/silt surface, a diatom surface layer was generally present. The large-bladed Laminarians were present in very patchy fashion, only in the area of metal debris or occasionally attached to large bark pieces.

Molluscan abundance and diversity appeared to be low. A few bivalve siphons were observed, and were identified as *Clinocardium nuttallii* and *Tresus nuttallii*. Feces of the wood-boring bivalve *Bankia setacea* bordered the few larger wood chunks. A nudibranch, *Flabellina sp.*, was observed on the kelp in the metal debris area. Other molluscs observed were unidentified chitons and limpets.

Echinoderm abundance and diversity in the area were low. The sea star species observed were *Pycnopodia helianthoides* and *Evasterias troschelii*. Low numbers of *Parastichopus californicus* were observed throughout the area.

Crustacean abundance and diversity were low to moderate. Juvenile *Cancer magister* were observed in low densities throughout the survey area. Small crabs of the Majidae

family, *Hyas lyratus* and *Oregonia gracilis*, commonly observed at LTFs on both the bark and natural substrate, were present in low abundance. Hermit crab abundance and diversity also were low. Using both natural substrate and bark chips for crevice habitat, *Pandalus sp.* individuals were observed in low densities. Barnacle abundance was low on the fill rocks and metal debris.

Other invertebrates observed during the survey included the anemone *Cribrinopsis fernaldi*.

Fish were observed in low to moderate abundance and diversity in the area. Individuals of *Lumpenus sagitta, Pholis spp.*, and *Platichthys stellatus* were observed occasionally over the entire survey area. A number of unidentified flatfish were noted actively swimming just off the substrate surface or resting on the debris. A school of *Cymatogaster aggregata* followed me around the survey area.

Other than the typical, minor operational debris, some man-made debris was observed directly in front of the fill rock structure. It consisted of a variety of metal debris, such as roofing metal. A bulldozer track was also noted. No batteries, fuel tanks, or other potentially hazardous debris was observed.

Conclusion:

Despite the location of this bark deposit in a shallow bay with apparently no tidal currents, it has no obvious signs of habitat health problems. The species abundance, diversity, and health appeared to be the same on the fringes of the survey area as it was in the middle of the 100% bark zone. The most significant factor at this site is the deposition of silt. Having just two survey's worth of experience here, it is my opinion that the bark and silt are mixing at a rapid pace, compared to most LTFs I have surveyed and considering the large volume of wood transferred here.

If there are any questions regarding this report, please contact me at 907-826-3481 or by email at craigdiv@aptalaska.net. Thank you for allowing Craig's Dive Center to be of service.

Respectfully submitted,

Craig Sempert
Diver

November 9, 2000

TABLE 1
Transect Data

Transect/Sample Pt.	Depth from MLLW	Debris Depth (in)	Percent Coverage	Substrate Type
Ref. Pt.	6	T	T	Rk
315/1	1	0	0	Rk
315/2	+1	0	0	Rk
315/3	+5	0	0	Rk
315/4	+5	0	0	Rk
315/5	1	T	T	Rk
315/6	5	4	75	Rk, Sa
315/7	5	2	75	Sa, Gr
315/8	5	<1	25	Sa, Gr
315/9	6	2	75	Sa, Si
315/10	6	10	100	Sa, Si
315/11	7	10	100	Si, Sa
315/12	8	4	100	Si, Sa
315/13	7	1	75	Si, Sa
315/14	6	<1	25	Si, Sa
315/15	6	<1	10	Sa
345/1	10	<1	10	Rk
345/2	12	<1	50	Rk, Si
345/3	12	8	100	Si
345/4	12	13	100	Si
345/5	14	18	100	Si
345/6	18	18	100	Si
345/7	20	8	100	Si
345/8	21	8	75	Si
345/9	21	6	50	Si
345/10	21	6	50	Si
345/11	22	4	50	Si
345/12	22	4	50	Si
345/13	22	4	50	Si
345/14	23	4	50	Si
345/15	23	3	50	Si
345/16	24	3	50	Si
345/17	25	1	25	Si
345/18	26	1	10	Si

TABLE 1 (cont.)
Transect Data

Transect/Sample Pt.	Depth from MLLW	Debris Depth (in)	Percent Coverage	Substrate Type
015/1	9	10	100	Si
015/2	12	4	100	Si
015/3	13	6	100	Si
015/4	16	12	100	Si
015/5	18	8	100	Si
015/6	19	8	90	Si
015/7	20	8	90	Si
015/8	20	8	75	Si
015/9	20	6	50	Si
015/10	21	3	25	Si
015/11	21	2	25	Si
015/12	21	1	25	Si
015/13	21	1	25	Si
045/1	8	12	100	Si
045/2	10	8	100	Si
045/3	13	10	100	Si
045/4	15	10	100	Si
045/5	15	10	100	Si
045/6	17	8	100	Si
045/7	18	8	90	Si
045/8	19	4	50	Si
045/9	20	4	50	Si
045/10	20	3	50	Si
045/11	20	2	25	Si
045/12	20	1	25	Si
045/13	20	1	10	Si
045/14	20	1	10	Si
075/1	7	15	100	Si
075/2	8	4	100	Si
075/3	10	8	100	Si
075/4	12	10	100	Si
075/5	12	12	100	Si
075/6	13	16	100	Si
075/7	15	13	100	Si
075/8	16	13	100	Si
075/9	17	9	90	Si
075/10	17	8	90	Si
075/11	18	6	75	Si

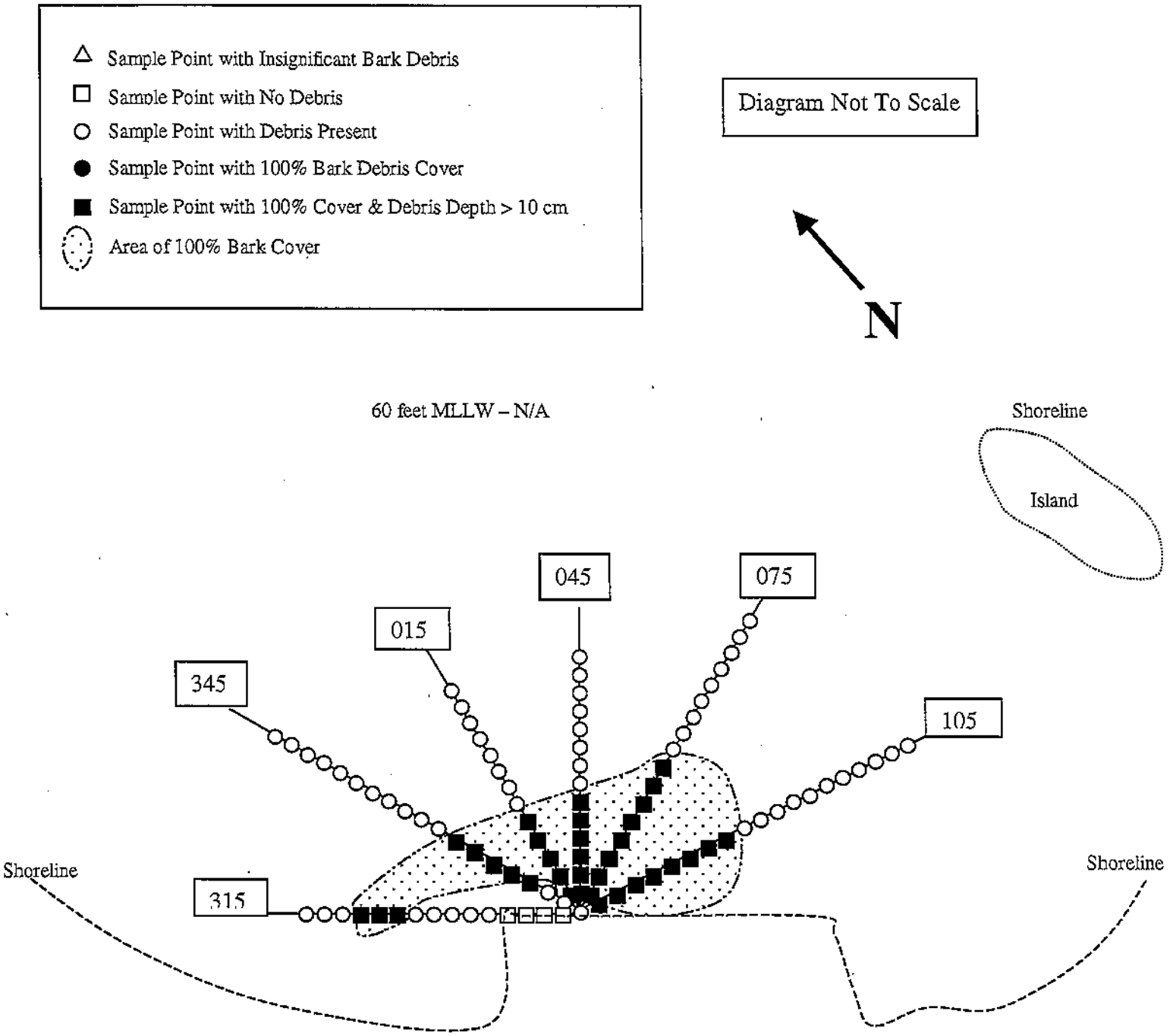
TABLE 1 (cont.)
Transect Data

Transect/Sample Pt.	Depth from MLLW	Debris Depth (in)	Percent Coverage	Substrate Type
075/12	19	6	75	Si
075/13	19	4	50	Si
075/14	19	2	25	Si
075/15	19	2	25	Si
075/16	19	2	25	Si
075/17	19	2	25	Si
105/1	5	8	100	Rk, Si
105/2	5	13	100	Si, Gr
105/3	5	6	100	Si, Gr
105/4	5	4	100	Si, Gr, Rk
105/5	4	4	100	Si, Gr, Rk
105/6	7	19	100	Si, Gr
105/7	8	17	100	Si
105/8	10	20	100	Si
105/9	11	10	90	Si
105/10	12	6	75	Si
105/11	13	4	50	Si
105/12	14	3	50	Si
105/13	15	2	50	Si
105/14	15	2	50	Si
105/15	15	2	25	Si
105/16	15	2	25	Si
105/17	16	1	25	Si
105/18	16	1	25	Si, Gr
105/19	16	<1	10	Si, Gr

Key to Substrate Type	
Brk	Bedrock
Gr	Gravel
Rk	Rock
Sa	Sand
Sh	Shell
Si	Silt

Table 2

Species Abundance L = Low C = Common A = Abundant		
Scientific Name	Common Name	Abundance
Plants		
Chrysophyta spp.	Diatoms	C
Monostroma/Ulva spp.	Green algae	L
Rhodophyta spp.	Foliose red algae	L
Laminaria saccharina	Sugar kelp	L
Invertebrates		
Cribrinopsis fernaldi	Crimson anemone	L
Metridium spp.	Anemone	L
Lottiidae spp.	Limpet	L
Polyplacophora spp.	Chiton	L
Flabellina sp.	Nudibranch	L
Clinocardium nuttallii	Cockle	L
Tresus nuttallii	Horse clam	L
Evasterias troschelii	False-ochre star	L
Pycnopodia helianthoides	Sunflower star	L
Parastichopus californicus	Sea cucumber	L
Cancer magister	Dungeness crab	L
Oregonia gracilis	Decorator crab	L
Pandalus spp.	Shrimp	L
Balanus sp.	Barnacle	L
Pagurus spp.	Hermit crab	L
Hyas lyratus	Lyre crab	L
Vertebrates		
Lumpenus sagitta	Pacific snake prickleback	L
Platichthys stellatus	Starry flounder	L
Pholis spp.	Gunnel	L
Cymatogaster aggregata	Shiner perch	L
Pleuronectidae spp.	Righteye flounders	L

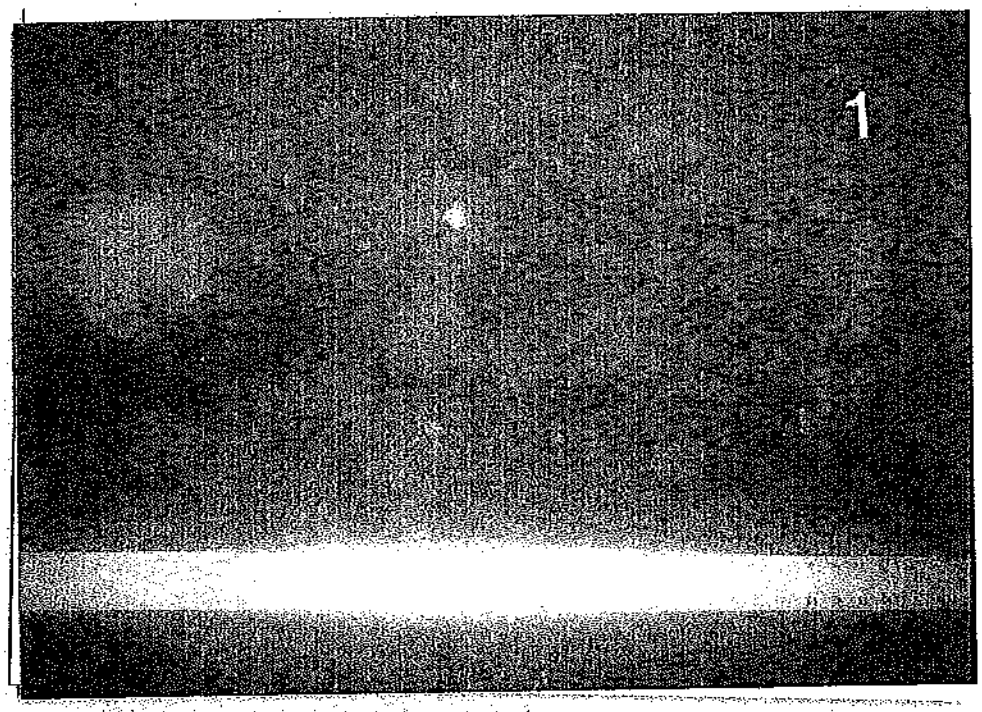


8/12/00 Whale Pass LTF Dive Survey

Photograph Key		
Photo Number	**Transect/ Sample Pt.**	**Description**
1	Reference Point	Edge of fill rock slope
2	345/1	High kelp cover on rocks
3	345/2	High kelp cover on metal debris
4	345/3	Silt covered 100% bark layer
5	345/4	Silt covered 100% bark layer
6	345/5	Sea star, some kelp on 100% bark layer
7	345/6	More silt, branch and sea cucumber on debris
8	345/7	More silt with debris
9	345/8	More silt mixed in with bark
10	345/9	Diatom layer on silt/bark mix
11	345/13	Anemone, large bark chunks on surface of mix
12	345/16	Fewer bark chips on surface of mix
13	345/17	Less bark in silt
14	045/1	Diatoms and silt on bark layer
15	045/2	Diatoms and silt on bark layer
16	045/3	Diatoms and silt on bark layer
17	045/4	Dungeness crab, large bark chunks on bark layer
18	045/5	Metal strip on bark/silt
19	045/6	Diatoms and silt on bark layer
20	045/7	Diatoms and silt on bark layer
21	045/8	Less bark in silt
22	045/9	Less bark in silt
23	045/10	Kelp attached to bark chunk
24	045/11	Less bark in silt
25	045/13	Less bark in silt
26	105/1	High kelp cover on rocks
27	105/2	Diatoms and silt on bark layer
28	105/4	Kelp on bark and metal debris
29	105/5	Kelp on bark and metal debris
30	105/6	Kelp, shell on surface of 100% bark
31	105/7	Diatoms and silt on bark layer

Photograph Key (cont.)		
Photo Number	**Transect/ Sample Pt.**	**Description**
32	105/8	Wire coil on debris
33	105/9	Sea star and diatoms on bark/silt mix
34	105/10	Bark/silt mix
35	105/11	Crab on surface of bark/silt mix

3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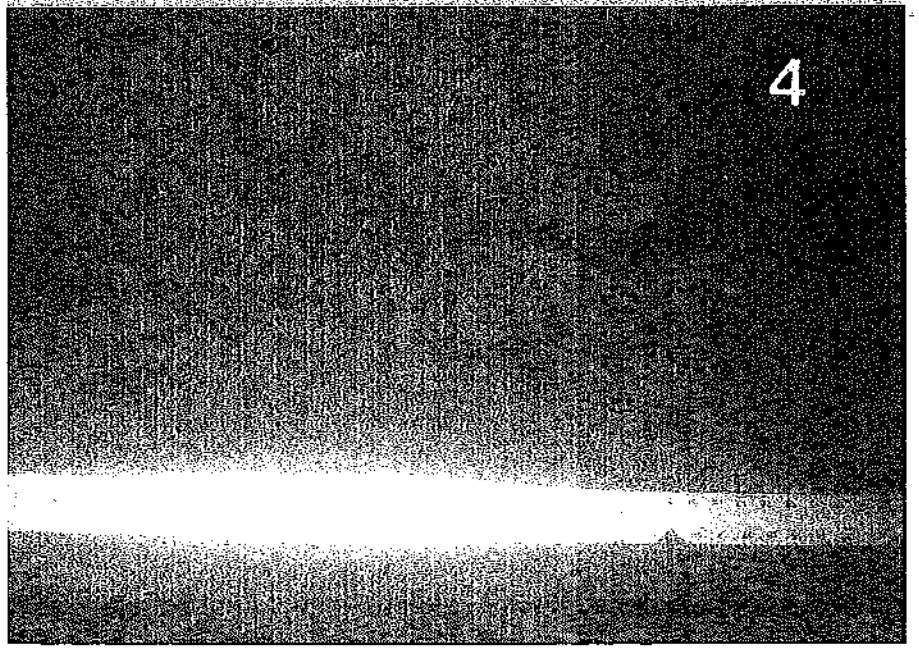
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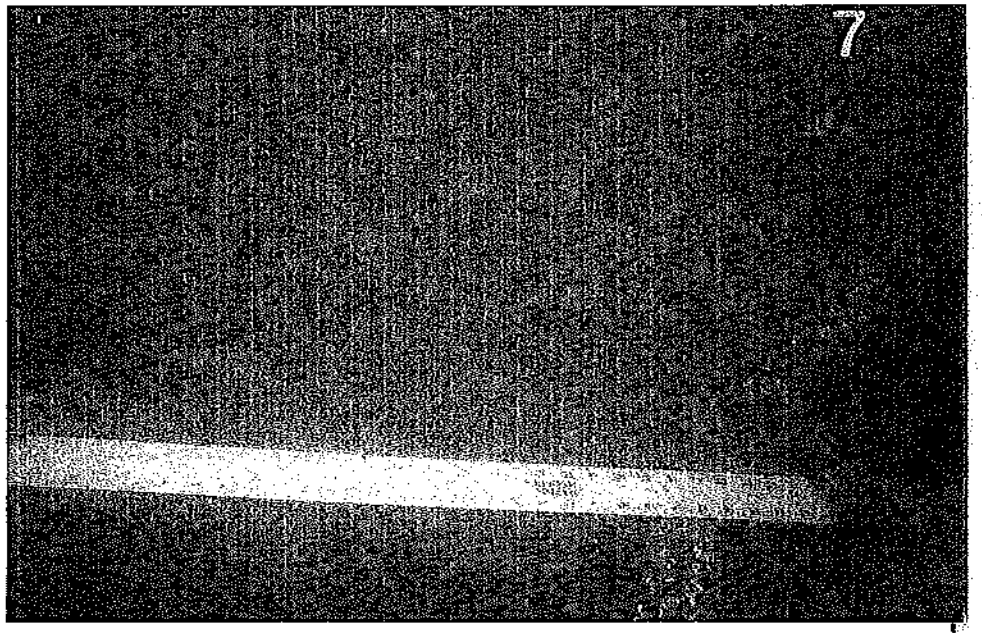
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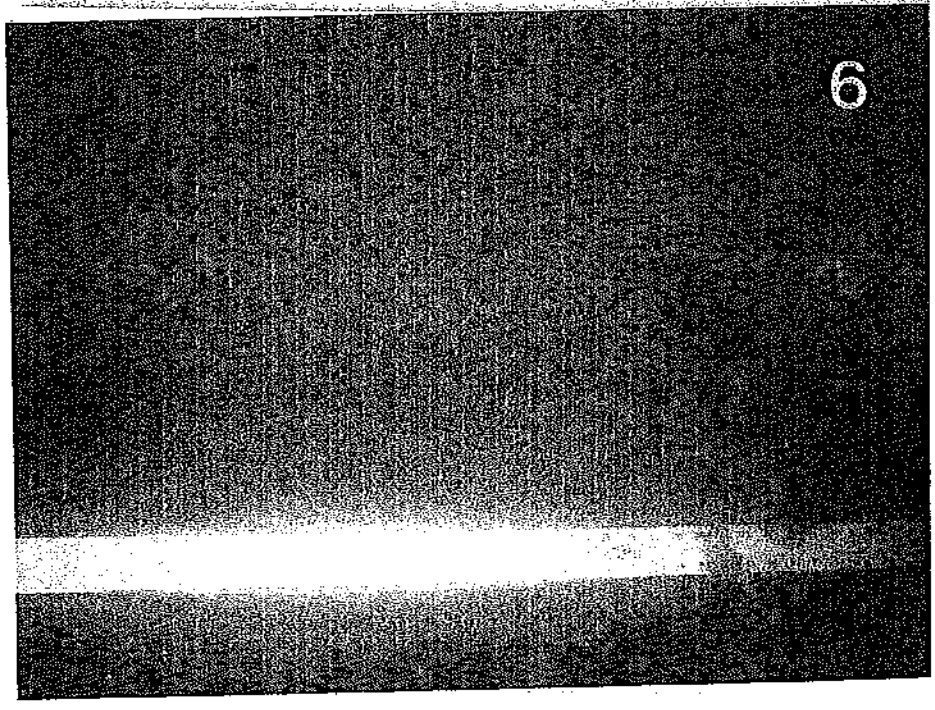
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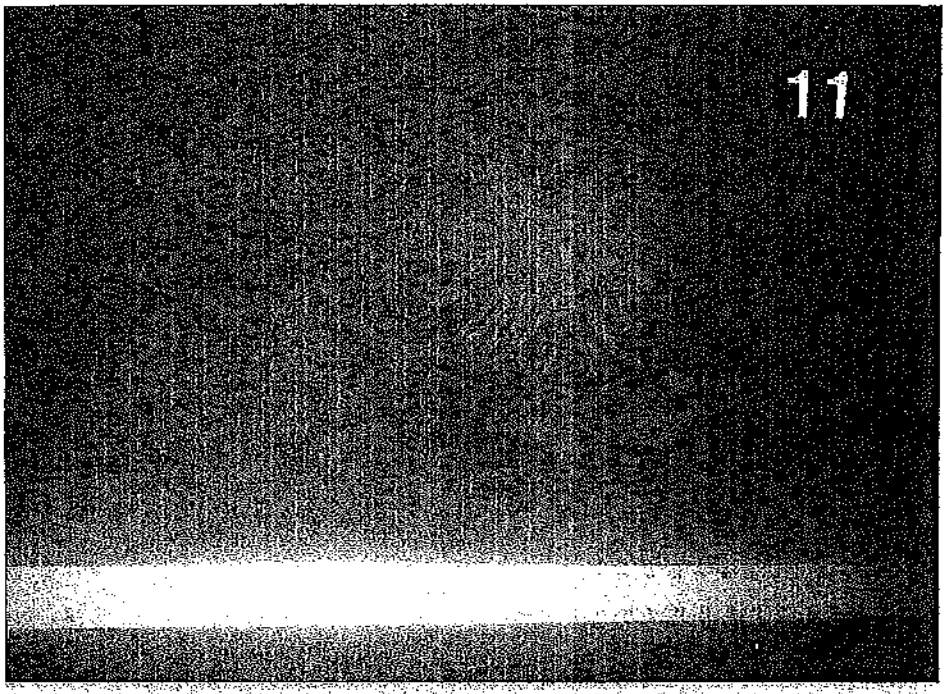
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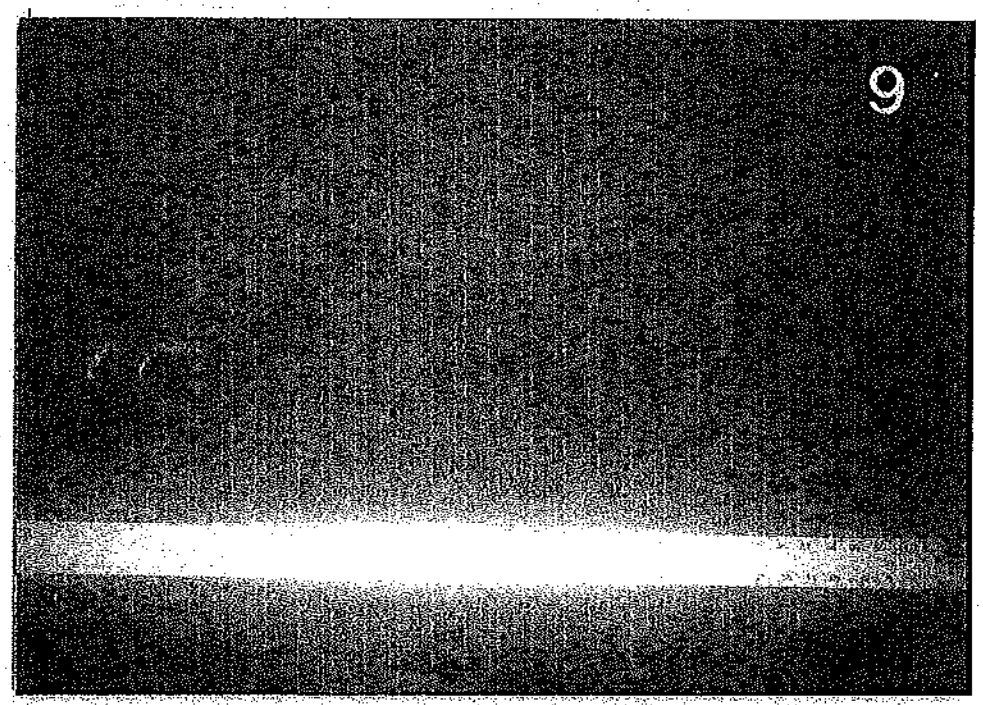
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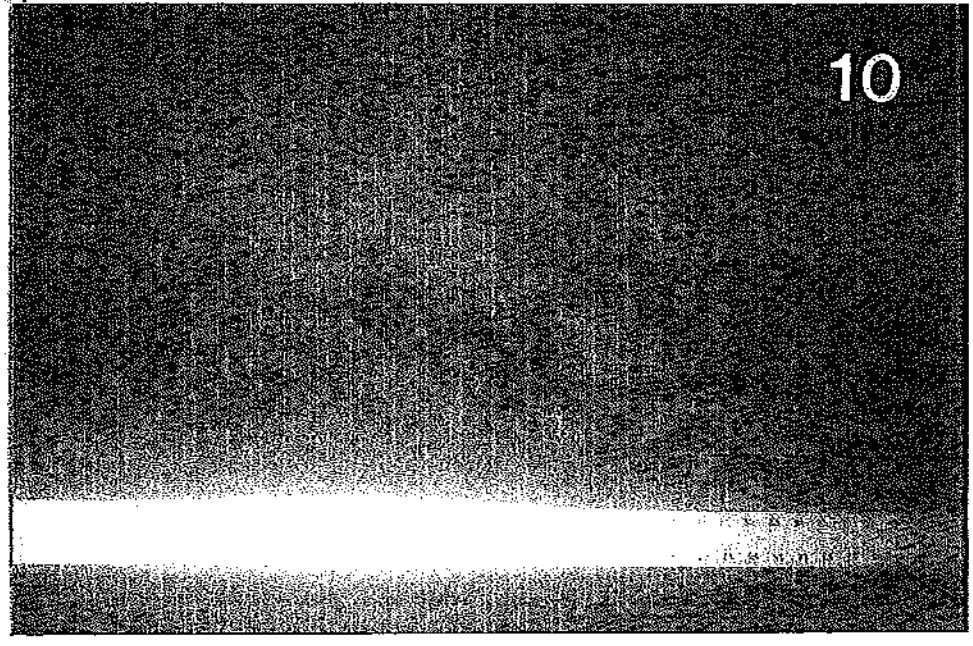
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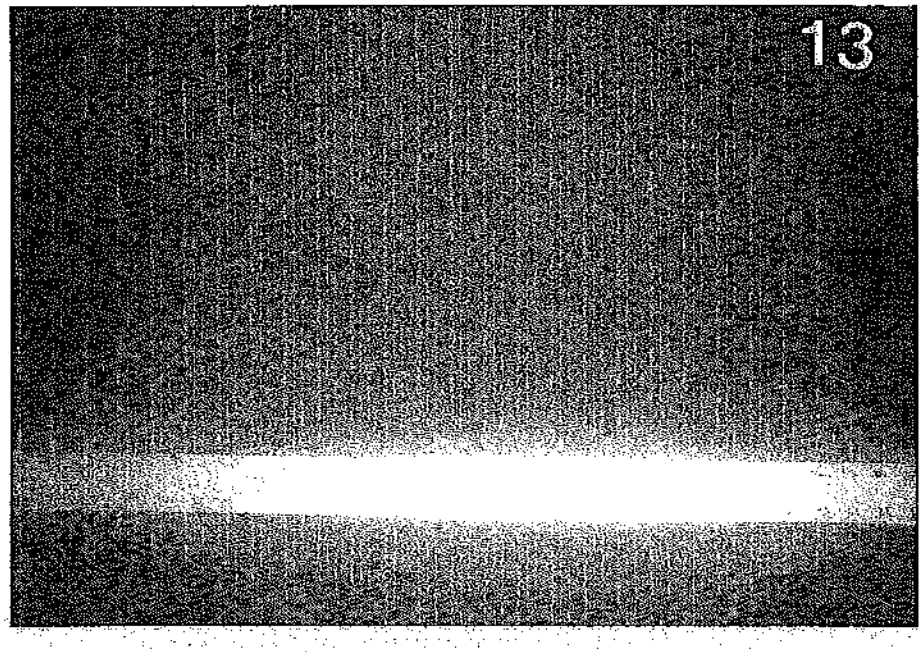
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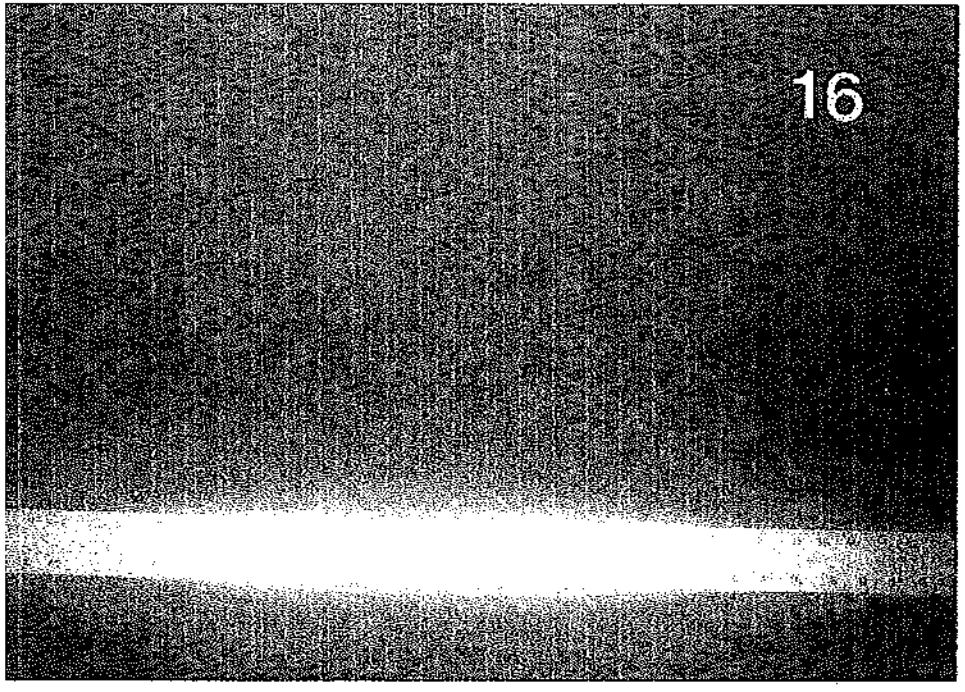
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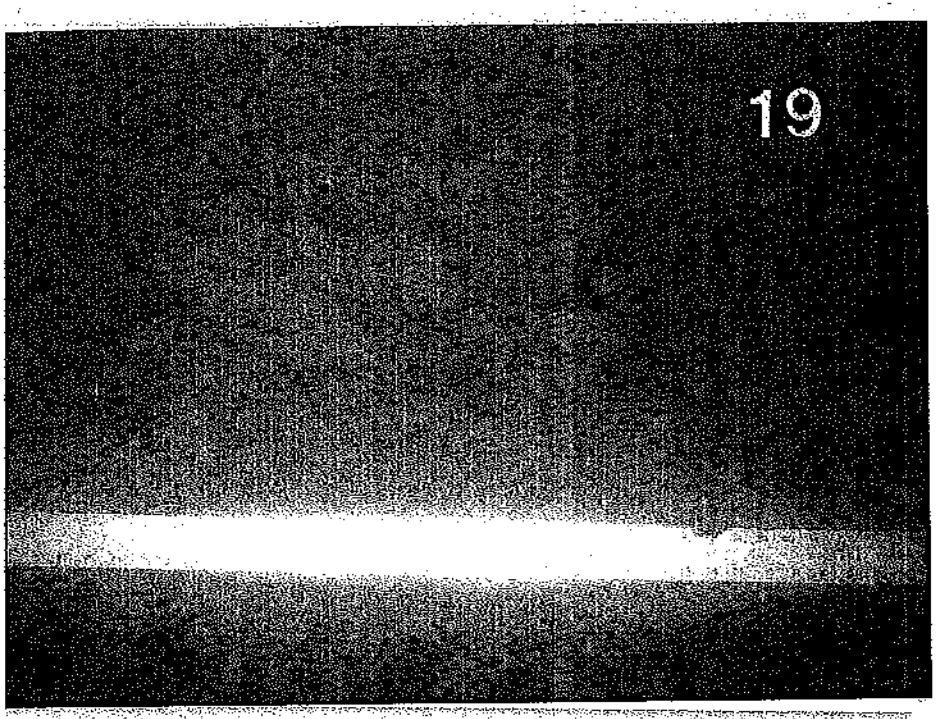
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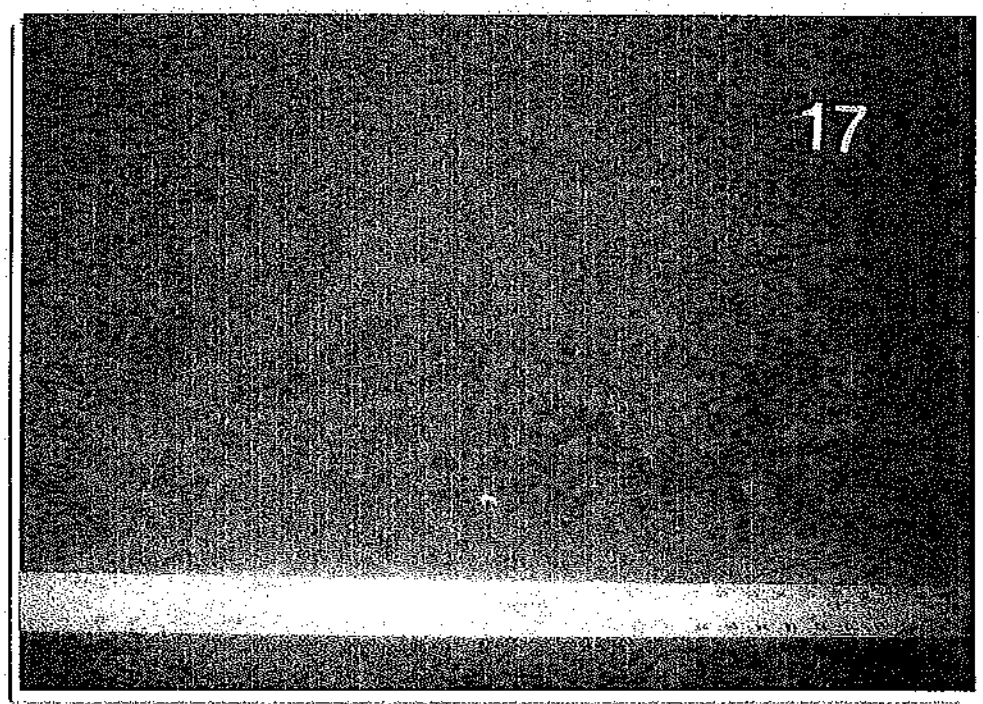
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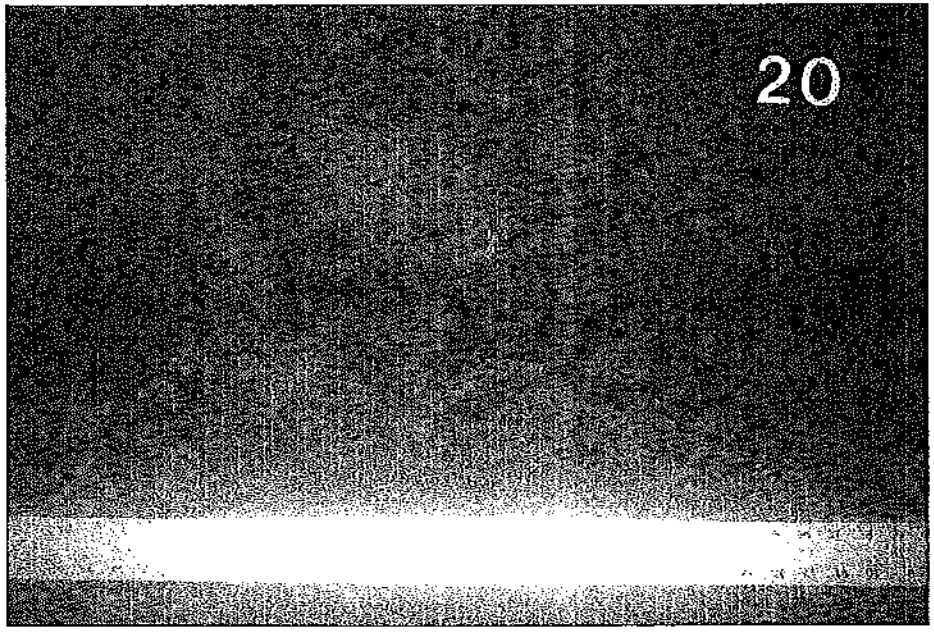
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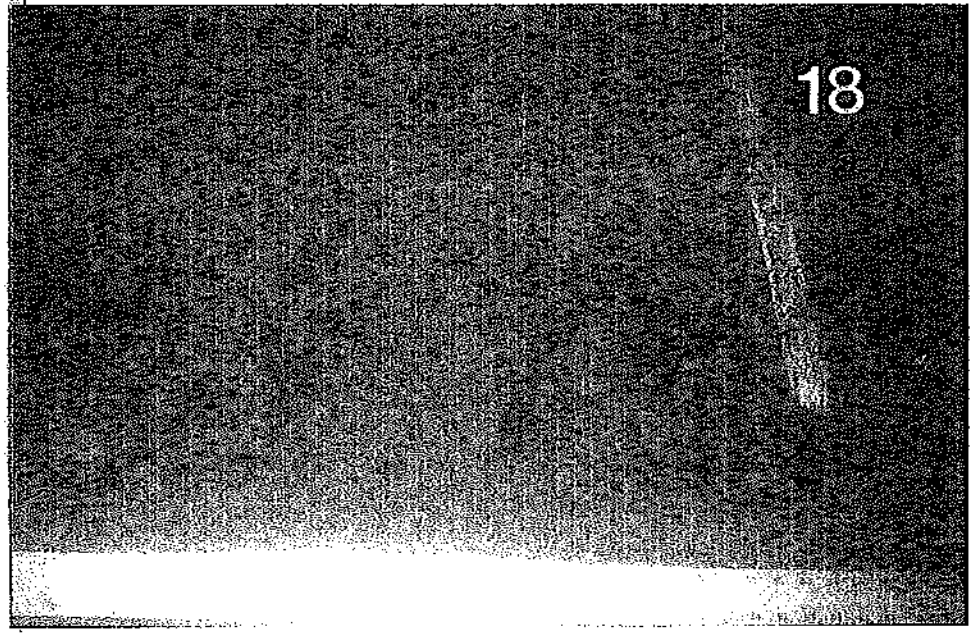
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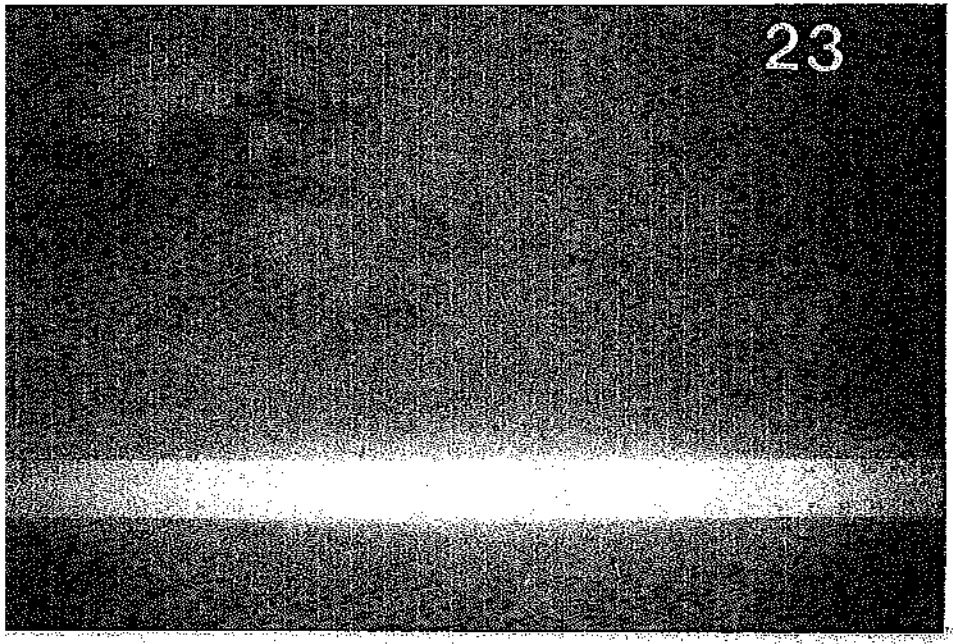
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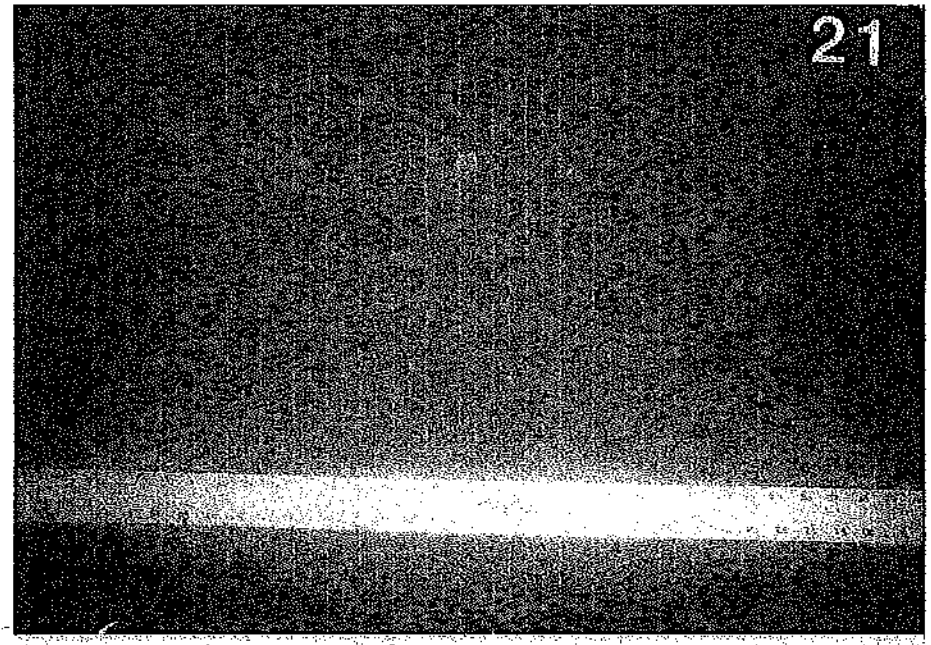
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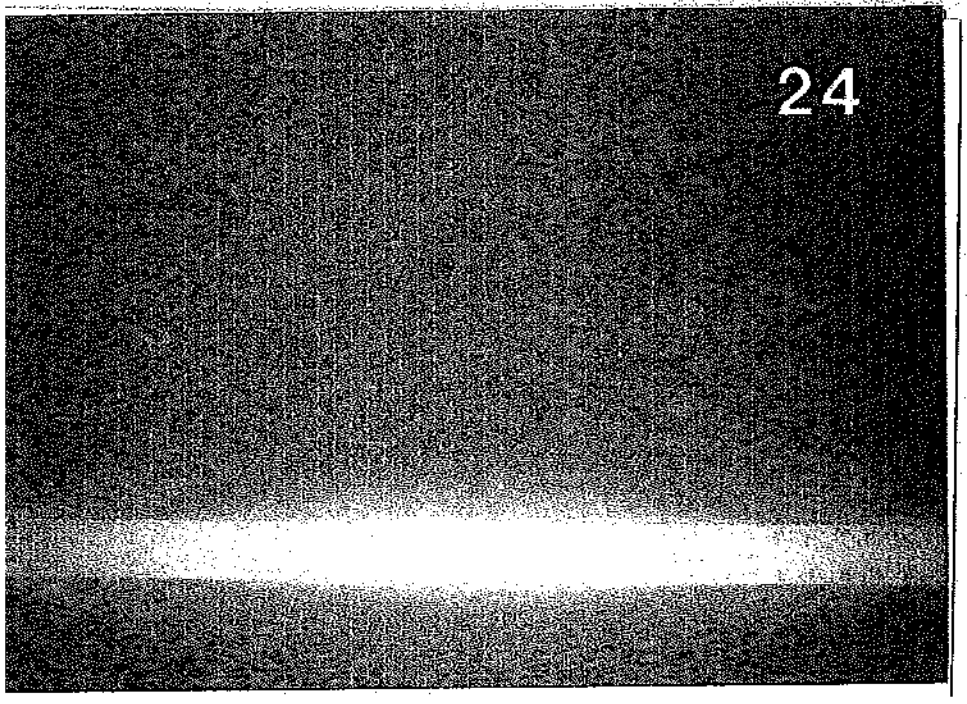
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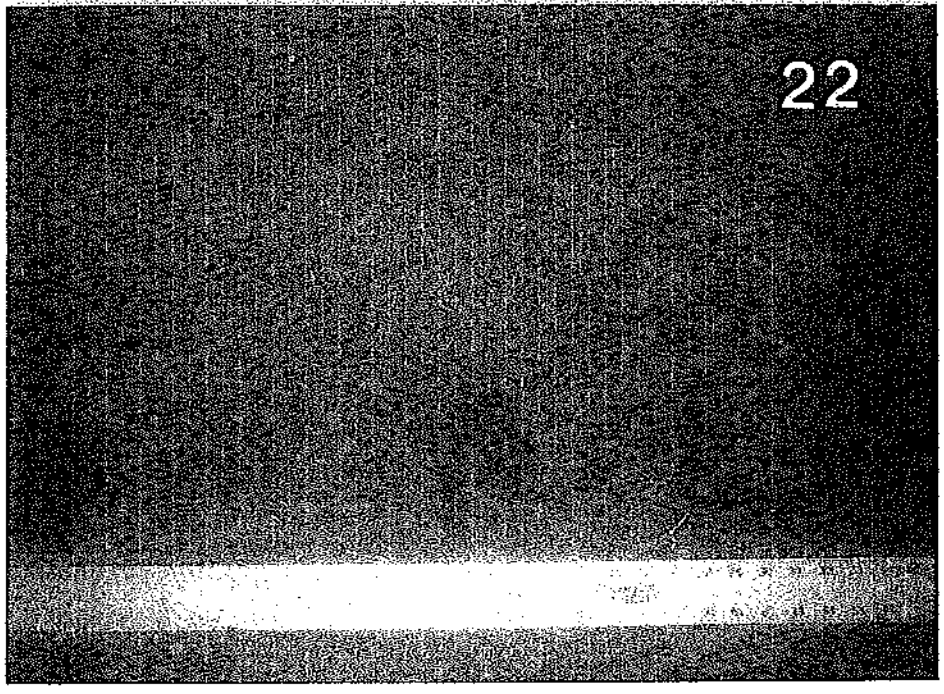
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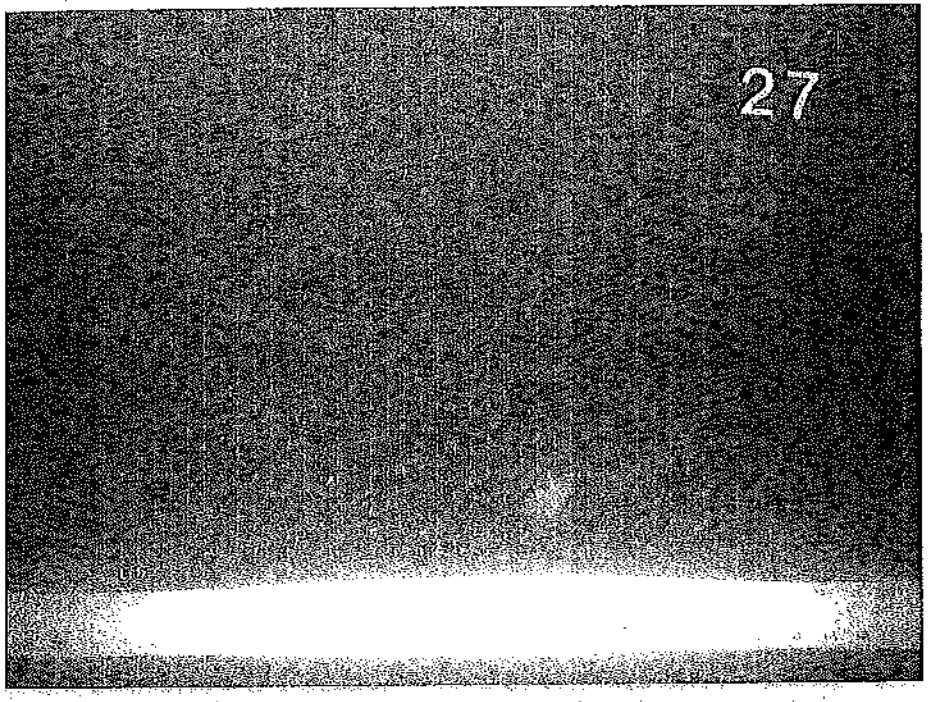
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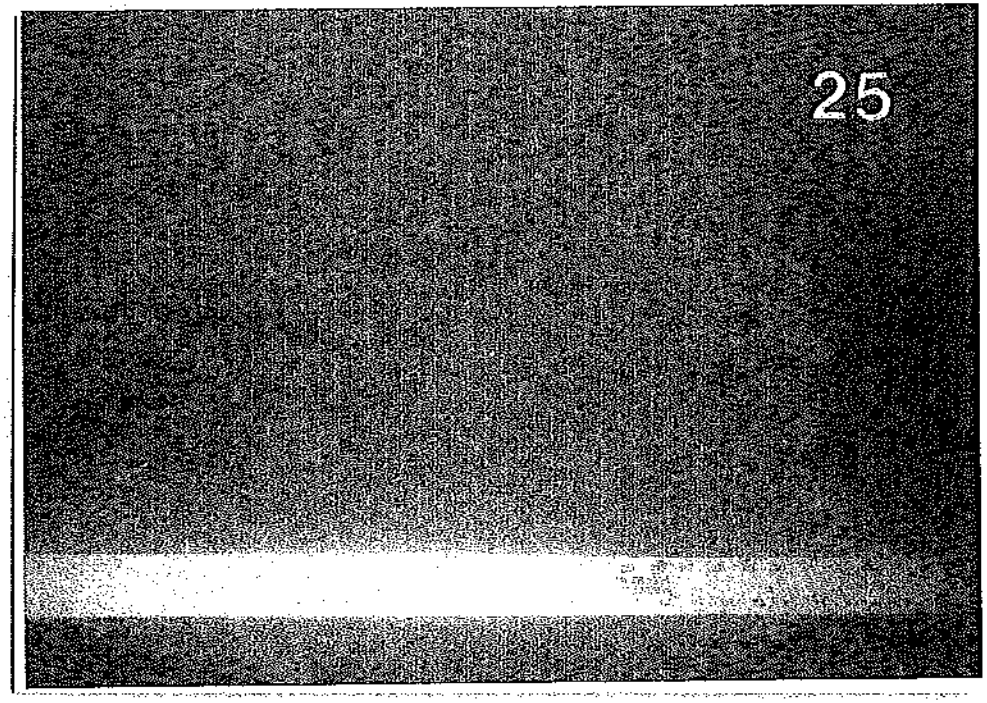
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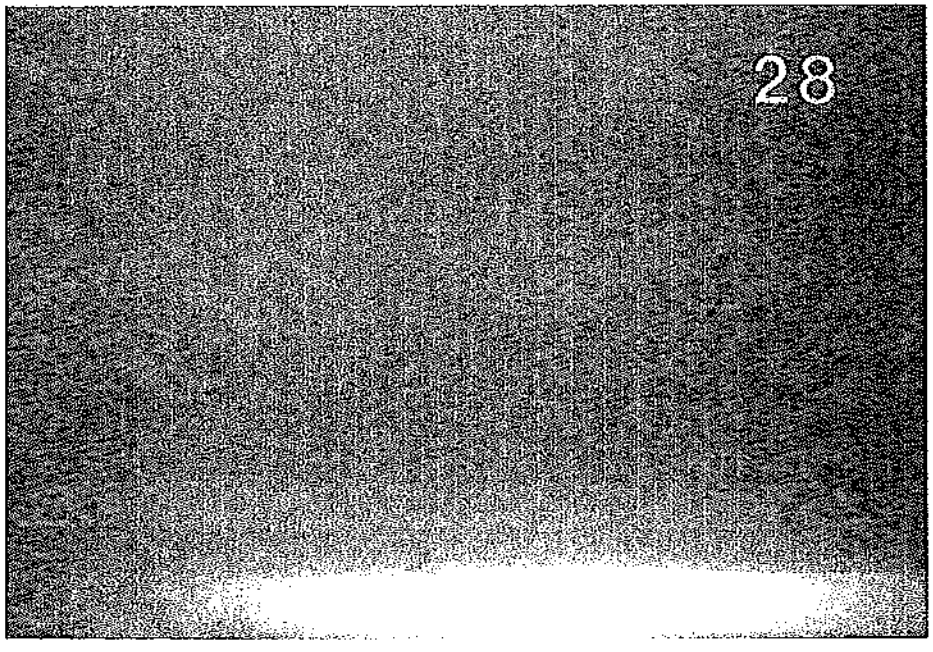
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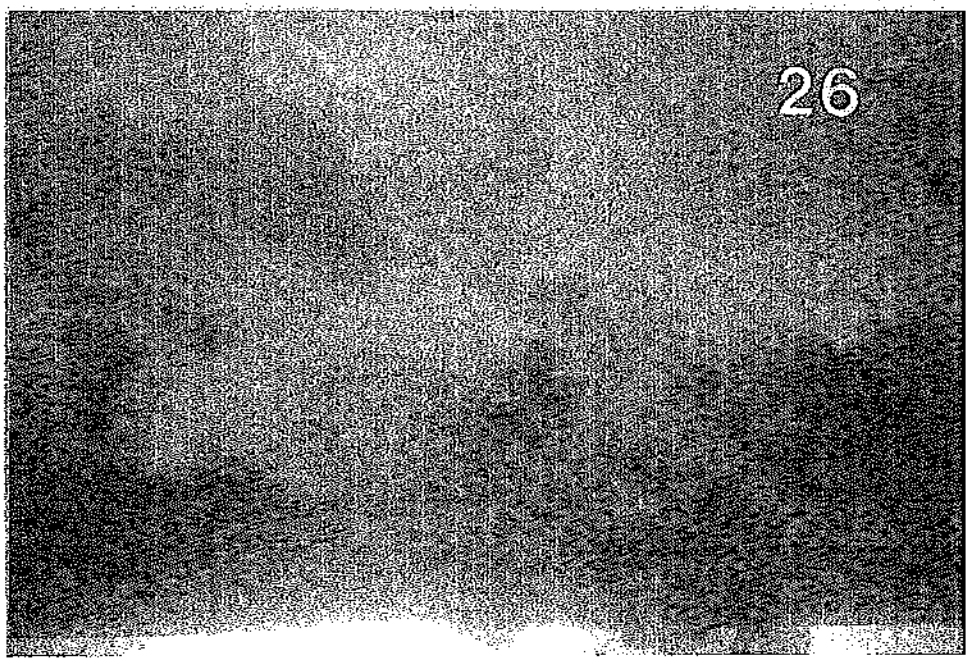
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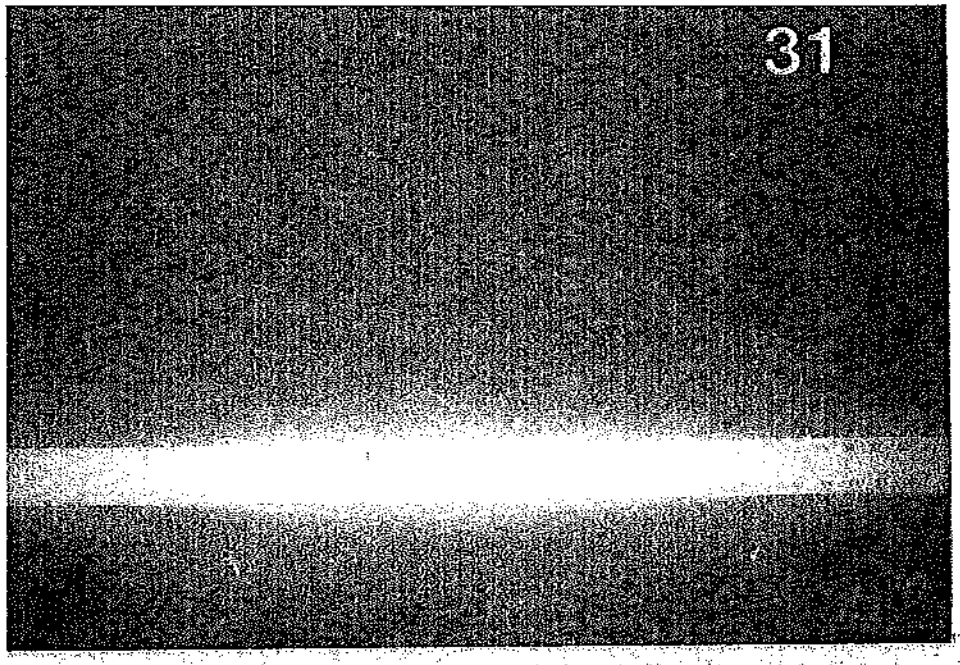
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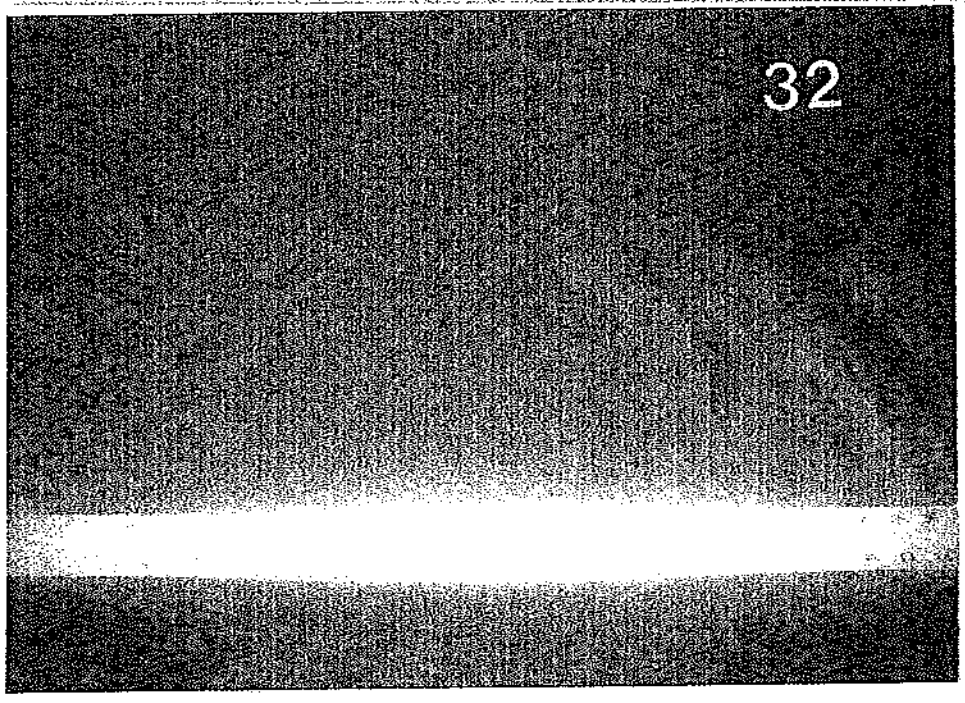
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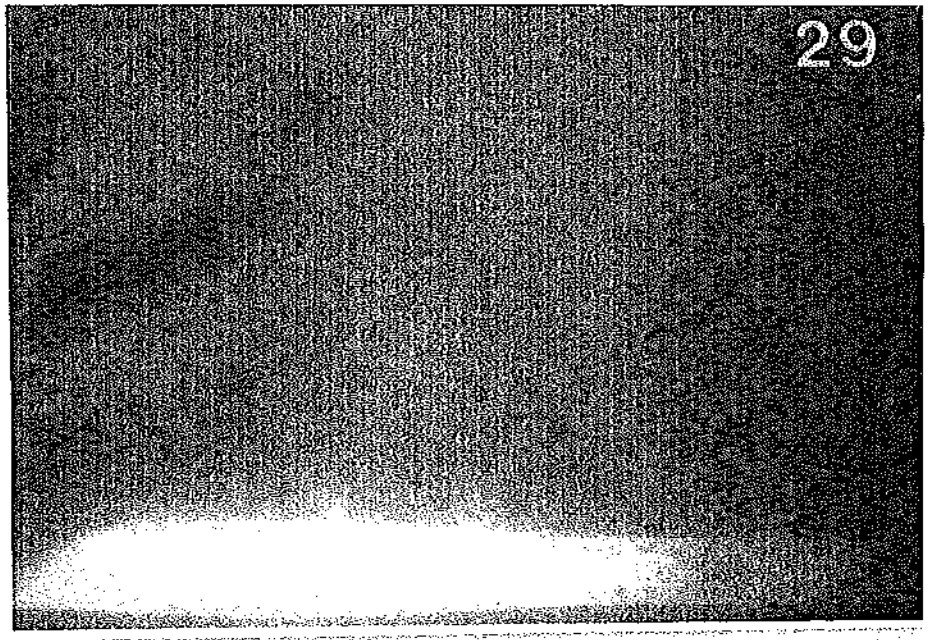
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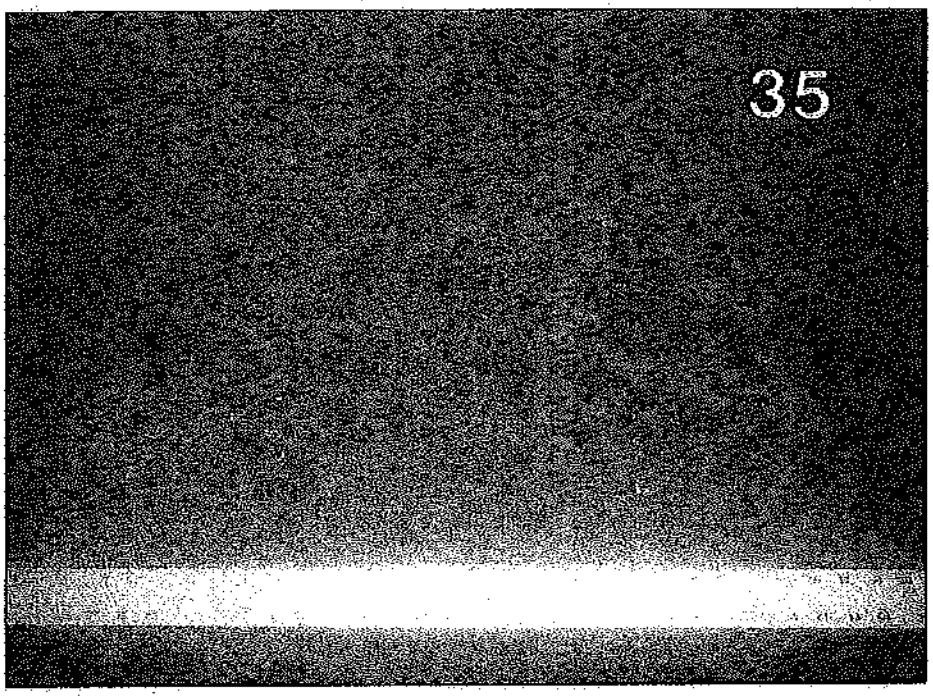
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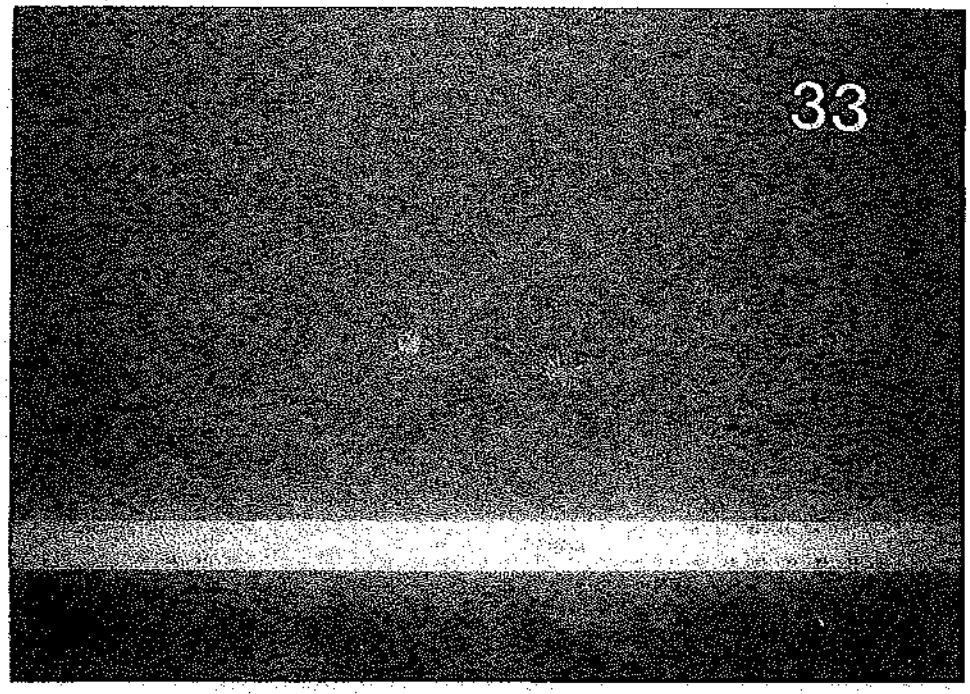
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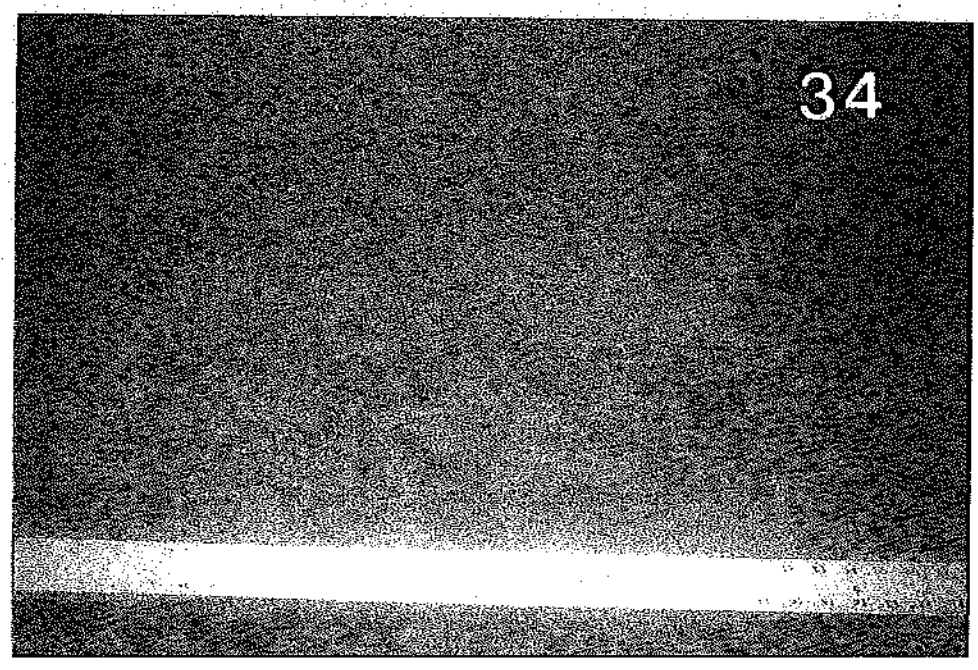
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