UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Carborne Radiometric Survey of the Nome Area, Seward Peninsula, Alaska

By

Robert A. Brooks and Warren I. Finch

Open-File Report 77-472

1977

Contents

Illustration

Carborne Radiometric Survey of the Nome Area, Seward Peninsula, Alaska

by Robert A. Brooks and Warren I. Finch

Abstract

A carborne radiometric survey was made along the accessible roads in the Nome, Alaska, area. The background radiation was generally found to be low, about 40 cps, but higher radioactivity near granite was noted. No radioactive anomalies of a magnitude greater than three times the average background were encountered.

INTRODUCTION

In order to quickly assess the radioactivity of the area around Nome in the southern Seward Peninsula, a carborne radiometric survey was made along the accessible roads. The survey was part of an assessment of the uranium and thorium resources in Alaska, conducted by the U.S. Geological Survey. The Seward Peninsula contains numerous radioactive occurrences. Many of these occurrences are summarized by Eakins (1975). Eakins concluded that the Seward Peninsula should still "be considered a possible source of radioactive materials" (1975, p. 142).

METHODS

Carborne radiometric traverses were conducted using a Mount Sopris Scintillation counter Model SC-132 and a Mount Sopris Strip Chart Recorder Model R-132. The scintillation counter was mounted on the dashboard of the vehicle, and the vehicle was driven at as constant a speed as possible along roads and trails. The output of the scintillation counter at a count-rate of one second was recorded on a strip-chart recorder that produces a series of small dots on pressure-sensitive recording paper; these dots have been connected by hand on the accompanying figures. The strip charts are keyed to U.S. Geological Survey 1:63,360 topographic maps, which the reader should obtain to use the strip charts. Traverse 1 is from Nome to Teller on the road shown on quadrangles Nome C-1, Nome C-2, Nome D-2, Teller A-3, and Teller B-3. Traverse 2 is from Nome to the Kougarok River on the road shown on quadrangles Nome C-1, Nome D-1, Solomon D-6, Bendeleben A-6, and Bendeleben B-6. Traverse 3 is from Nome to Jensens Camp on the road shown on quadrangle Nome C-1. Local geographic features are noted on the strip charts. Readings from the dashboard-mounted instrument are considerably reduced from what can be obtained by placing the instrument in contact with the roadway, rock, or soil. However, the amount of signal attenuation should be relatively constant over the area surveyed. Some outcrops were surveyed during foot traverses using the scintillation counter.

GENERAL GEOLOGY

The southern Seward Peninsula is composed primarily of Precambrian granite and metamorphic rocks, mostly graphitic siltite, slate, graywacke, and chloritic and marble schists. Some Precambrian mafic intrusions are present, as well as a thick sequence of Paleozoic carbonates. Rocks in the area are enriched in tin, tungsten, and gold and have lesser quantities of antimony, mercury, fluorine, lead, silver, and bismuth (Clark and others, 1974). Eakins (1975) considers the abundance of mineralized Precambrian rocks an indication of a possible source for radioactive materials. Detailed geological descriptions have been published (Sainsbury, 1972; Sainsbury and others, 1970; and Eakins, 1975).

RESULTS

Three reaverses were conducted (fig. 1). The background on all three traverses was between 30 and 50 counts per second (cps) (appendixes 1-3). On the Nome to Teller traverse (appendix 1), several areas had radioactivities greater than the background. These were Washington Creek, Sinuk River, and Crete Creek. Higher radioactivities near these drainages were partly due to the lack of tundra cover on the rocks and boulders along the river; however, along Crete Creek (also called Wooly Lagoon), boulders of light-gray granite having radioactivities on the outcrop of 300 cps were located. This granite is similar to that found on Cape Nome and described by White (White and others, 1953). White found that most of the radioactivity could be attributed to uranium and thorium in the accessory minerals, zircon and sphene, with only a minor contribution from allanite.

Along the Nome to Kougarok River traverse (appendix 2), the radioactivity was higher than background in the highlands around Salmon Lake, especially near Nugget Creek and around the Lutheran Camp and Crater Creek, northeast of Salmon Lake. These readings were also due to the presence of light-colored granite similar to that found at Crete Creek. No readings above background were encountered in float rock on the Nome to Jensens Camp traverse (appendix 3), although very slightly higher readings were noted along some of the creeks where the bedrock is exposed.

CONCLUSIONS

No radioactive anomalies of significant magnitude were encountered along the road traverses. However, the presence of high radioactivity of granites was confirmed. These granites could have acted as source rocks for sedimentary uranium deposits in nearby basins in the same manner that the Granite Mountains are hypothesized to be the source for the uranium in the Gas Hills and Crooks Cap districts in Wyoming (Rosholt and others, 1973).

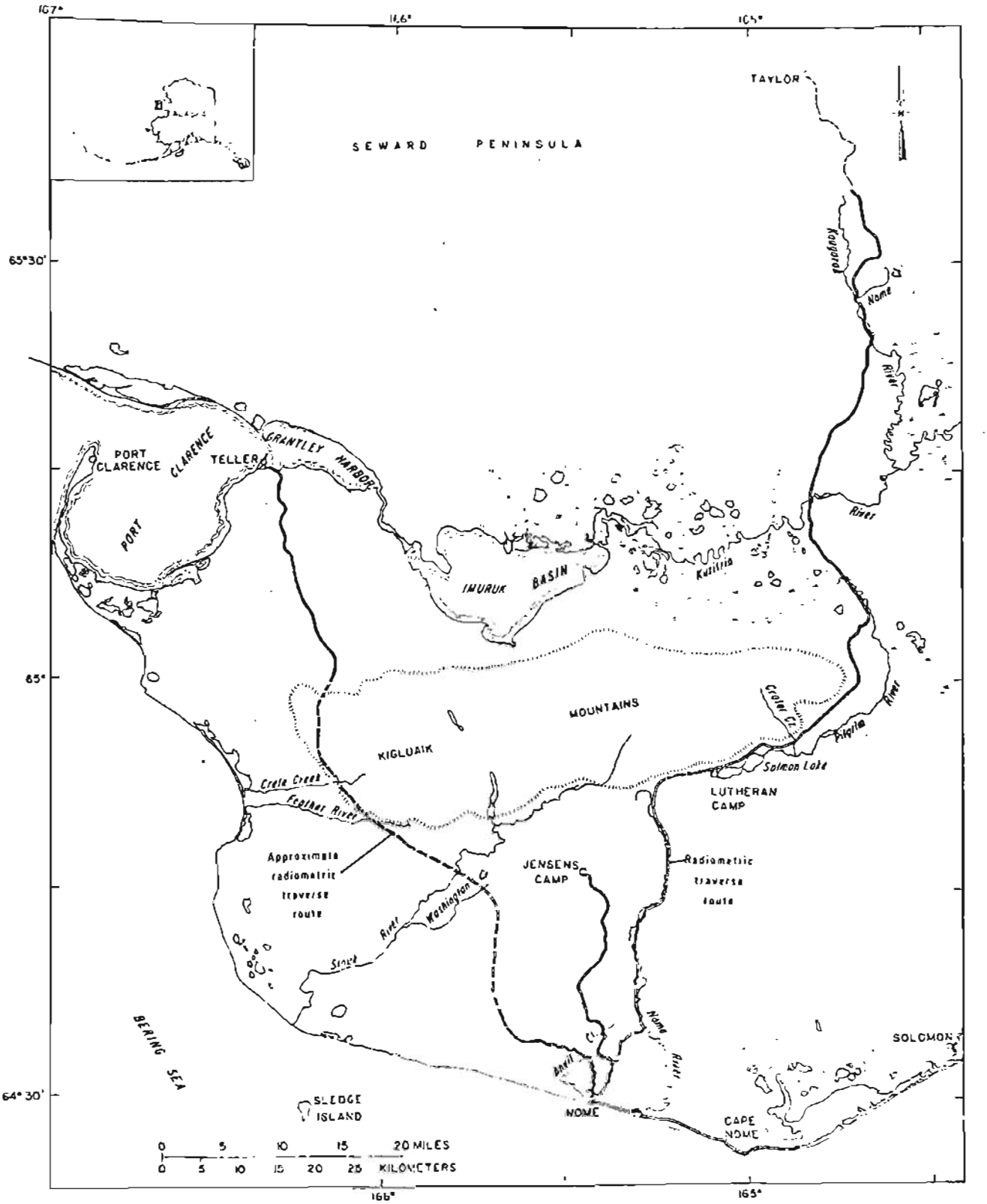


Figure 1.--Route of carborne radiometric traverses, Seward Peninsula, Alaska.

The possibility of high radioactivity zones at some distances from the roads is not ruled out by the carborne survey. Radiometric examination of potential host and source rocks and vein deposits should be conducted by airborne surveys.

REFERENCES

Clark, A. L., Berg, H. C., Cobb, E. H., Eberlin, G. D., MacKevett, E. M., Jr., and Miller, T. P., 1974, Metal provinces of Alaska: U.S. Geol. Survey Misc. Inv. Map I-834.

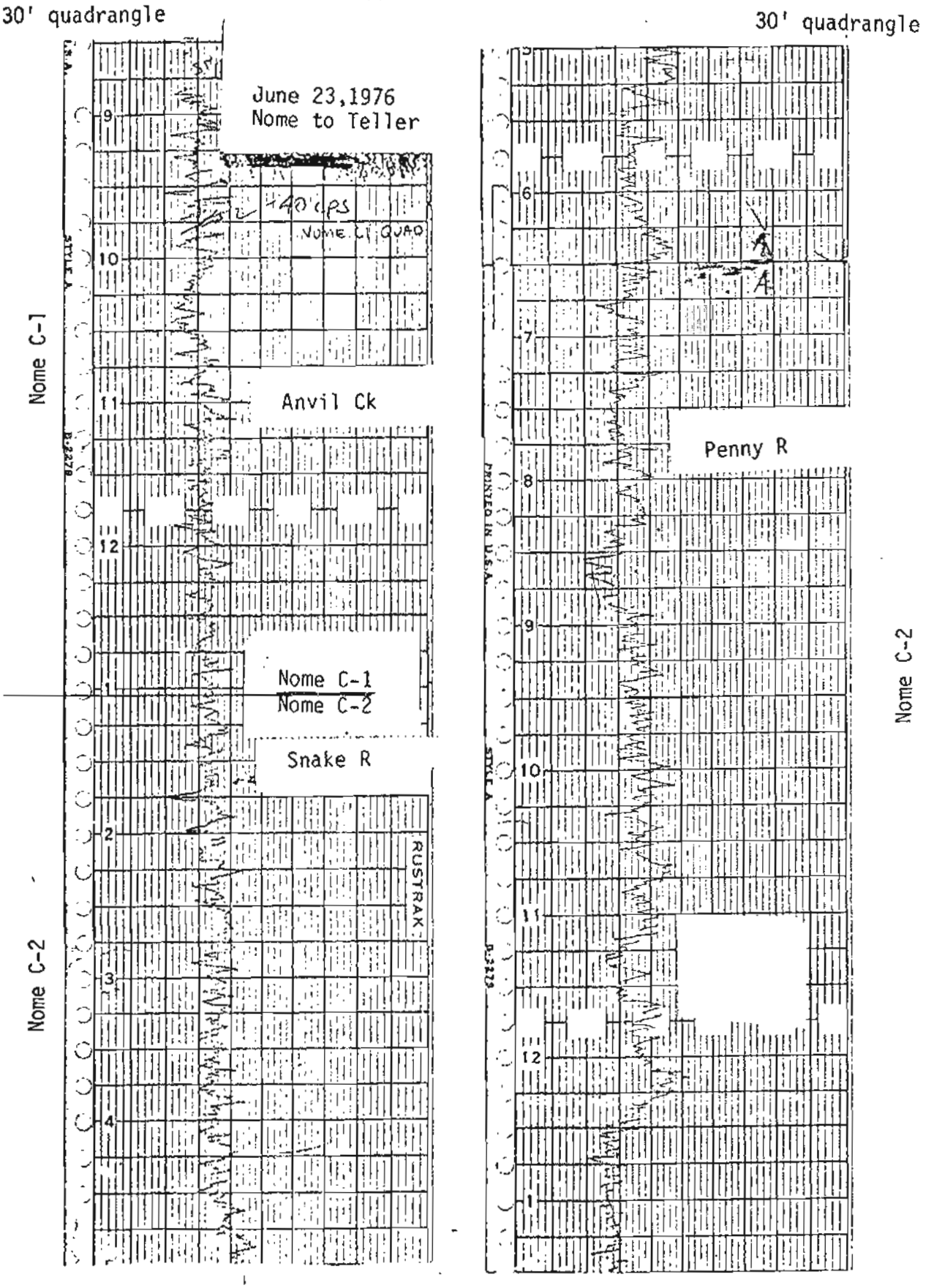
Eakins, G. R., 1975, Investigations of Alaska's uranium potential, V. 1: U.S. Energy Research and Develop. Admin. GJO-1627, 437 p.

Rosholt, J. N., Zartman, R. E., and Nkomo, I. T., 1973, Lead isotope systematics and uranium depletion in the Granite Mountains, Wyoming: Geol. Soc. America Bull., v. 84, p. 989-1002.

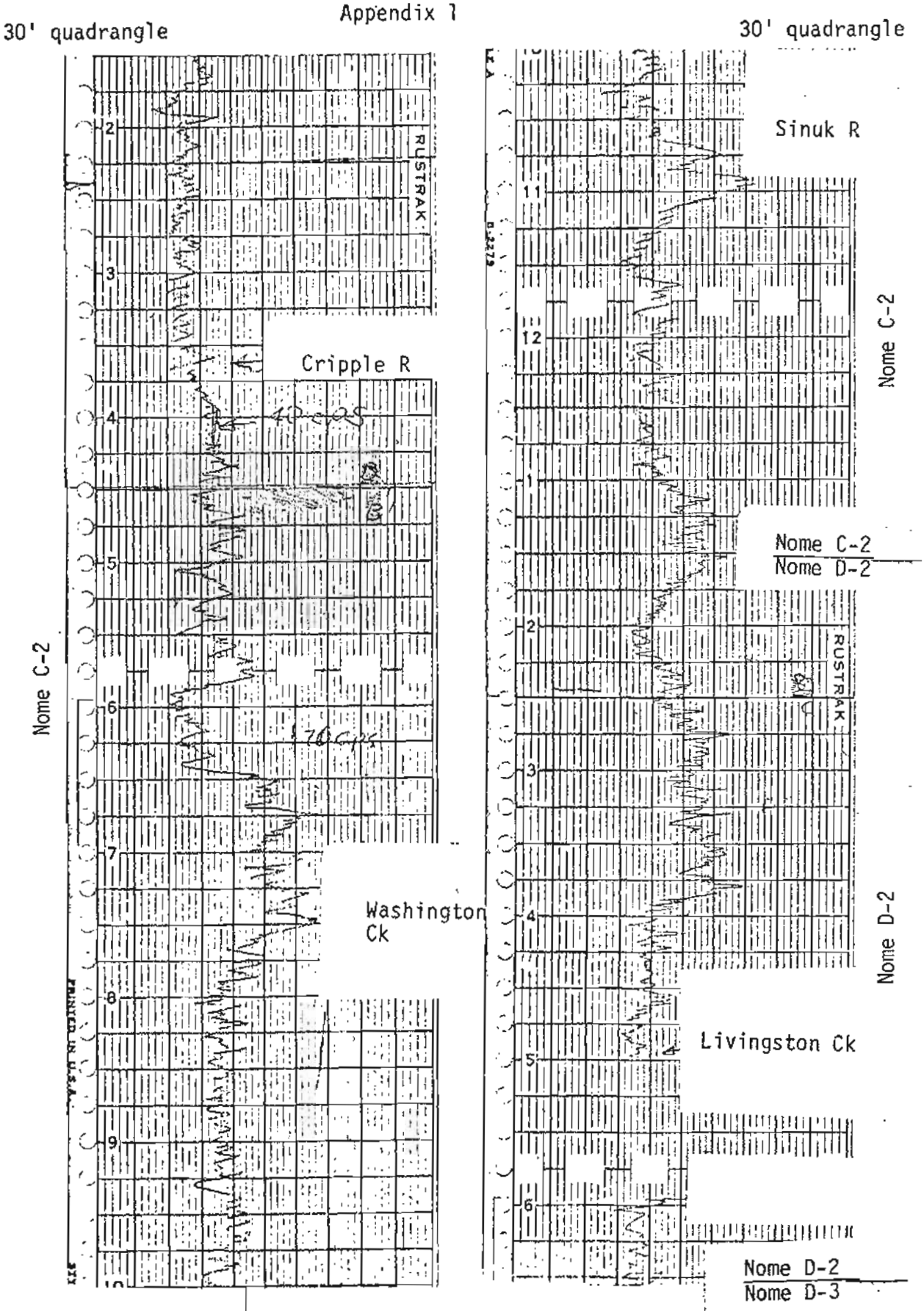
Sainsbury, C. L., 1972, Geologic map of the Teller quadrangle, western Seward Peninsula, Alaska: U.S. Geol. Survey Misc. Inv. Map I-685.

Sainsbury, C. L., Coleman, R. G., and Kachadoorian, Reuben, 1970, Blueschist and related greenschist facies rocks of the Seward Peninsula, Alaska, in Geological Survey research 1970: U.S. Geol. Survey Prof. Paper 700-B, p. B33-B42.

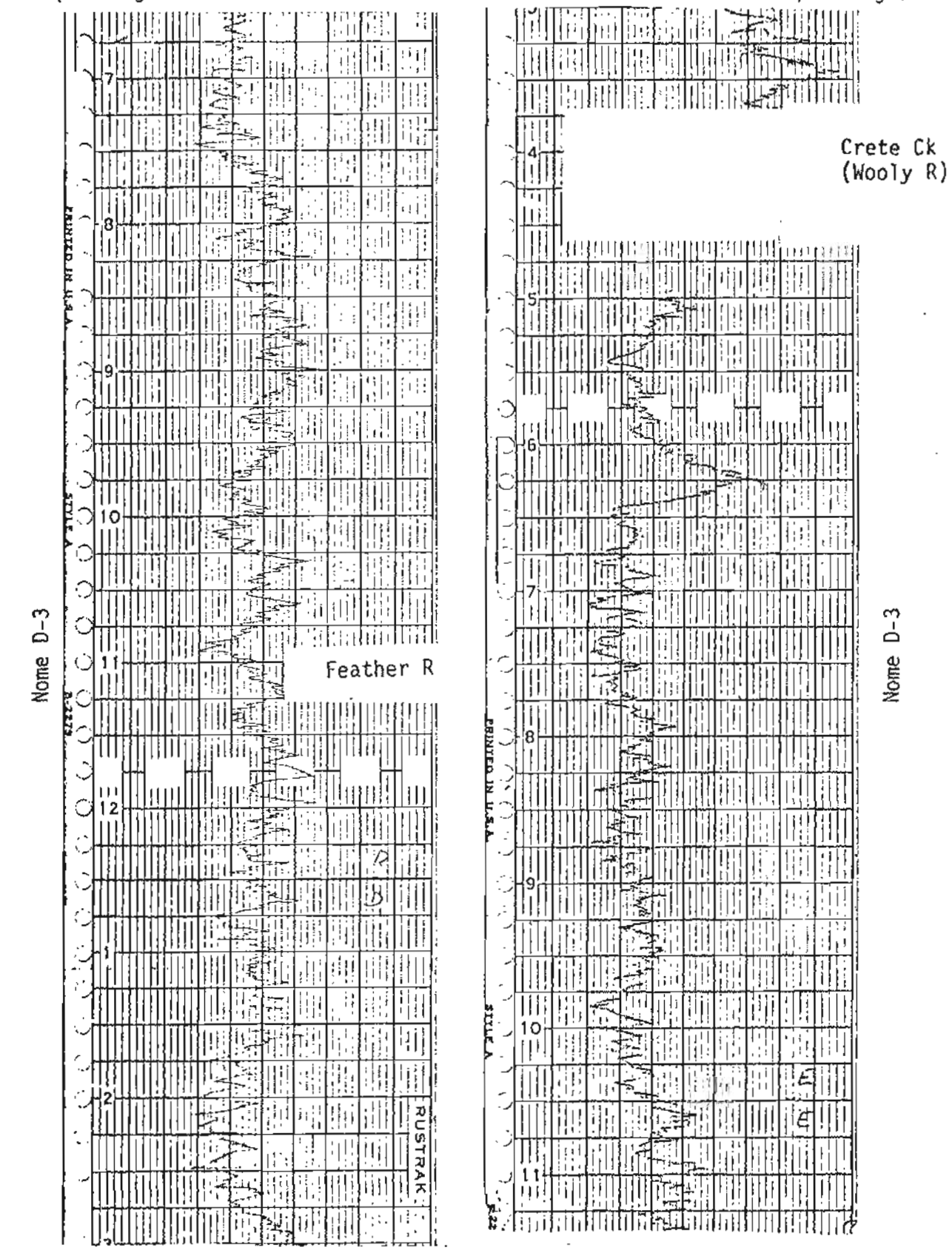
White, M. G., West, W. S., and Matzko, J. J., 1953, Reconnaissance for radioactive deposits in the vicinity of Teller and Cape Nome, Seward Peninsula, Alaska, 1946-1947: U.S. Geol. Survey Circ. 244, 8 p.

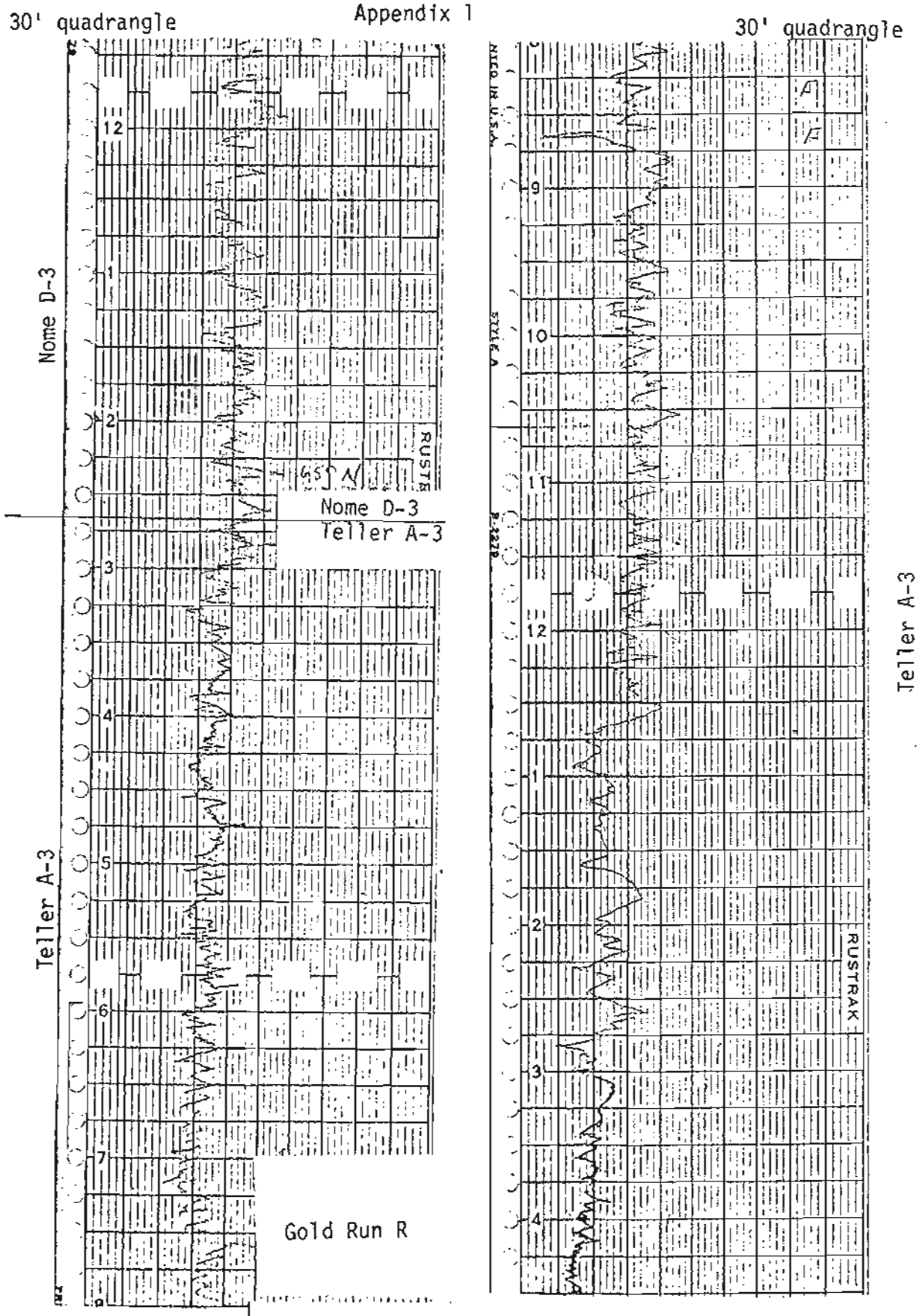

30' quadrangle
30' quadrangle
June 23,1976
Nome to Teller
140 cps
NOME C1 QUAD
Nome C-1
Anvil Ck
Penny R
Nome C-1
Nome C-2
Snake R
RUSTRAK
Nome C-2
Nome C-2
APPROXIMATE SCALE
0 25 50 75 100
counts per second

Appendix 1


30' quadrangle
30' quadrangle
Sinuk R
Cripple R
Nome C-2
Nome C-2
Nome C-2
Nome D-2
Nome D-2
Washington Ck
Livingston Ck
Nome D-2
Nome D-3
RUSTRAK
RUSTRAK
APPROXIMATE SCALE
0 25 50 75 100
counts per second

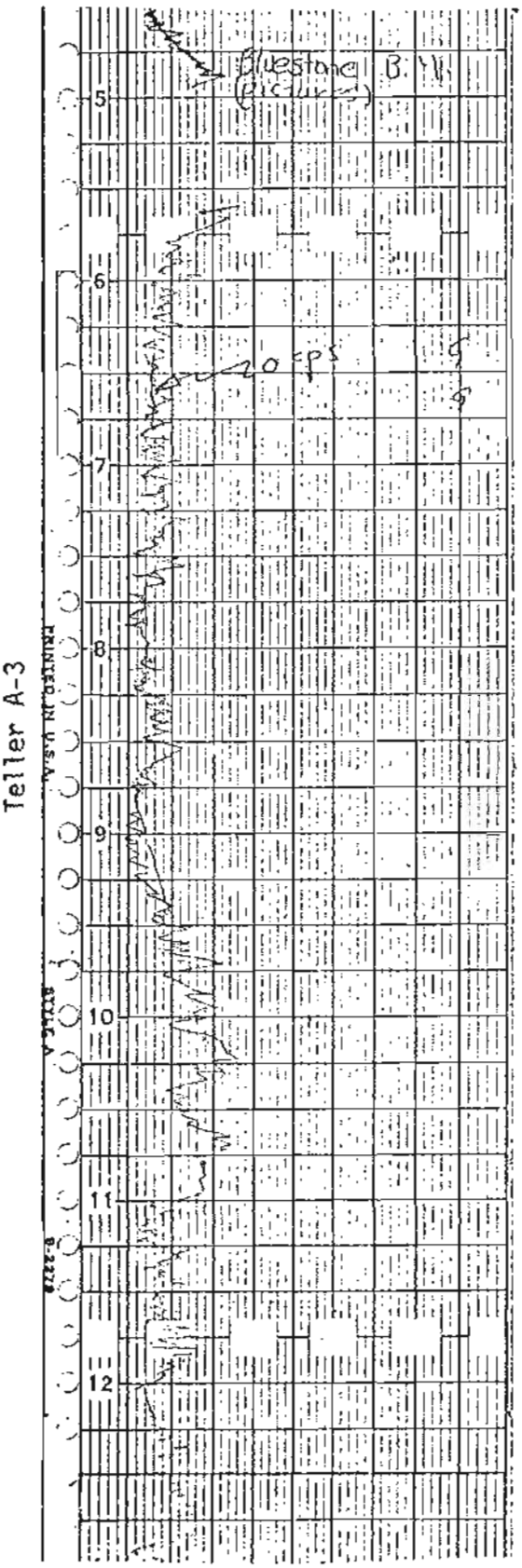
Appendix 1


30' quadrangle
30' quadrangle
Nome D-3
Feather R
Crete Ck
(Wooly R)
Nome D-3
RUSTRAK
APPROXIMATE SCALE
0 25 50 75 100
counts per second

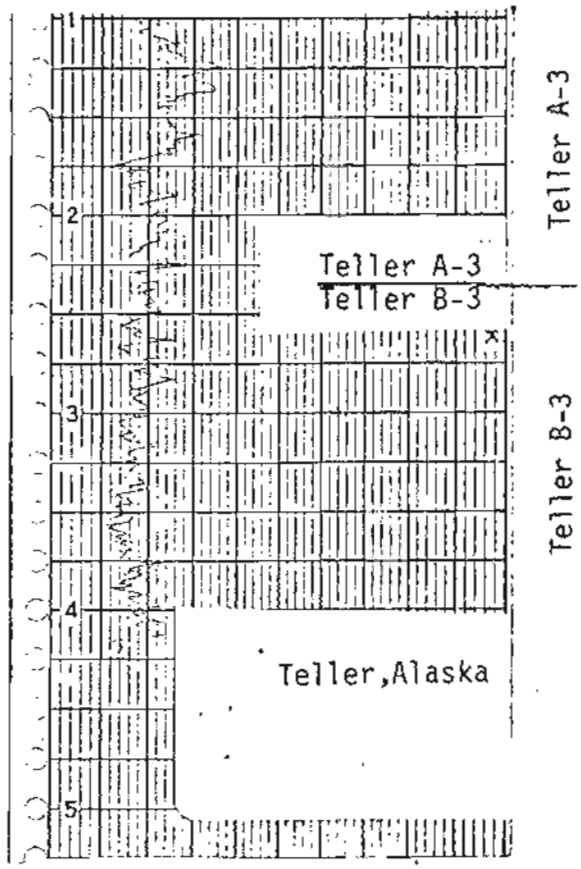

30' quadrangle
30' quadrangle
Nome D-3
Teller A-3
Nome D-3
Teller A-3
Teller A-3
Gold Run R
RUSTRAK
RUSTRAK
APPROXIMATE SCALE
0 25 50 75 100
counts per second

Appendix 1

30' quadrangle



30' quadrangle

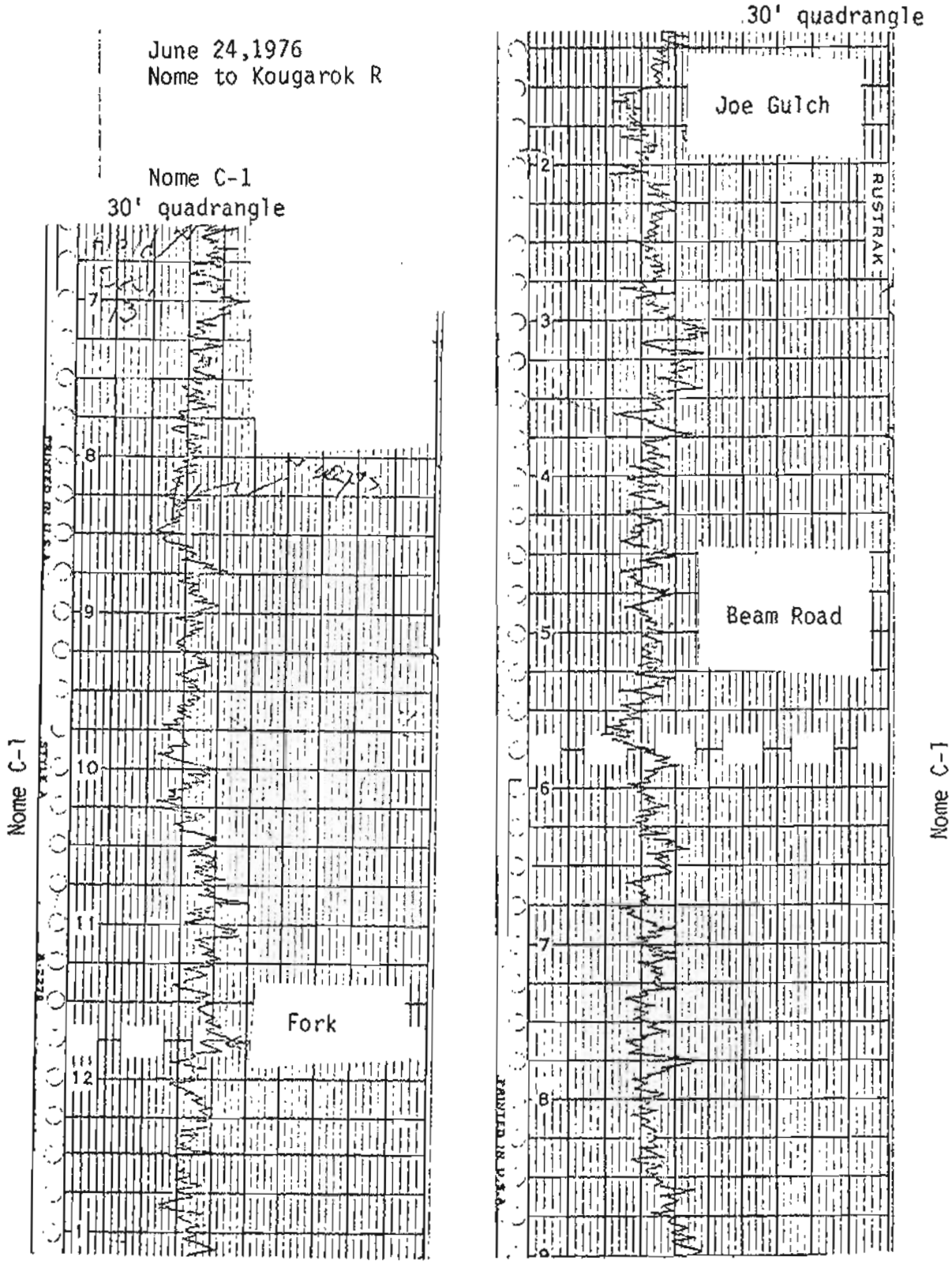


APPROXIMATE SCALE

0 25 50 75 100

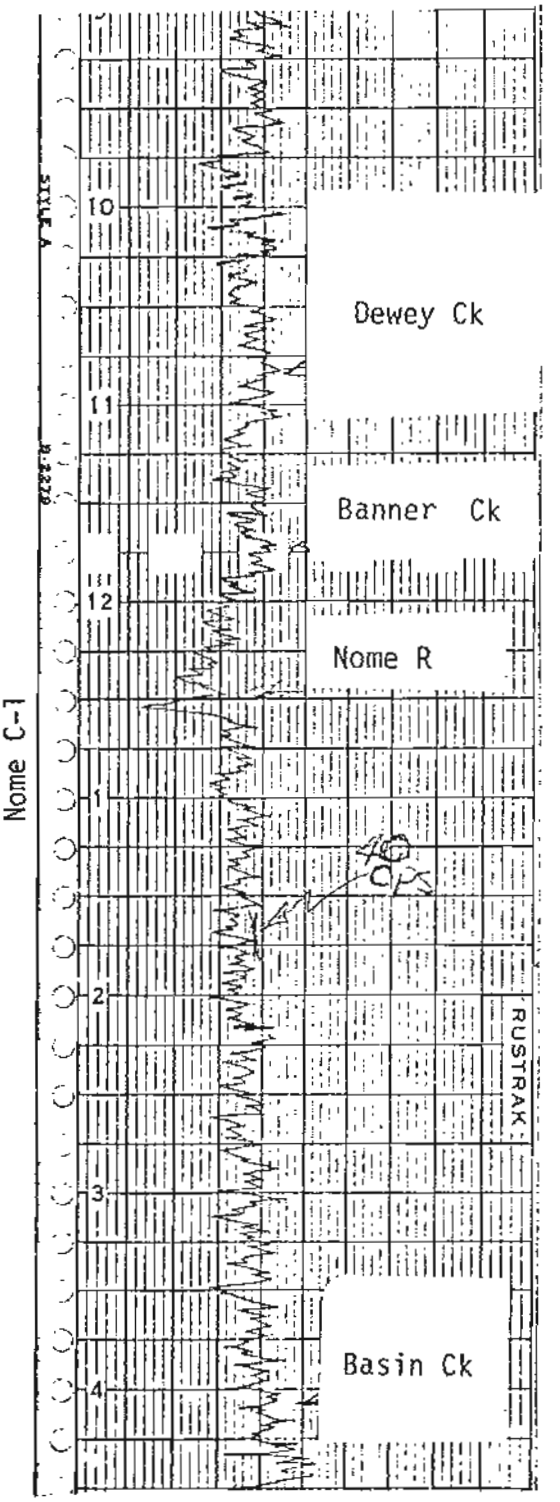
counts per second

Appendix 2

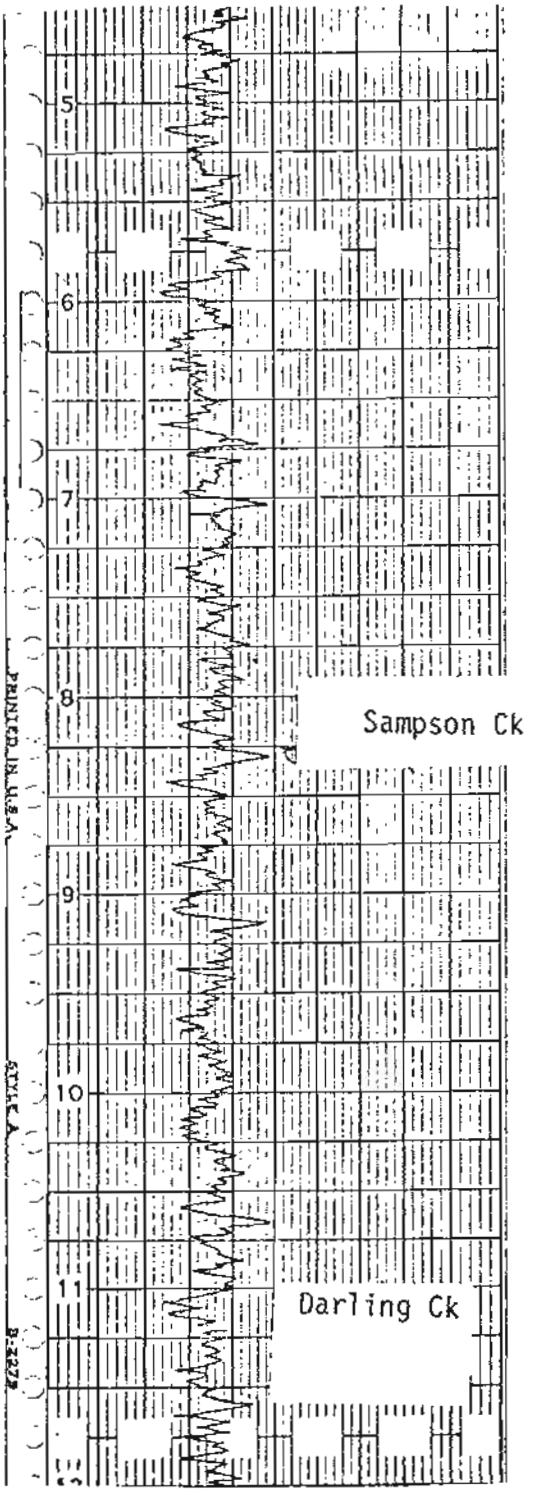

June 24,1976
Nome to Kougarok R
Nome C-1
30' quadrangle
30' quadrangle
Joe Gulch
Beam Road
Fork
Nome C-1
Nome C-1
RUSTRAK
APPROXIMATE SCALE
0 25 50 75 100
counts per second

Appendix 2

30' quadrangle



30' quadrangle

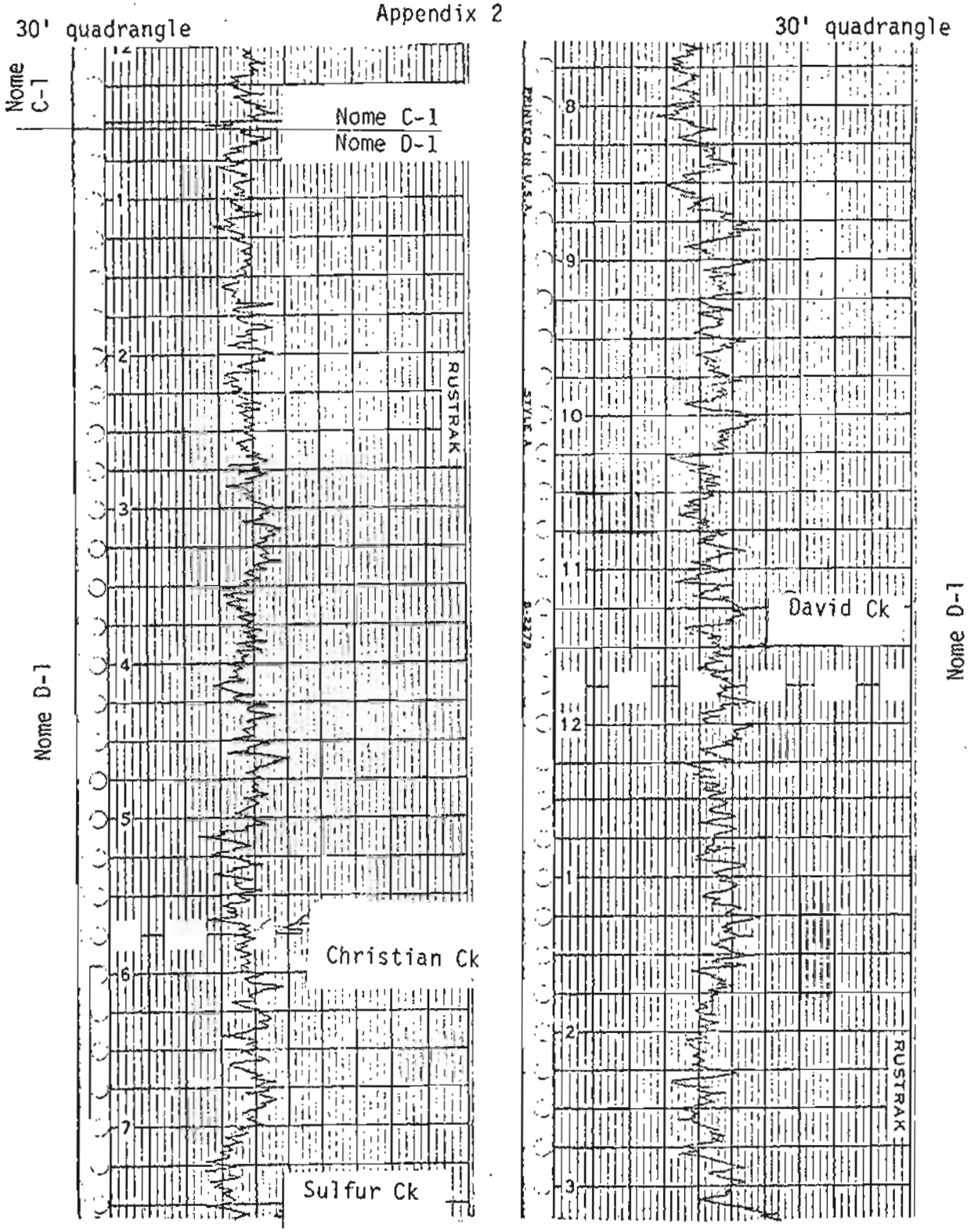


APPROXIMATE SCALE

0 25 50 75 100

counts per second

Appendix 2

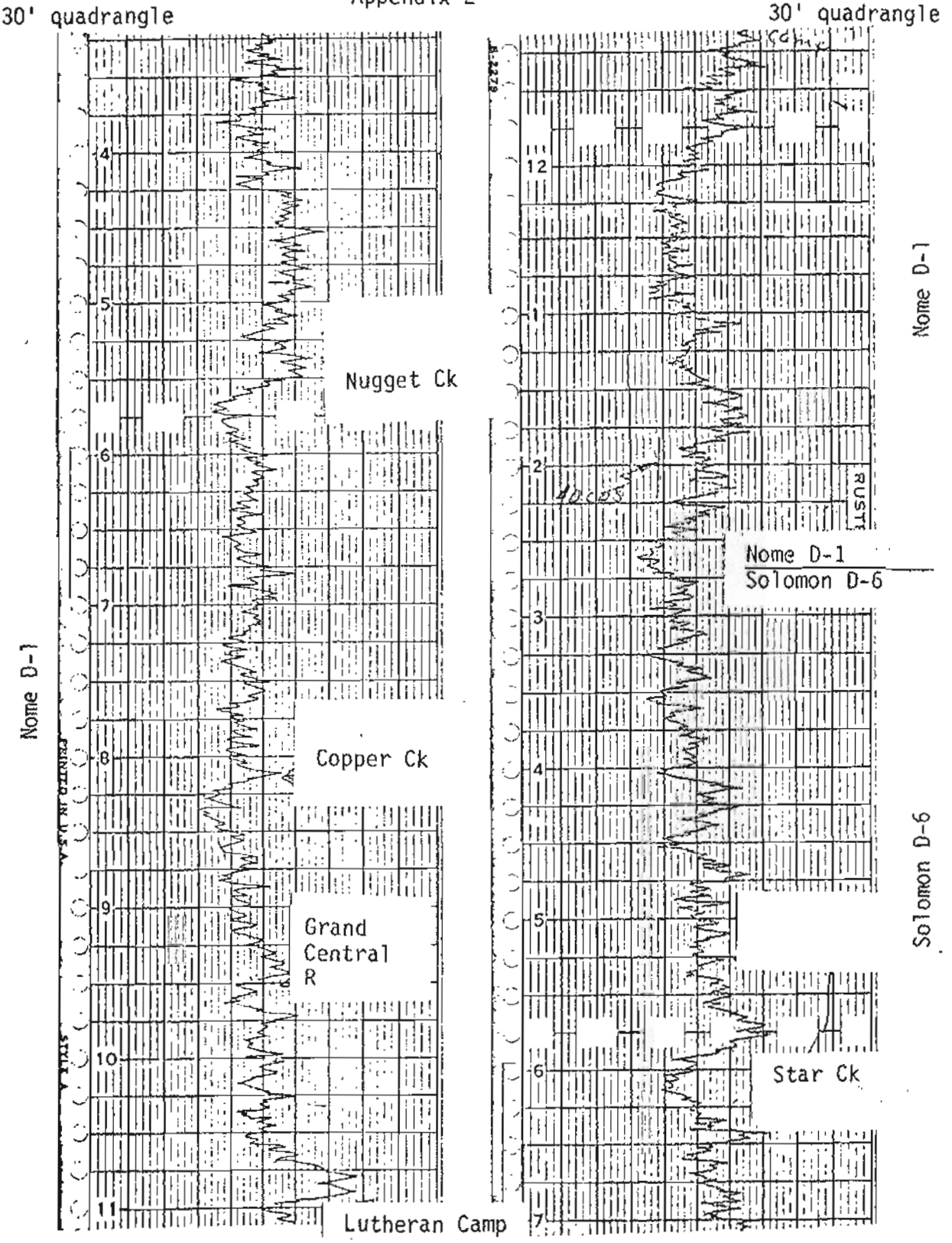


APPROXIMATE SCALE

0 25 50 75 100

counts per second

Appendix 2

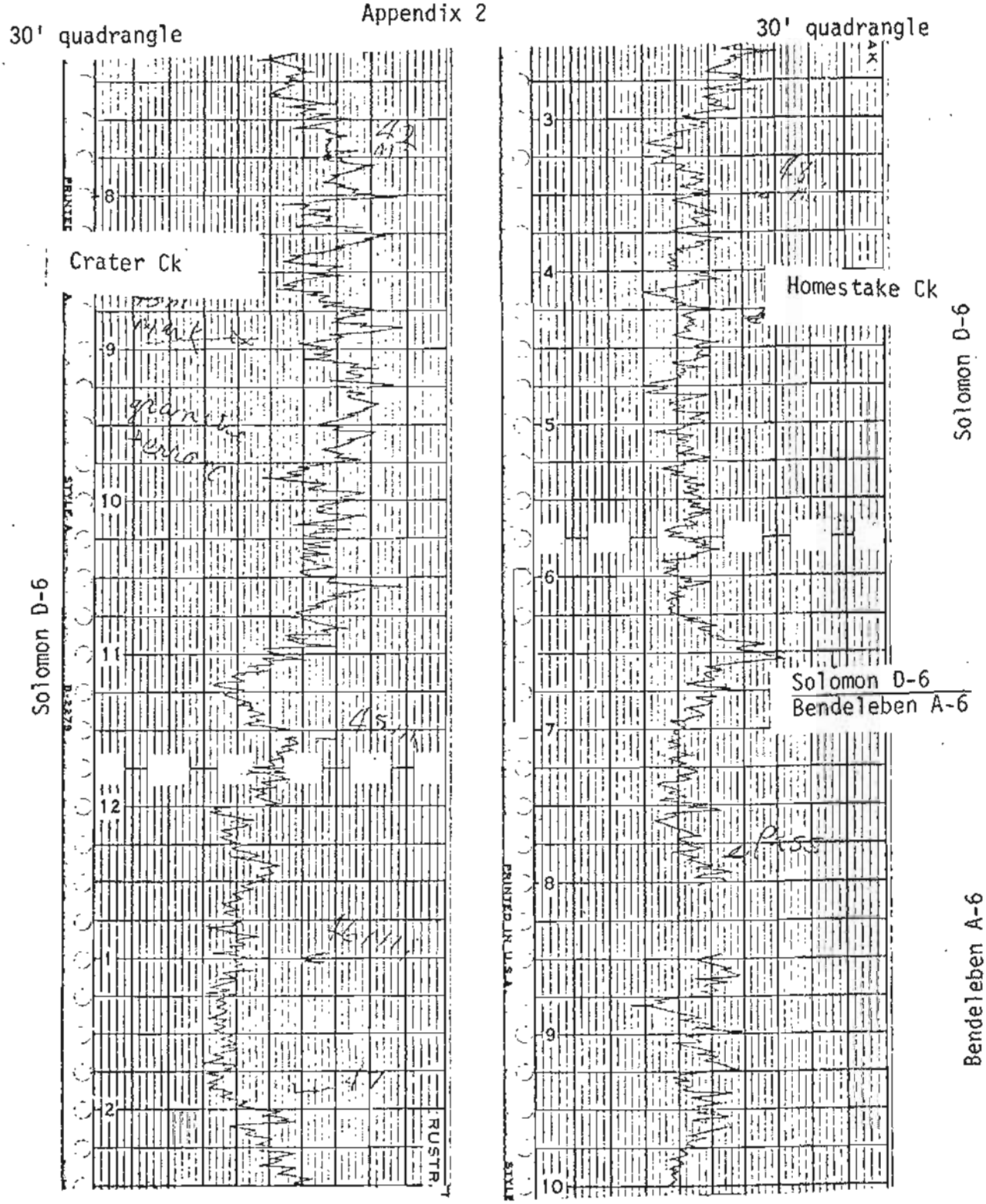


APPROXIMATE SCALE

0 25 50 75 100

counts per second

Appendix 2



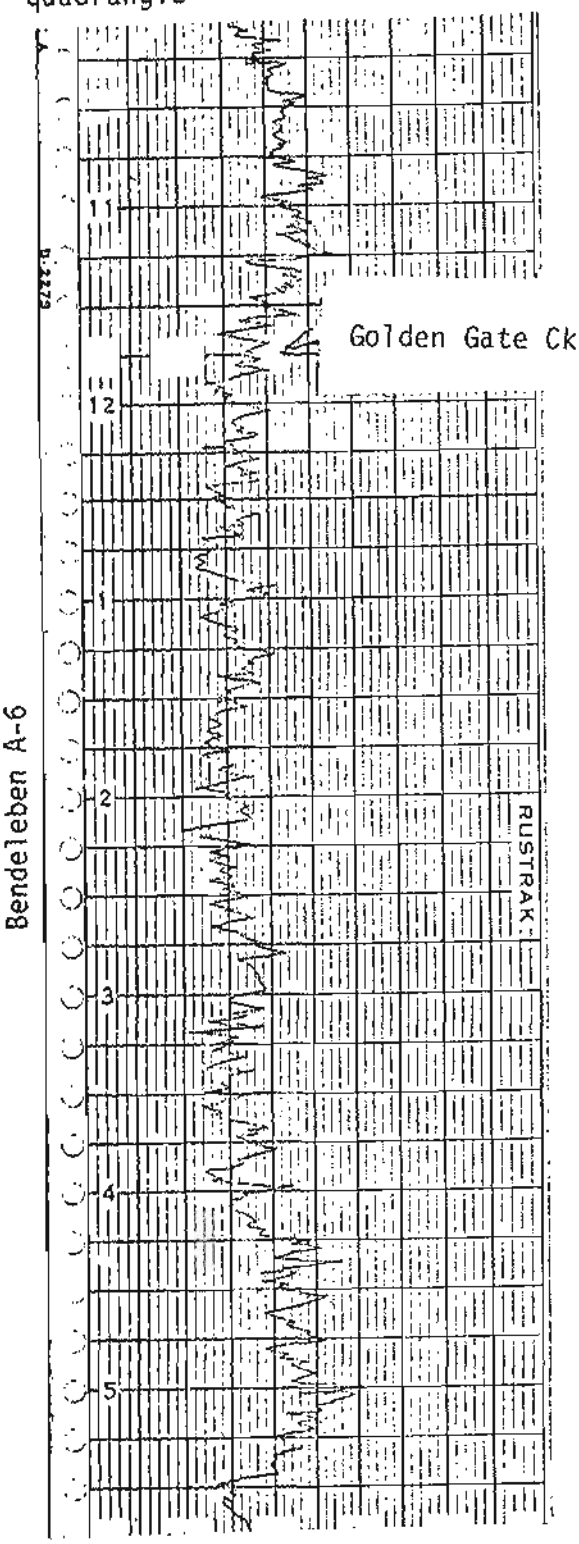
APPROXIMATE SCALE

0 25 50 75 100

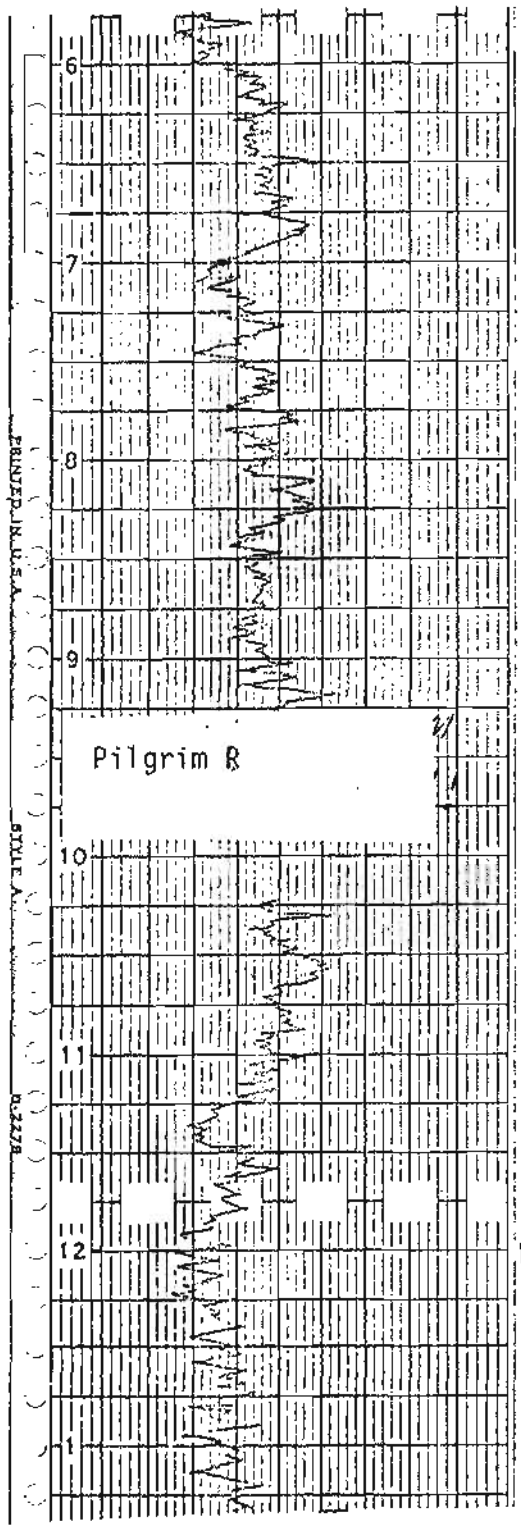
counts per second

Appendix 2

30' quadrangle



30' quadrangle

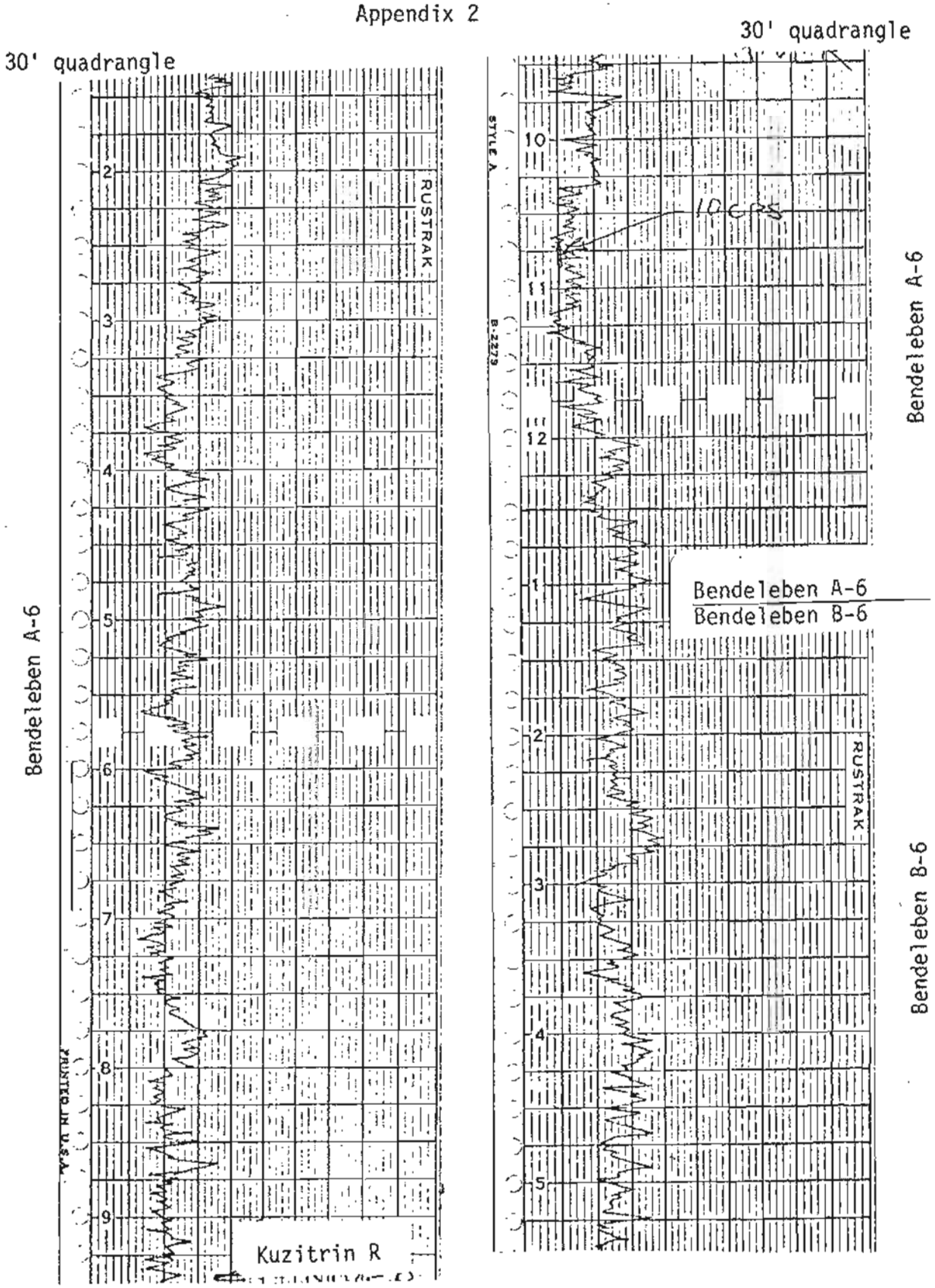


APPROXIMATE SCALE

0 25 50 75 100

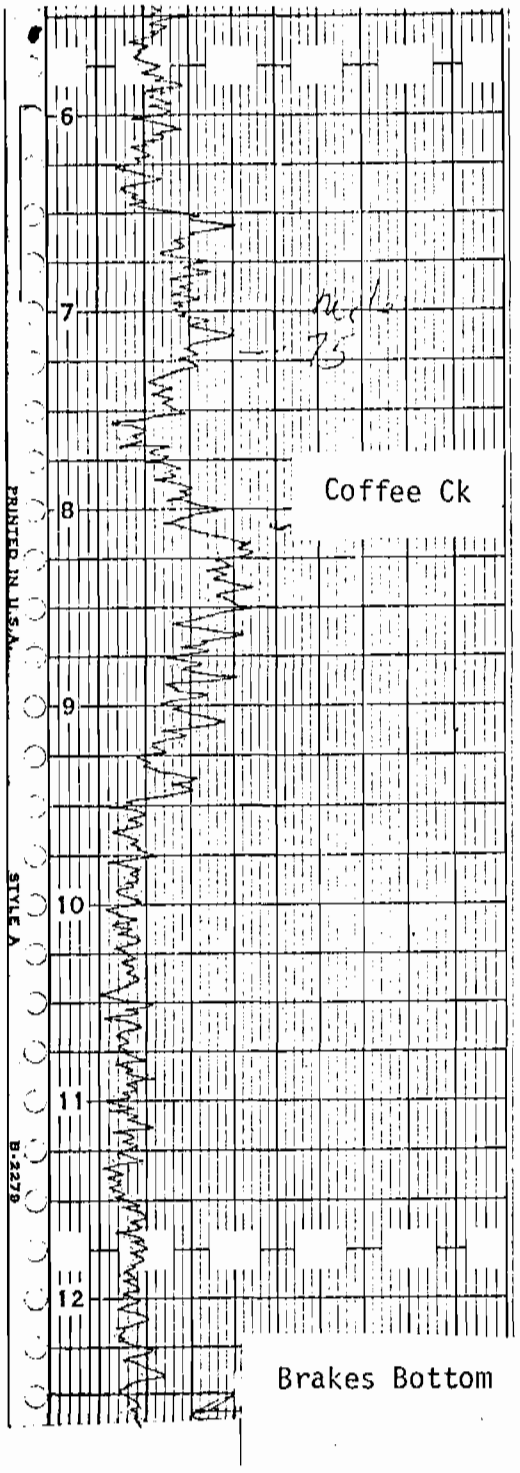
counts per second

Appendix 2

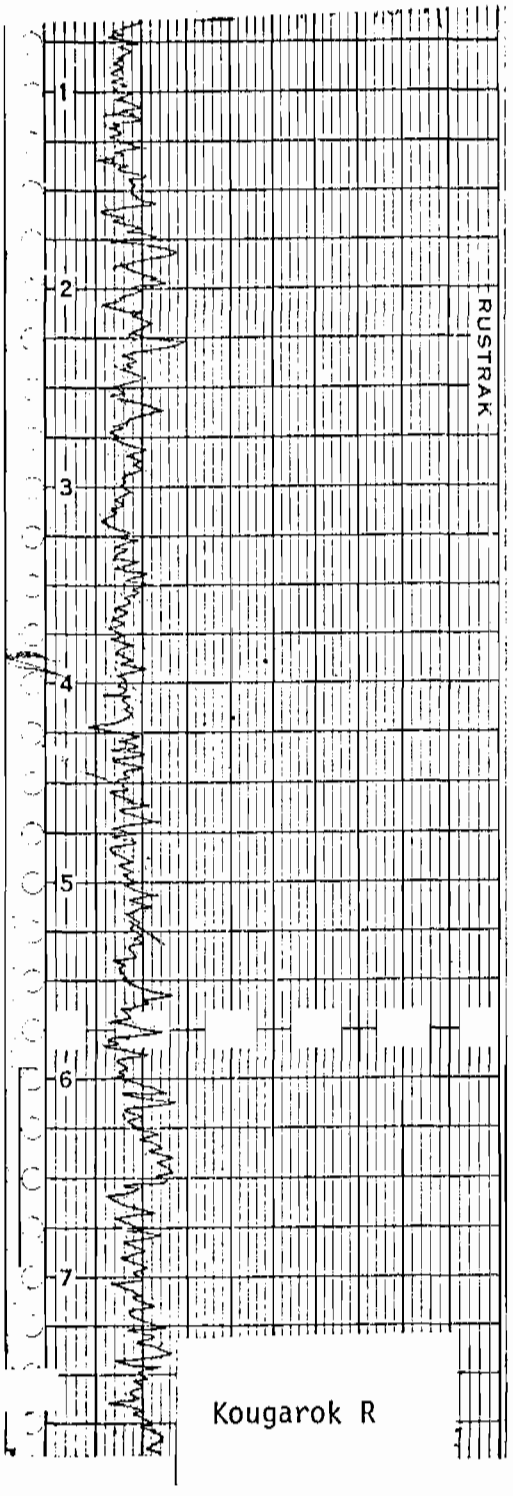

30' quadrangle
Bendeleben A-6
RUSTRAK
Kuzitrin R
30' quadrangle
Bendeleben A-6
Bendeleben A-6
Bendeleben B-6
RUSTRAK
Bendeleben B-6
APPROXIMATE SCALE
0 25 50 75 100
counts per second

Appendix 2

30' quadrangle



30' quadrangle



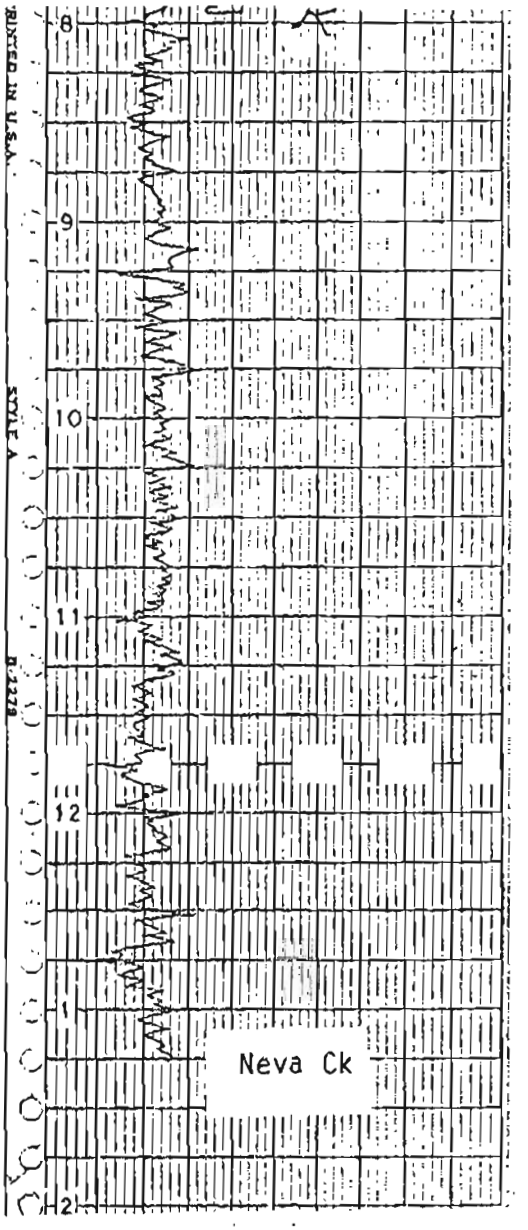
APPROXIMATE SCALE

0 25 50 75 100

counts per second

Appendix 2

30' quadrangle



Bendeleben B-6

APPROXIMATE SCALE

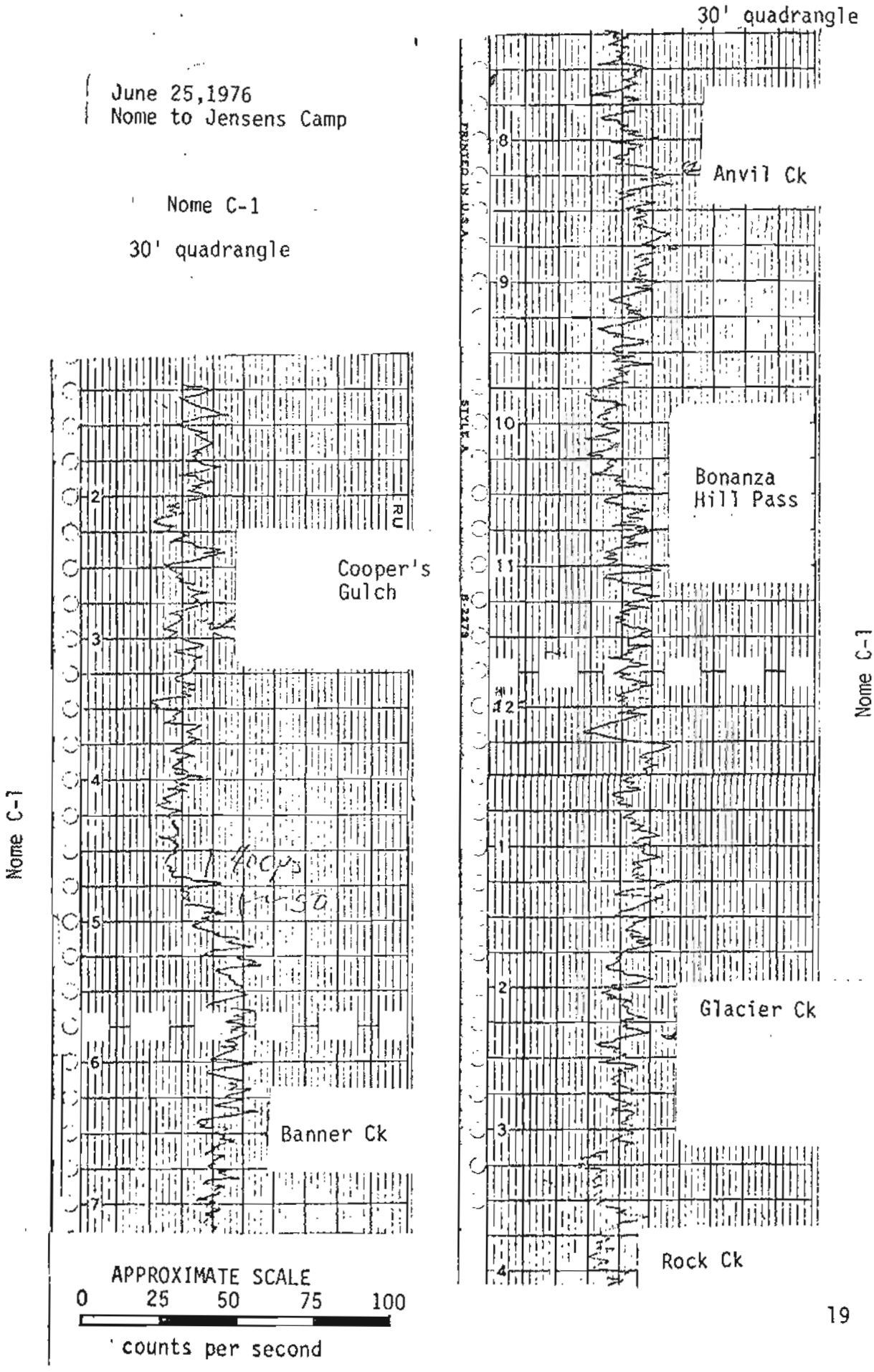
0 25 50 75 100

counts per second

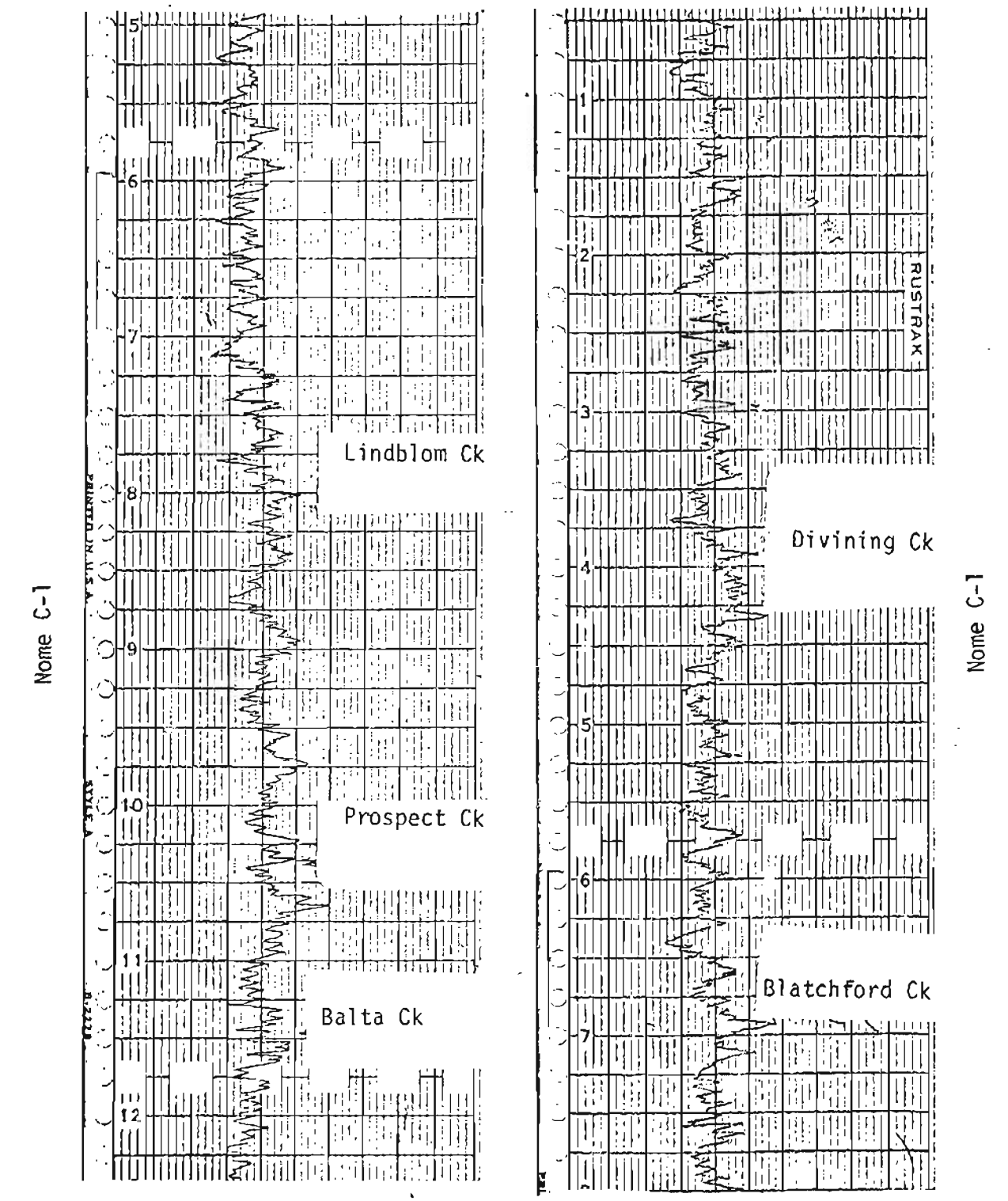
June 25,1976
Nome to Jensens Camp

Nome C-1

30' quadrangle

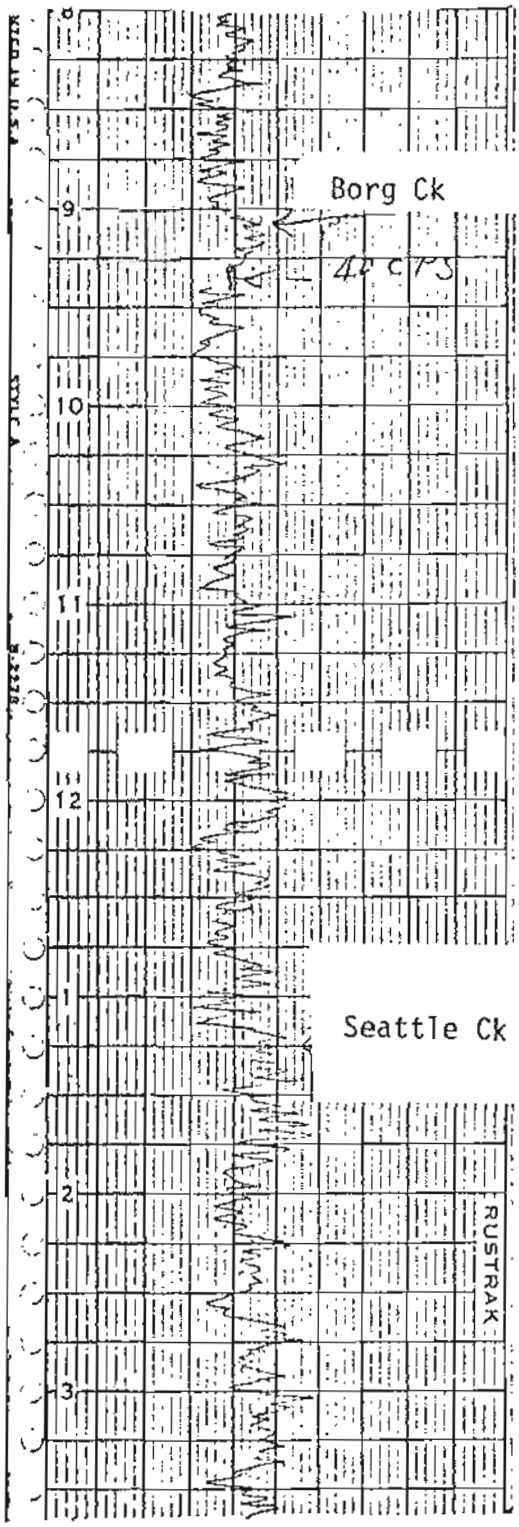


Appendix 3

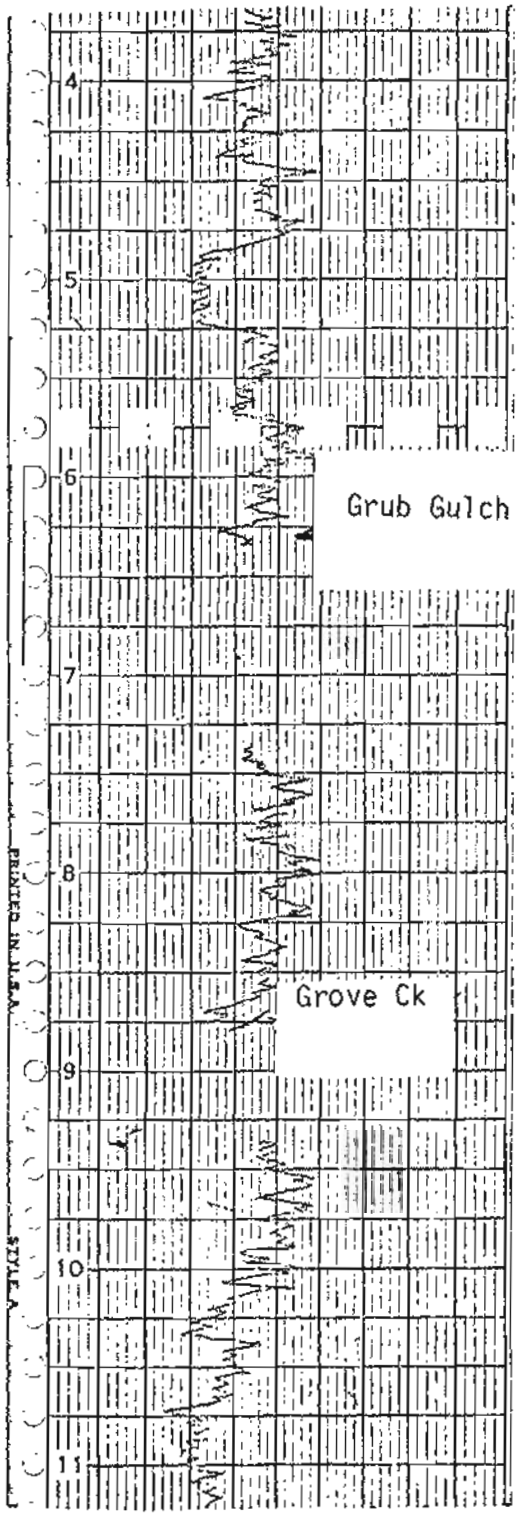

30' quadrangle
30' quadrangle
Nome C-1
Nome C-1
Lindblom Ck
Prospect Ck
Balta Ck
Divining Ck
Blatchford Ck
RUSTRAX
APPROXIMATE SCALE
0 25 50 75 100
counts per second

Appendix 3

30' quadrangle



30' quadrangle



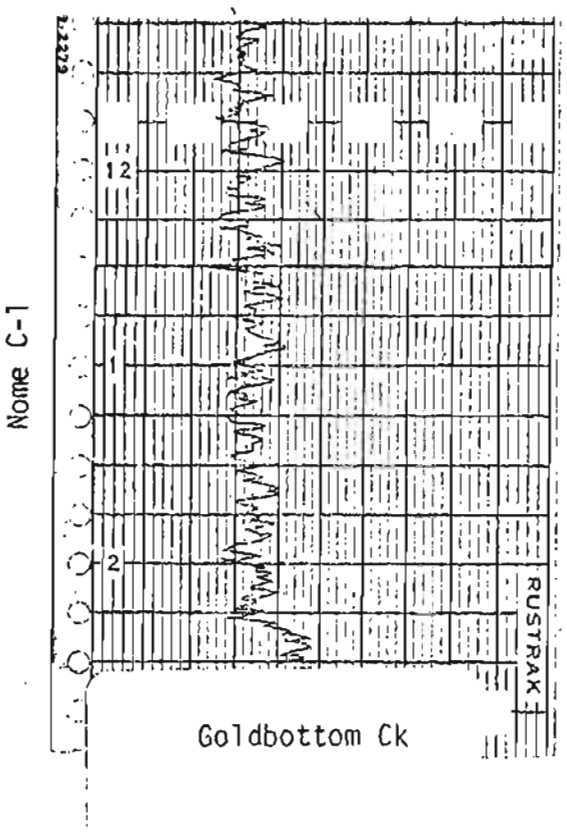
APPROXIMATE SCALE

0 25 50 75 100

counts per second

Appendix 3

30' quadrangle



APPROXIMATE SCALE

0 25 50 75 100

counts per second