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Esperance Pine Plantation

by A.C. Van Noort 1968.

Summary.

An inspection of the Esperance Pine Plantation was carried out in October 1968 to examine the growth and development of the existing pines and to assess the potential for pine planting of the Forestry Reserve ↑ 23527 (9,200 acres).

The early growth rates of P. pinaster here compare favourably with those attained at Gnangara. Severe fertilizer deficiencies are apparent in all stands over 7 years of age now but indications are that with good site preparation and repeated dressings of superphosphate and zinc some 50% of this reserve could carry a satisfactory P. pinaster plantation. Trials to test the effect of subsequent dressings of superphosphate and zinc super have now been established in these stands. Observations of the future growth on these treated areas will show whether the promising early growth can be maintained.

If there is a reliable future post and pole market in this district there could be an opportunity for the development of a useful plantation on this reserve, possibly as a combined Forestry and Agricultural project.

The Area.

Reserve ↑ 23527 of 9,200 acres is situated some 10 miles north of Esperance. Soils are typical of the Esperance Plain consisting of fine siliceous sand of varying depth to gravelly clay. Much of the area is poorly drained. Rainfall is approximately 20" per annum.

The existing postwar plantations consist of some 180 acres of P. pinaster established between 1951 and 1967.

Areas by planting years are as follows:

1951	4	acres
1953	26.5	"
1954	11	"
1956	20	"
1961	20	"
1964	25	"
1965	45	"
1967	28.5	"
	180	Acres.

Detailed notes describing the soil, the treatment history and pine growth for each year of planting are appended.

Plantation Techniques.

The need for thorough site preparation and for super and zinc fertilizers was recognised by Mr. Brockway. His notes on file 709/52 (December 1954) recommend double ploughing with a 12 month fallow period. This practice has been

followed but there appears to have been some variation in effectiveness. For instance, the scrub competition has been, and still is, severe in the 1953 planting. This was noted by Brockway in 1960. Most other areas are reasonably free of scrub competition.

Marked responses to both superphosphate and zinc have been described from plots in the old plantation and in the 1953 planting (1959 notes).

Zinc spray has been applied to the post war plantings from 1951 to 1961. Plantings since then received copper zinc super at time of planting.

The 1951, 1953, 1954 and 1956 plantings received additional superphosphate but it was all applied by hand and generally appears to have been inadequate in quantity to maintain good growth. No resupering has been done since 1960.

Fertilizer Trials.

Trials to test the effect of superphosphate and a 10% zinc super mixture have now been established. One ton of each of these fertilizers has been applied as one chain strips through various age classes, at the rate of 4 cwts. per acre.

Fifty chains of strip of each fertilizer was established. The fertilizers were applied with a tractor drawer super spreader working between the rows.

The location of the trial strips is shown on the attached plan. See also Appendix 1 for details.

Weather conditions at the time of application were fine but there was a fresh south west breeze which resulted in some drift of the fertilizers.

Pine Growth.

The post war plantings cover a range of soil types and provide an indication of the potential of this area for pine growth.

With good site preparation and an initial dressing of superphosphate and zinc spray, pinaster makes good growth for about 7 years, provided that the site is well drained.

Growth rates fall off sharply at about this age and the crowns become sparse, short needled and of poor colour (bronze). These symptons appear identical with those of the phosphate deficiency at Gnangara.

Unfortunately there are no stands available here which have had the necessary fertilizer treatment to permit unchecked growth to an age where useful comparisons of volume production can be made.

The 1951 planting has a 5 year intercept of 18 feet. It obviously grew well in the early years, (it was zinc sprayed in 1954 and resupered at 4 ozs. per tree or 2 cwts. per acre in 1959), but has now gone into a decline. Crowns are sparse, short needled and of poor colour and growth rings show a marked decline over the past 6 years.

Two inventory plots measured in this stand indicate a volume per acre of 888 cubic feet. This is very low for

age 17 but this stand has virtually stagnated for the past 6 years.

The 1953 planting contains some of the poorest pine in the area, with a top height of 27 feet and a five year intercept of only 12 feet. Crowns are badly degraded, being very thin and short needled and comprising only about ¼ of the total height. Scrub competition has been severe here in spite of double ploughing 1952 and 1953.

The stand has been zinc sprayed and resupered but growth is extremely disappointing. The soil is a deep sand over clay at 48".

Immediately alongside this the 1954 planting on the same soil type has done better, with a top height of 29' and a five year intercept of 15'. Crowns are denser and occupy about 2/3 of the total height. Scrub is far less evident than in the 1953 planting.

Site preparation for the 1954 planting was apparently very good. The area has been prepared (double ploughed) for planting in 1953 but was not planted due to shortage of plants. It was reploughed and planted in 1954. It has been reported that the super used for the initial dressing in 1954 was "copper sulphate super." It also appears that the area had an additional dressing of 6 ozs. of copper, zinc super per tree in 1960.

Both the 1953 and 1954 plantings contain areas which failed to establish because of swampy conditions.

The 1961 planting has a top height of 21 feet and a 5 year intercept of 16'. Crowns are still dense and healthy with 5 year old needles still green.

The first signs of decline are now showing with a reduction in needle length. Four year old needles measure 7" while last years needles are 5½" long near the top of the tree and only 2½" long on the lower branches.

The soil here is very shallow with heavy gravelly clay at 19". It is surprising to see such good growth on such a shallow soil. Some early thinning as well as fertilizer may be necessary to maintain growth on this site.

The 1965 planting which received 4 ozs. of copper zinc super at planting time is a healthy even stand up to 9' high. Scrub regrowth is sparse and there is little grass in the plantation.

Soil Survey and Assessment for Pine Potential of Reserve 23527.

An assessment of the reserve was made by speedo traverse along boundary firebreaks and internal tracks. Soil depths were probed at 8 chain intervals and notes made of vegetation and topography. Air photos were used to interpolate types between the traverses.

The soils consist of fine sands of varying depth to a subsoil of clay or gravelly clay.

Three major types based on factors which may influence pine growth, were recognised.

1. Deep sands over 48" to clay.
2. Sands less than 48" to clay.
3. Poorly drained and swampy areas with a shallow hard pan.

Types 1 and 2 were sampled down to the clay for soil analysis. Detailed profile descriptions are shown in Appendix 3.

A strong correlation between the major species of the native vegetation and soil type was observed.

The deep sands carry fairly dense stands of Banksia speciosa.

'Chittick' (Lumbertia inermis) occurs, often in dense formation on the sands less than 4' deep.

The poorly drained areas are usually fairly open with scattered paper bark and titree.

A plan showing the distribution of these types on the reserve is attached.

The pine assessment indicates that both types 1 and 2 could be suitable for pinaster. I would suggest a limit of at least 2' depth. On this basis approximately 50% or 4600 acres of the reserve would be suitable for P. pinaster, provided that the site can maintain good growth with fertilizers under heavier stocking. This has still to be proved.

Parts of Type 3 may prove to be suitable for species such as P. elliottii, with suitable techniques of draining and fertilizing.

The Department of Agriculture Bulletin No. 3080 describes these soils. The following passage quoted from this bulletin is of interest.

> "Most of the soils of the plain are grey siliceous sands overlying a gravel, gravelly clay or clay subsoil. The depth of sand is variable and pasture development is easier when the sand is less than 24" deep."

This suggests the possibility of a combination of Forestry and Agriculture on this land. I understand that the low lying shallow soils with poor drainage will produce excellent clover.

Future Management.

The fertilizer trials now established will show whether these soils can maintain good growth under a heavy stocking of pine. If this proves to be so consideration could be given to a commercial plantation here.

A plantation in this area would presumably be managed to supply posts and poles for local farming requirements. A very short rotation of about 15 years seems feasible for this market. Costs of establishment and maintenance of such a plantation project could be kept to a low figure.

Establishment should be very cheap because of low clearing costs. The Department of Agriculture Bulletin 3080 gives the following costs (1963) for clearing and ploughing.

	Cost per Acre.
Rolling	£ 1.00
Burning	0.25
Rake and Burn	2.50
1st Ploughing	2.75
2nd Ploughing	2.00
Total	£ 8.50

The major maintenance cost would be in fertilisers. Probably two subsequent dressings of superphosphate and zinc would be needed.

Other maintenance operations could be kept to a minimum. Pruning would be unnecessary and, with 25 of the plantation less than 4 years old and virtually unburnable, planned distribution of age classes could eliminate the need for internal firebreaks. Development of the unsuitable areas for pasture could further reduce the fire danger and improve the economics of the venture.

I recommend that the response to the recent fertiliser trials be closely observed over the next few years. If good responses are apparent next year permanent sample plots should be established in the treated areas to determine the growth rates over a range of age and stocking under conditions of adequate fertilizer.

A. C. van Noort
Inspector

ACvN
Como Research
3rd December 1968.

APPENDIX 1

STAND DESCRIPTIONS 1968 ESPERANCE PLANTATION

Planting Year	Area	Soil	Preparation	Fertilizers	Description			Remarks
					Appearance	Height	Ht/Interc.+	
1951	4	Fine sand over sandy clay 52" Roots to 72"	Double ploughing and lined	3 ozs s/tree 51 4 ozs s/tree 59 Zn spray 54	Crowns thin and short needled. Little scrub Pruned and thinned to 500 S.P.A. in 1959	36'	18'	Growth in heigh and diam. declined in las 6 years
1953	26.5	Fine sand over sandy clay 48" Water at 60".	Double ploughed 1952 & 53 and lined.	2 ozs s/tree 53 6 ozs s 57? 4 ozs s 59 Zn spray 60	Crowns v. thin and s/needled. Crowns only $\frac{1}{4}$ total height. Severe scrub competition	27'	12'	Decline in heigh growth over las 7 years. Scrub comp. suggests poor site preparation.
1954	11	Fine sand over sandy clay 48" Water at 60"	Ploughed 3 times 1952, 53, 54 and lined.	2 ozs s/tree 54 6 ozs s 57? 4 ozs s 59 6 ozs s cu Zn 60 Zinc spray 60	Crowns much denser than the 53 pl. & occupy 2/3 of height. Little scrub.	29'	15' ←	No record on files of any supering '57. Good site prep- aration and more fertiliser than 55 pl. Badly drained areas failed.
1956	20	Variable depth sand over clay 60" in south 27" in Nth Water at 24"	Double ploughed and lined.	2 ozs s/tree 56 4 ozs s 59 Zinc spray 60	Variable - generally thin crowns. Poorer pine on shallow poorly drained soil in north.	(S)30' (N)25'	16' 13'	Decline in growth rate over last 5 years
1961	20	Fine sand over gravelly clay 19". Pine roots to 30"	Double ploughed and lined.	3-4 ozs of cu Zn s/tree 61 Zinc spray 64	Dense crowns of good colour. Little scrub.	21'	16'	Crowns dense but needle length decreasing. P. deficiency Badly drained areas poorer

APPENDIX 1 - Continued.

Planting Year	Area	Soil	Preparation	Fertilizers	Description			Remarks
					Appearance	Height	Ht/Interc.+	
1965	45	Fine sand over gravelly clay 30"	Double ploughed and lined	4 ozs of cu Zn s/tree 1965	Vigorous even stand Little scrub	9'		This stand is well advanced for 3 y.o.

APPENDIX 2.

FERTILIZER TRIALS - OPERATIONS.

The fertilizers were applied on 30/10/65 at the rate of 4 cwts. per acre. Superphosphate and a 10% Zinc super mixture were used.

The weather was fine with a fresh S.W. breeze causing some drift.

The location of the strips is shown on the plan. Details are as follows:

1961 Planting.

Line (1) Super. 11 chains E.W.
6 chains S of N. boundary.

Line (2) Zinc super. 11 chains E.W.
6 chains S of N. boundary.

1965 Planting. (Eastern Compartment).

Line (3) Super. 19 chains N.S.
1½ chains E of W. boundary.

Line (4) Zinc super. 19 chains N.S.
3½ chains E of W. boundary.

1953 Planting. N.W. corner C.13.

Line (5) Super. 5 chains E.W.
½ chain S of N. boundary

Line (6) Zinc. super. 5 chains E.W.
2½ chains S of N. boundary.

1954 Planting. C.13.

Line (7) Super. 8 chains E.W.
5½ chains N of S. boundary.

Line (8) Zinc super. 8 chains E.W.
3½ chains N of S. boundary.

1951 Planting. C.13.

Line (9) Super. 7 chains E.W.
3½ chains N of S. boundary.

Line (10) Zinc super. 7 chains E.W.
2 chains N of S. boundary.

APPENDIX 3.

SOIL PROFILE DESCRIPTIONS - ESPERANCE.

The following soil profiles from the Esperance Pine Plantation have been sampled for soil analysis.

1. Deep Sand. 1951 Planting C 15.

0 - 4"	Pale grey fine sand.
4 - 18"	White fine sand.
18 - 52"	Pale yellow fine sand with occasional orange mottles.
52 - 60"	Pale grey sandy clay.
60 - 72"	White and orange mottled clay. (Pine roots to 72").

2. Shallow Sand. 1961 Planting.

0 - 6"	Light grey fine sand.
6 - 12"	Very pale grey fine sand.
12 - 19"	Very pale yellow fine clayey sand.
19 - 24"	Pale yellow sandy clay with orange mottling and concretions.
24 - 30"	Massive yellow and orange mottled horizon with fissures. (Pine roots to 30").

O.I.C.
Kalgoorlie.

SOIL ANALYSIS ex ESPERANCE

Please find enclosed the results of the nitrogen, phosphorus and potassium analysis for the Esperance samples.

Sample	%N.	p.p.m.P	m.e.%K.
Hole 1:			
0 - 4"	.196	8	.025
6 - 10"	.102	19	.001
20 - 24"	.192	21	.038
52 - 56"	.144	14	.445
60 - 72"	.036	14	.581
Hole 2:			
0 - 4"	.228	36	.099
6 - 12"	.226	41	.136
20 - 24"	.312	59	.631
24 - 30"	.362	84	.581

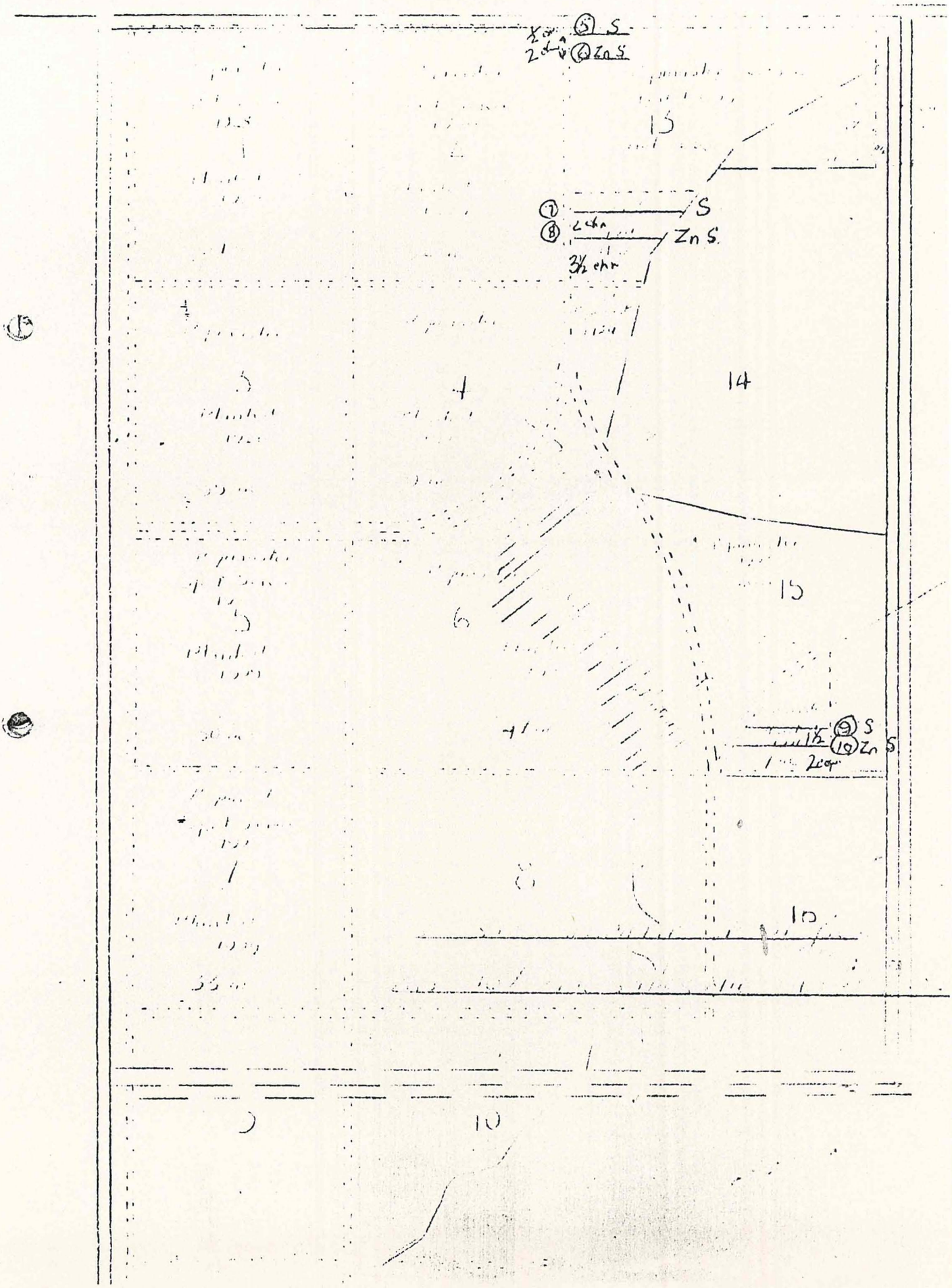
A.B. HATCH
Senior Research Officer

ABH:VM
Como Research
24th December 1968.

Esperance Plantation

Fertilizer Trials

3/10/25



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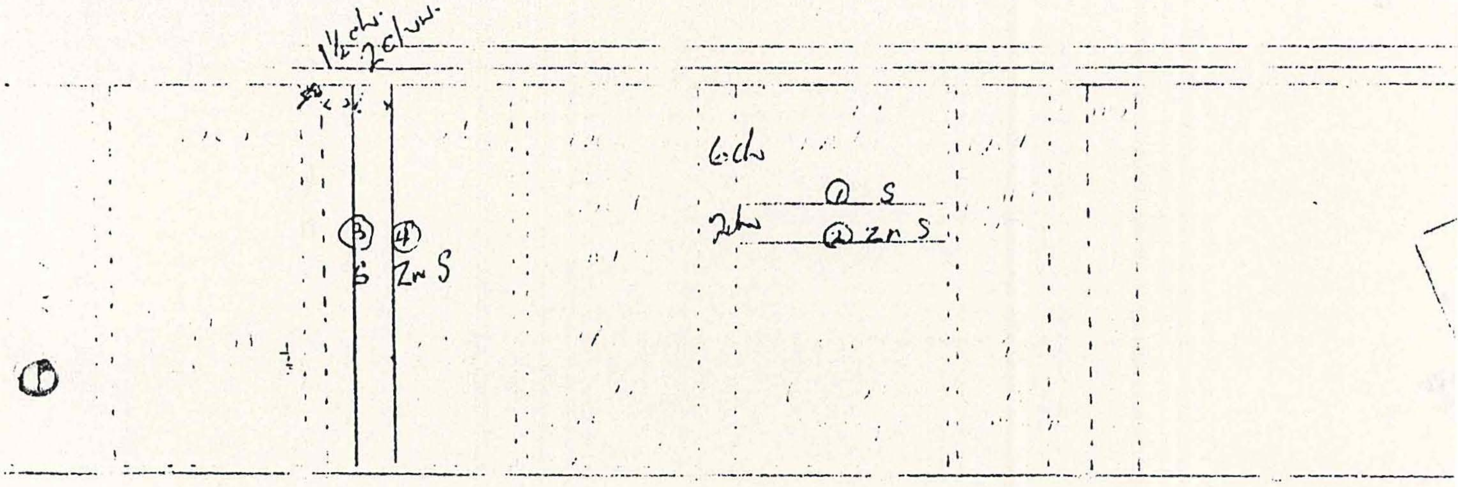
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