Well #2

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Land Office (local) _____
Serial (G.L.O. No) _____

Lease or Permit _____

LOG OF PROSPECT BORE HOLE

Lessee William E. Shallenbeger, Evanston 024435

Address 4320 Sutton Place, Sherman Oaks, Calif.

Driller W. D. Thomas, 231 K St., Rock Springs, Wyo.

Commenced drilling Sept. 14, 1949 Finished Oct.7,1949

Hole No. 1 Sec 6 T 23N R 106 W Meridian 6th P.M.

County SWEETWATER State WYOMING

The information given herewith is a complete and correct record of the bore hole and all work done thereon, so far as can be determined from all available records.

Signed _____

Title _____

Subscribed and sworn to before me this _____ day of _____, 1950

_____
Notary public

Elevation of top of hole
relative to sea level 6570 ft. FORMATION RECORD

DEPTH From-	to-	Thickness of Stratum	Formation (Kind of Rock, etc.)	REMARKS
FEET	feet	feet		
0	30	30	Top Soil, Alluvial deposit.	Water seepage at 15'
30	65	35	Grey Shale, Hard.	
65	80	15	Grey Shale, Water at 80'	
80	190'	110	Grey Shale and Layer Rock	
190	340	150	Grey Shale.	
340	400	60	Dark Brown Shale, Sour Gas Odor at 375'	
400	419	19	Dark Brown Shale, Set 6 5/8" casing at 419' 8" casing perforated 417-419 to allow dark green liquid in pipe.	
419	440	21	Grey Rock, Hard.	
440	455	15	Light Brown Shale.	
455	485	30	Grey Shale, small flow for two hours, 483-485'.	
485	515	30	Grey and Brown Shale.	Well flowed strongly at 515'

LOG OF PROSPECT BORE HOLE

Log- W. E. Shallenberger Well No. 1. Evanston 024435, Continued

DEPTH From-	DEPTH to-	Thickness of Stratum	Formation (Kind of Rock, etc.)	REMARKS
feet	feet	feet		
515	534½	19½		Same Formation, Grey Shale, Well still flowing. Well flowed a Brine content containing Sodium Sesquicarbonate or Trona, samples of which were analyzed by Mr. Roland Andreau, Chemical Engineer, 4227 Van Nuys Blvd., Sherman Oaks, California, and a sample was turned over to Mr. H. B. Lindeman, Mineral Division, W. S. G. S. Salt Lake City, Utah. The capacity of this well was similar to the Wm.O. McDermott Well in Sec.5, same Township and Range, Evanston 024436, flowing from 2500 to 3000 barrels of Brine per day. A pit was constructed, circular in shape, diameter about 75 feet, 4 feetdeep. Date of well starting to flow was 10 A. M. October 4th, 1949 at a depth of 515 feet. Present were Dr. Wm. O. McDermott, Sherman Oaks, California, John R. McDermott, Rock Springs, Wyoming, Robert Santhuff, Virgil Cooper, W. D. Thomas, all of Rock Springs, Wyoming. Well was deepened from 515 to 534½ feet. Brine is contaminated by dark green liquid obtained at 417-419 feet and at an early date, the casing will be pulled, collar at 417'-419' removed, casing again installed in hole, formation shut-ogg accomplished at 437 feet to which depth hole will be reamed and an additional length of casing added to present string. Well will be housed by 6' x 6' x 6' structure suitable covered and filled with manure and straw for protection against winter storms and freezing. This well is located in the South East Quarter of the South East Quarter of Section 6, Twp. 23 North, Range 1o6 west of the 6th P. M., being 858 feet west of the East line and 407 feet north of the South line of said Section 6.

W. D. Thomas
Water Well Drilling
Contractor
Rock Springs, Wyo.

26 August 1949

Surface elvation 6555' approximately.

Log on Test Hole #1, McDermott Basin, Sweetwater County, Wyoming.

Thickness in feet	
0 - 25	Yellow clayish top soil with rock
25 - 90	Grey shale and sandstone (water 60' to 90')
90 - 108	Grey sandstone
108 - 112	Grey shale
112 - 130	Grey sandstone (large quanity water, washed away cutting samples from 115'-120')
130 - 135	Grey sandstone
135 - 139	Grey sandstone and shale
139 - 150	Grey sandstone
150 - 180	Grey rock (water washed away cutting samples, 155'-165')
180 - 190	Grey shale and rock
190 - 200	Rock (water washed away cutting samples) sour gas odor.
200 - 210	Grey shale and sandstone
210 - 220	Grey sandstone, hard
220 - 250	Grey shale
250 - 255	Grey sandstone, hard
255 - 270	Grey shale and sandstone
270 - 300	Light brown shale and sandstone
300 - 325	Grey shale and rock
325 - 380	Dark brown shale, hard; sour gas odor at 360'.
380 - 425	Light brown rock
425 - 430	Dark brown shale
430 - 435	Grey lime
435 - 439	Dark brown shale
439 - 445	Layers black and grey shale (liquid used in drilling tested from 33% to 70% trona in solution by Baume hydrometer test).
445 - 447	Grey shale, powdered (casing set at 446' , formation shut-off accomplished).
447 - 450	Hard shale, dark (core sample)
450 - 456	Light grey limestone (core sample) drilling solution test from 33% to 109% trona) subject to correction.
456 - 458	Dark brown shale (core sample)
458 - 460	Resumed drilling with bit, dark brown shale (Hydrometer test 20 or 145% trona - subject to correction.
460 - 465	Grey shale
465 - 477	Grey shale; well blew in at 477 feet, 5000 barrels per day, trona brine.

Well in SW$\frac{1}{4}$ NW$\frac{1}{4}$ Sec. 5, T. 23 N., R. 106 W.
Wm. O. McDermott, Evanston 024436

Drilling log on Well #5

McDermott Basin, Sweetwater County, Wyoming-Patrick S. McDermott, Evanston 025272

Started drilling April 26, 1950, 10" hole for 8 5/8" pipe.

Surface elevation 6650' approximately

Thickness in feet

0 - 20	Sandy surface soil
20 - 22	Very light shale
22 - 50	Redish shale
50 - 105	Grey shale; small amount water 90' to 100'.
105 - 155	Grey shale
155- 160	Grey shale
160 - 215	Light brown shale
215 - 225	Grey shale
225 - 235	Grey sandy shale; water increase
235 - 250	Grey sandy shale
250 - 265	Light brown shale
265 - 280	Grey sandy shale
280 - 300	Redish grey shale
300 - 345	Grey shale
345 - 355	Grey sandy shale
355 - 365	Grey and brown shale
365 - 395	Grey shale; slight gas odor 375'
395 - 418	Grey shale
418 - 425	Grey sandstone
425 - 440	Grey sandy shale
440 - 453	Light brown shale
453 - 458	Grey shale
458 - 483	Light brown sandy shale
483 - 510	Grey shale; 1st vinegar reaction at 500'
510 - 520	Grey and brown shale; very good reaction at 515'
520 - 535	Dark brown shale; gas odor at 525'
535 - 545	Brown and grey shale
545 - 550	Dark brown shale, good reaction
550 - 565	Dark brown shale 12° Hydrometer reading at 560'
565 - 570	Variegated grey, green and brown shale
570 - 575	Light and dark brown shale
575 - 580	Light and dark brown shale
580 - 585	Grey and light brown shale
585 - 590	Grey and green shale
590 - 595	Grey shale
595- 637	Grey and dark brown shale; good trona showing from 55'-610' stronger gas odor. Vern hard from 605'-610'. 8 5/8" casing set at 637'. Formation shut-off accomplished water bailed from hole.
637 - 645	Grey shale; very hard
645 - 665	Grey & dark brown shale; water seepage 660'-665'
665 - 670	Variegated grey, green & dark brown shale
670 - 690	Grey and light brown shale
690 - 700	Dark grey shale; good reaction at 700'
700 - 710	Dark grey shale, good reaction
710 - 725	Dark grey & light brown shale
725 - 733	Light grey & dark brown shale
733 - 734	Dark brown shale; some trona solution; good vinegar reaction $5\frac{1}{2}$° Hydrometer reading
734 - 750	Dark brown & grey shale

750 - 755	Variegated grey, green & light brown shale
755 - 770	Grey & light brown clay, soft, sticky, w/some gravel
770 - 773	Variegated grey, green & light brown shale
773 - 780	Light & dark grey clay, soft, sticky, shale particles Good reaction on drilling mud; slight on cuttings; strong gas odor from hole, less petroleum odor to cuttings.
780 - 815	Dark grey shale; well suspended at this depth.

Department of the Interior
BUREAU OF MINES

Land Office(Local) _____

Serial (GLO No. _____

Lease or Permit _____

Log of Prospect Bore Hole

Lessee Elizabeth Shallenburger Evanston 024434

Address _____

DRILLER W. D. Thomas, 231 K Street, Rock Springs, Wyo.

Commenced drilling March 8, 1950 Finished Apr. 19, 1950

Hole No. 1 Sec 20 T 23 R 106 Meridian 6th P.M.

County Sweetwater State Wyoming

The information given herewith is a complete and correct record of the bore hole and all work done thereon, so far as can be determined from all available records.

Signed /s/ John R. McDermott

Title Operator

Subscribed and sworn to before me this _____ day of _____, 1950

_____
Notary Public

Elevation of top of hole relative to sea level 6600' FORMATION RECORD

DEPTH From- Feet	To- Feet	THICKNESS OF STRATUM Feet	FORMATION (Kind of rock, etc.)	REMARKS
0	30	30	Red clay; water vein at 30'	
30	55	25	Grey shale; Water increase at 45'	
55	85	30	Grey sandy shale; water temp. 44° at 35'	
85	95	10	Grey sand; water increase	
95	137	42	Grey sandy shale	
137	140	3	Brown shale; very hard	
140	170	30	Grey shale	
170	185	15	Brown and grey shale	
185	220	35	Grey shale	
220	230	10	Brown and grey shale	
230	280	50	Grey shale	
280	295	15	Sandy grey shale	
295	315	20	Grey and brown shale	
315	320	5	Grey shale; soft	
320	325	5	Brown and grey shale	
325	350	25	Grey shale; soft	

(cont'd)

350	380	30	Grey shale; medium hard
380	385	5	Grey sandstone, very fine-grained, hard:
385	415	30	Grey sandy shale; medium hard
415	420	5	Brown sandy clay, slight vinegar reaction on cuttings. 1st traces of Trona, water at bottom hole tested 4°. Started coring
420	424	4	Grey sandstone, hard, brittle-broken cores; no reaction
424	429	5	Grey shale, hard, brittle, broken cores, very small reaction
429	431	2	Grey shale, solid cores, thin brn seams, evidence of thin trona seams.
431	433	2	Grey shale, brittle, broken cores, no reaction
433	438	5	Grey sandstone, and brittle shale, thin drk brown seams no reaction
438	443	5	Grey shale thin blk seams. reaction slight.
443	446	3	Grey sandstone, coarse grained, broken cores; no reaction
446	448	2	Grey shale, thin blk seams
448	449	1	Brown sandstone
449	450	1	Dark brown shale; strong reaction on cuttings, none on cores. Bottom hole water 4° hydrometer test.
450	460	10	Light brown & grey shale, very hard; petroleum odor
460	490	30	light brown shale; stronger petroleum odor
490	495	5	Light brown and grey shale
495	500	5	Variegated light, dark brown, grey and yellow shale
500	515	15	Light brown and grey shale; hydrometer test 3°
515	520	5	Variegated light, dark brown & grey shale; Vgr. reaction
520	525	5	Light brown, grey, small amount white shale less petroleum odor.
525	530	5	Variegated grey, light brown & reddish shale
530	540	10	Grey and brown shale; set 6 5/8" casing at 540'
540	545	5	Dark brown shale
545	550	5	Grey shale; black water came in, raised slowly to within 30' of ground level. 10° test, good vinegar reaction
550	560	10	Brown & grey shale; drilling solution had plaster like appearance, evidence of Trona in solution Underreamed-set casing at 556, made formation shut-off
560	570	10	Grey shale; drilling solution same as above
570	595	25	Grey and brown shale, solution shows good reaction. 10° hydrometer reading
595	610	15	Light grey shale, seepage of trona in solution 595'-600' Approx 25 gal in hole from 14 hr setting
610	630	20	Dark grey shale
630	635	5	Grey and brown shale
635	650	15	Dark grey shale
650	665	15	Grey and brown shale
665	686	21	Variegated grey, green and brown shale; started coring at 686
686	702½	16½	Variegated grey, green and brown shale cores

702½ total depth

Department of the Interior
BUREAU OF MINES

LAND OFFICE _____
Serial (GLO. NO) _____
Lease or Permit _____

LOG OF PROSPECT BORE HOLE

Lessee Patricia S. McDermott, Evanston 024437

Address 4147 Davana Road, Sherman Oaks, California

Driller W. D. Thomas, 231 K St., Rock Springs, Wyo.

Commenced drilling Oct. 17, 1949 Finished Mar. 3, 1950

Hole No. 1 Sec. 8 T. 23 N R 106 W Meridian 6th P.M.

County Sweetwater State Wyoming

The information given herewith is a complete and correct record of the bore hole and all work done thereon, so far as can be determined from all available records.

Signed /s/ J. R. McDermott

Title Operator

Subscribed and sworn to before me this _____ day of _____, 1950

_____
Notary public

Elevation of top of hole 7
relative to sea level 65~~0~~5 feet. FORMATION RECORD

DEPTH From- feet	To- feet	Thickness of stratum feet	Formation (Kind of rock, etc.)	REMARKS.
0	20	20	Top soil, red clay	Water seepage at 20'
20	50	30	Grey shale	
50	55	5	Grey rock	Hard
55	65	10	Grey shale and rock	
65	95	30	Grey shale	large water stream 92'
95	110	15	Shale	Water washed away cuttings
110	150	40	Grey shale,	Hard layers dark grey shale
150	190	40	Grey shale	Water at 152'
190	215	25	Brown shale	
215	285	70	Grey shale	Water increase at 250'
285	295	10	Shale and rock	
295	305	10	Light grey shale	
305	320	15	Grey shale and rock	
320	330	10	Brown shale	
330	350	20	Brown shale and rock	
350	360	10	Light brown shale	
360	370	10	Grey shale	
370	417	47	Dark brown shale	Strong gas odor
417	425	8	Light grey shale	
425	440	15	Grey lime and shale	Dark brown water traces of trona brine

(cont'd)

440	460	20	Hard grey shale
460	471	11	Light grey shale, medium hard
471	472	1	Dark brown shale
472	480	8	Grey shale 8 5/8" casing set at 480' complete shut-off accomplished.
480	483	3	Dark brown shale
483	495	12	Layers brown and grey shale (dark brown water)trona brine started flowing at 490'
495	510	15	Grey shale, soft
510	560	50	Grey shale, medium hard
560	572	12	Layers grey and brown shale
572	576	4	Grey shale, soft
576	583	7	Layers grey and brown shale
583	590	7	Grey shale, soft
590	600	10	Variegated shale, traces brown, grey
600	611	11	Grey shale and limestone
611	613	2	Grey shale, soft
613	625	12	Grey shale and limestone
			Temporary well shutdown Dec. 22, 1949;Resumed operation January 10, 1950; hole underreamed, casing lowered for formation shut-off to 498' 3". Dark brown water at 490' shut completely out.
625	640	15	Grey shale and silica
640	642	2	Brown shale
642	652	10	Grey shale and silica
652	655	3	Grey shale, traces of trona indicated by reaction of vinegar on cuttings. Started coring at 655'
655	682	27	Grey shale
682	684	2	Dark brown shale
684	687	3	Dark brown and grey shale
687	690	3	Variegated grey, green and dark brown shale
690	698	8	Variegated grey and dark brown shale
698	705	7	Variegated grey, blue, and dark brown shale
705	708½	3½	Dark brown shale
708½	709	½	Brown sandrock
709	710	1	Grey shale
710	716	6	Grey conglomerate, particles of lime and sand Coring discontinued, reamed 6" core hole to 8" continue drilling
716	725	9	Grey and dark brown shale, lime particles
725	740	15	Grey sandstone
740	750	10	Grey and dark brown shale, lime particles
750	760	10	Grey sandstone and sand, water at 760'
760	810	50	Light grey sand, water started small flow at 775'
810	855	45	Light grey sandstone, fine grained, w/blk particles
855	860	5	Light grey sand, soft, coarse w/crystals, water increase at 895', increasing flow with penetration of sand. Estimated flow 400 to 500 GPM
860	885	15	Light grey sandstone, fine grained, w/blk particles
885	888	3	Darker grey sandstone, fine grained, hard
888	895	7	Grey sandstone, fine grained, hard
895	933	38	Grey sand,fine, soft, w/blk particles. No increase in water flow.
933	963	30	Grey sandstone, hard, fine grained, w/blk particles
963	975	12	Grey sand, fine, soft w/blk particles, no increase in water flow

(cont'd)

975	977	2	Grey sandstone, hard, fine grained started coring at 977'
977	984	7	Grey sandstone, porous, w/thin blk seams
984	997	2	Grey sandstone, porous, (flow still 400 to 500 GPM
997	999	2	Grey sandstone, very hard
999	1004	5	Grey sand, coarse, increase negative
1004	1005	1	Grey sandstone, porous, w/thin blk seams
1005	1006	1	Grey sandstone, hard
1006	1019	13	Grey sandstone, porous blk particles
1019	1020	1	Grey sandstone, very soft
1020	1040	20	Grey sandstone, porous, blk particles
1040	1040'3"	3"	Grey rock, very hard
1040'3"	1055	14'9"	Grey sandstone, porous blk particles
1055	1062	7	Grey sandstone, finer texture, hard
1062	1065	3	Grey sandstone, porous, thin blk seams noted

CHRISTION VRANG-GEOLOGIST TELEPHONE 675 BOX 536, EVANSTON, WYOMING

October 29, 1949

NOTES AND OBSERVATIONS ON THE TRONA DEVELOPMENT,
McDERMOTT BASIN EXPLORATION, SWEETWATER COUNTY, WYOMING.

From observations made of the surface structural attitudes, September 25, one-half day, and full days on September 28, October 6 and 19, 1949, coupled with a study of the aerial photographs and the logs of wells Nos. 1 and 2, in the McDermott Basin (Township 23 North, Ranges 106 and 107 West and possibly involving the southernmost tier of sections in Township 24 North, Ranges 106 and 107 West) there is definite evidence that a structural depression obtains thereat. The lowest point is marked by the soda flat in sections 5 and 6, T. 23 N., R. 106 W.

Southwardly from the soda flat and in sections 17 and 18 the formations perceptibly rise indicating a northerly component through sections 7, 8 and 9, T. 23 N., R. 106 W. Eastwardly of the McDermott Basin, in Tps. 23 and 24 N., R. 105 W., the apparent dip is westerly. Northwardly towards the settlement of Eden near the middle portion of T. 24 N., R. 106 W., the apparent structural attitude is that of a southward component. A definite eastward inclination of the Bridger beds was observed and measured by J. R. McDermott and the writer ($1\frac{1}{2}$° to 2°) in the exposed break in the formation in sections 11 and 12, T. 23 N., R. 107 W., on October 19, 1949. Factual surface evidence was sought to support the postulate of Hoyt Gale that a possible fault trends from the south ¼-corner of section 6, T. 23 N., northeasterly to the center of Section 32, T. 24 N., R. 106 W. While the abrupt bend in the drainage of a stream makes a right-angle in the center of the section no other significant surface manifestation in support of the conjectured fault was found. The vertical book-like laminations found on the surface in the central portion of section 12, T. 23 N., R. 107 W., is in line with the southward projection of the assumed fault and, in addition, the adjoining abrupt break in the Bridger beds (also in sec. 12) might be speculated upon as further evidence yet this evidence seems to be inclusive. The break in the Bridger beds hold more closely to an easterly and westerly direction but without lineal continuity to its trend and therefore is regarded as a typical bad land erosion feature.

Some speculation was accorded the upturned thin bedded sandy lime layers found but since there was no visible evidence of a break in the proximal Bridger beds exposed in the cliff, the possibility of a real fault seems to be uncertain.

Some discordancy in the surface dips is observable from the butte in section 12, T. 23 N., R. 107 W. The Bridger beds dip markedly eastward which is at variance with the regional dip in this area. The normal dip from the Rock Springs Uplift is westerwardly into the Green River Basin Syncline and the eastward inclination observed is therefore a reversal which obviously demarks a down fold

or syncline in the McDermott Basin area. Southwestwardly into the eroded portion of sections 13, 14, 23 and 24, T. 23 N., R. 107 W., a similar directional component is well developed and is plainly seen from the vantage point in section 12.

It is additionally observable that the beds farther to the west, in sections 4, 5, 8 and 9 reassume the regional westward dip. The two last components, taken by themselves, indicate a high in the neighborhood of section 12 but since the Bridger beds in section 11 indicate an eastward dip, discordancy is suspected which may justify the assumption that sub-surface igneous disturbance may be responsible. Inasmuch as igneous activity has been attendant upon the close of the tectonic deformation resulting in the great Rock Springs Uplift with eruptions of leucite stocks, dikes and flows, at various points, some consideration should be given to the possibility of uneruptted igneous masses in the McDermott Basin region.

Twelve miles eastwardly at Boar's Tusk, section 16, T. 23 N., R. 104 W., and 25 miles southerly at Pilot's Butte, section 10, T. 19 N., R. 106 W., the igneous leucite stocks have emerged as prominent land marks. The finding of a piece of igneous material in well No. 1, would seem to render the probability of a nearby igneous body a more insistent one.

If an uneruptted mass or masses of igneous rock, has or have, invaded the near-to-surface formations in the McDermott Basin, local folding and faulting will naturally have obtained as a resultant of that activity. The resulting structural disharmony to an otherwise gentle westward dipping flank of the Rock Springs Uplift is now readily appreciated.

Wells Nos. 1 and 2 are 2,500 feet or more apart, both of which are flowing trona wells encountered at 477 and 515 feet respectively. A wide area of a productive liquid trona deposit, 5.5% trona solid has consequently been established. The slightly greater depth of No. 2 is partly explained by the slightly greater elevation over that of No. 1 but does not fully account for the difference of (515-477) 38 feet.

It must be pointed out that the trona fluid was not found in a sandstone but in dense limy or siliceous shale beds as prevail in various strata of the Green River and Bridger formations. Since these strata are not porous we are obliged to set out the hypothesis that fractures in the impervious beds account for the presence of the fluid under pressure, - extraordinary pressure resulting in flowing wells the initial head of which may approximate 2,500 or 3,000 barrels per day before declining to a settled flow of perhaps 400 or 500 barrels per day. When shut in again the pressure builds up to its original head.

In a contemplation of the origin of the fractures in the otherwise silicious and impermeable beds we find ourselves considering the proximity of transgressive igneous bosses that might serve as proximate causes. This leads to further appreciation, if not apprehension, as to probable greater quantity or quantities, accompanied by commensurate flows and pressures if the McDermott trona prospect holes are deepened into a reservoir sand or other porous medium.

A belt of trona production is demarked as trending between Wells Nos. 1 and 2 which belt is not limited by the width of 2,500 feet. Because the attitude of the terrain to the north suggests structural elevation the artesian trona belt probably will not be found beyond another half mile. The fact that the John Hay well in the middle of section 4 did not encounter an artesian flow when it hit the trona horizon at 150 feet indicates that this well is outside of the artesian basin.

Westwardly the limits are unknown but it is presumed that a barrier of some sort exists westwardly of soda flat in order to effect artesian flows. If a barrier, by reason of an unrecognized displacement or a concealed volcanic dike, exists westwardly an adequate explanation for the artesian trona flows in McDermott Basin is obvious enough but such a barrier would not preclude the repetition of a similar artesian catchment farther westward beyond the spillway.

The origin of the trona water must start with meteoric waters finding their intake at a higher elevation in a porous horizon which serves as a medium for downward circulation of these fluids toward the McDermott Basin. The conduit for the transportation of the waters is believed to be a porous member in the Green River formation, probably a sandstone. These waters became heated with depth and they leached out chemical salts in its progress. Waters were present at the time of the volcanic leucite invasion and it can only be imagined what the chemical reactions imposed during a period of time equal to a geological era. Oil was undoubtedly retorted out of the kerogen-bearing Green River shales. Chemicals in contact with this freed oil coupled with intense heat and pressure resulted in the strange and complex fluid effusions that are observed at the flowing trona wells, Nos. 1 and 2, today. Trona is present in the fluid as well as some trace of petroleum condensate along with other chemical fractions which ultimate analyses may eventually reveal.

From the structural evidence, a long gentle dip off of the Rock Springs Uplift, into the first catchment, we are confronted with the fact that the McDermott Basin structural trap constitutes the primary, and if not the sole entrapment then one of the primary deposits of trona in the greater Green River Basin.

It is not believed that the main source of trona has yet been penetrated since it is reasonable to expect the main production to be in a porous medium below the present horizon of discovery. What has been developed up-to-date may be said to be "out-posts" of the primary deposit or deposits below. The possibilities of the primal accumulation cannot be estimated.

As a guide to future exploration of the McDermott Basin, with a view towards maximum development it seems insistent that well No. 2 should be deepened until a porous reservoir is encountered. Thereafter, with results of the completed well No. 3 in hand, cognizance of the structural features should be accorded in the selection of future prospecting for maximum flows. The results of No. 3 should serve as a test of the area southeastwardly and reveal whether

or not the trona artesian pool extends to or beyond that point. This well should also provide information as to the next advisable location, - whether No. 4 should be designated at "Gun Sight" in section 20, T. 23 N., R. 106 W., or elsewhere.

It seems likely that the structural depression may trend uninterruptedly to the west from soda flat and thence southwesterwardly through sections 11 and 12, T. 23 N., R. 107 W., but additional surface study seems to be necessary before more can be said at this time.

Respectfully Yours,

Christian Vrang

C
O
P
Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

1600 East First South Street
Salt Lake City, Utah

July 3, 1950

Mr. Homer J. Ballinger
Oil-Shale Mine Branch
Bureau of Mines
P. O. Box 792
Rifle, Colorado

Through: J. D. Lankford,
Acting Chief

Dear Mr. Ballinger:

This is in answer to your letter of June 21 requesting information on the concentration andpurification of the trona in brines obtained from trona wells drilled by John A. McDermott near Eden, Wyoming. Preliminary tests were made on three trona and oil samples assaying as follows:

Sample		Analysis, grams per liter			
		Na^+	CO_3^{--}	HCO_3^-	Organic Material
No. 1	Trona	22.4	23.2	9.9	1.5
No. 1	Oil	12.3	12.4	20.0	13.2
No. 2	Oil	22.6	8.7	42.1	46.5

The exploratory tests were made on the number 1 trona sample, and confirmatory tests were made on the oil samples because of the relatively small volumes of sample submitted. Although the composition of the samples varied considerably, no difficulty was experienced in recovering a relatively pure sodium carbonate product from each of the samples, because the organic matter was readily removed by calcining at 750° C. A relatively pure sodium bicarbonate product could be recovered from the brines similar to the number 1 trona sample; however, as the organic material increases, the grade of product tends to decrease because of entrained carbonaceous material in the bicarbonate crystals.

Two methods of concentration and purification were investigated: (1) evaporation of the water and recovery of the mixed carbonates which were calcined to Na_2CO_3, and (2) freezing out of the water and carbonating the brine to recover $NaHCO_3$. RELATIVELY pure Na_2CO_3 and $NaHCO_3$ were

obtained by both methods; however, the use of either method or a combination of both methods would require considerable capital investment and a more exhaustive investigation to determine optimum conditions.

Evaporation of the water and calcination of the residue at 750° C. gave a product assaying more than 96 percent Na_2CO_3. It was necessary to evaporate approximately 19 pounds of water per pound of sodium carbonate recovered. This method would require special evaporating equipment as well as a cheap source of fuel. In an evaporator operating at 50 percent efficiency, the theoretical amount of heat required to evaporate this quantity of water would be 40,000 b.t.u., or about 3 pounds of coal per pound of Na_2CO_3 recovered. In addition, fuel would be required for calcination.

The alternate method entails freezing out a portion of the water, carbonating the brine to convert Na_2CO_3, to $NaHCO_3$, and recovering the $NaHCO_3$ by filtration. Very close temperature control would be necessary to operate effectively because the freezing point of the eutectic solution of the Na_2CO_3-$NaHCO_3$-H_2O system is only minus 3.30 C. This gives an operating range of less than 5° C. In addition the eutectic brine composition is 32 grams CO_3^{--} ion and 32 grams HCO_3^- ion per liter1/ or 56.5 grams Na_2CO_3 and 44.0 grams $NaHCO_3$ which represents a considerable portion of the original salts.

In a test of a sample of number 1 trona, approximately 65 percent of the water was removed as an ice, but it contained 37 percent of the Na_2CO_3. When the ice melted, the solution contained 34 grams Na_2CO_3 per liter, and this solution would have to be evaporated to recover the dissolved sodium carbonate. Carbonation of the brine would convert the remainder of the Na_2CO_3 to $NaHCO_3$, and 48 percent of the contained $NaHCO_3$ would precipitate and could be recovered by filtration. This method would yield approximately 15 percent of the salts in the brine as $NaHCO_3$.

These data indicate that at the present price of soda ash, such methods of recovery are not economic unless cheap fuel is available, and advantage can be taken of solar heat for part of the evaporation. Because of the cold winter weather, a combination of solar evaporation and freezing of the brine might prove feasible on a limited scale.

Very truly yours,

/s/ S. R. Zimmerley, Chief
Metallurgical Division
Region IV

1/ Hill, A. E., and Bacon, L. R., Ternary Systems VI. Na_2CO_3-$NaHCO_3$-H_2O Jour. Amer. Chem. Society 49, 2487-95 (1927).

September 7, 1949

TRONA FIELD TESTS:

McDermott Basin, Sec. 5, TWP 23, RGE 106,

Well #1, depth approximately 470 feet.

Gusher struck August 20, 1949

Two gallon samples taken at 8 a.m. and 8:30 a.m.

Gusher output estimated at 10,000 to 12,000 bbls a day.

The above information supplied by the McDermott crew.

Analytical findings:

Both samples practically alike except for color which is deeper brown in early sample.

Crude trona:	4.42% and 4.78%	Average:	4.60%
	sodium sulphate:		0.0059%
	sodium chloride:		0.0745%
	in water solution.		

Brown precipitate separated by neutralization:

in sample 8 a.m.	0.2340%
in sample 8:30 a.m.	0.0580%

by
/s/ R. L. Andreau, Ch. E.

notarized

(John R. McDermott)

ROLAND L. ANDREAU
Consulting and Research Chemist
4227 Van Nuys Boulevard
Sherman Oaks, California

January 20, 1950

TRONA FIELD PRELIMINARY FINDINGS

McDermott Basin, S. W. Wyoming

Well #1 - NW 1/4 - Sec. 5 - T. 23 N.- R. 106 W.

Well #2 - SE 1/4 - Sec. 6 - T. 23 N.- R. 106 W.

Well #3 - NE 1/4 - Sec. 8 - T. 23 N.- R. 106 W.

. . . . . .

An area of twenty five square miles, located in southwestern Wyoming, has been investigated for the presence of Trona.

To date, three wells have been sunk, which have produced a solution of trona of unusual quality, the mixture of sodium carbonates assaying better than 98.5% on an anhydrous basis, with only traces of chlorides, sulfates and borates, a small percentage of calcium, magnesium and potash, and a variable quantity of a dark material, presumably a mixture of humic and naphthenic acids found only at a high level, easy to cut off and to separate.

WELLS: The first well was a gusher, delivering about 10,000 barrels of trona solution a day from a depth of 477 feet. It has been capped until further notice.

The second well also was a gusher, with an output of about one half of the first well, from a depth of approximately 517 feet. It has also been capped temporarily.

The third well is a flowing well, output not accurately determined, the flow started at a depth of 540 feet. Drilling and coring are now under way to a greater depth.

These three wells form a triangle, the distances between them being respectively about 3100 feet, 4000 feet and 4300 feet.

It must be noticed that the same concentration and quality of trona is delivered by the three wells in spite of their widely separated locations. Also the respective depth of 477 feet, 517 feet and 540 feet, taking into consideration the irregularities of the surface level, would seem to indicate the existence of a large subterranean horizontal flow of liquid.

At depths averaging 420 feet the dark substance mentioned above, and which is soluble in trona water, was obtained from an apparently sealed layer but further drilling and driving in the casings soon by-passed this layer and clear trona solution was obtained at lower levels.

It is expected that a clear, nearly colorless solution will be delivered by all wells after the casings have been driven into the main trona bed.

COMPOSITION: So far, all three wells have been delivering the same type of solution, i.e., concentration, percentage of trona, slight impurities and temperature which is 52°F.

As all analytical results have been closely related, an average composition based on 44 analyses from all wells is given in the folling table:

Sp.G	1.060	
Sodium carbonate,	4.46%	anhydrous basis
Sodium bicarbonate,	1.01%	- -
Potassium carbonate,	0.03%	- -
Calcium carbonate,) Magnesium carbonate,)	0.01%	- -
Chlorides,) Sulfates,) Borates,)	0.02%	

This is equivalent to 5.47% anhydrous sodium carbonates in the solution from either well. Translated into anhydrous soda ash by elimination of the carbon dioxide of the bicarbonate, the percentage would be 5.1%.

Should the carbonates be considered as hydrated, as they are in the flowing solution, the concentration would be 12,39%.

We offer no explanation as to this constant concentration; it is possible that a certain amount of flowing water passes at a certain speed through a trona bed, dissolving the carbonates as it passes on its way to the wells. However, as the material is of a high grade of purity, there must be a bed of such solid pure trona in the vicinity. Geologists are studying the matter now and their findings will be given in a special report.

We are much indebted to the members of the staff of the U. S. Geological Survey office of Salt Lake City who have inspected and sampled the solutions from the various wells. Their help has been greatly appreciated and our thanks are hereby extended.

RECOVERY AND FINAL DISPOSITION: Two grades of carbonates may be recovered from the trona solution:

1 - A technical grade of mixed carbonates, in a dry form, to be used as a general source of alkali. This will contain sodium carbonate, some sodium bicarbonate and small amounts of potassium carbonate with traces of other soluble impurities. There is quite a demand for such a product.

2 - A purified grade of sodium carbonate, or soda ash, containing no sodium bicarbonate.and only small traces of soluble impurities, like the standard commercial product.

The basic method of recovery is by evaporation and concentration of the clear trona brine. Two processes can be used, corresponding respectively to the product of the two grades mentioned above.

1 - Rapid evaporation in a current of comparatively dry air at a temperature sufficient to take out the moisture but not quite high enough to

decompose all the sodium bicarbonate by driving out its carbon dioxide. The dried material to be processed for bagging.

2 - Part air evaporation, using the above method, filtering, then finishing the concentration and crystallization in a multiple effect followed by centrifuging, drying and bagging.

Either method will require fuel oil which, fortunately, can be secured near by. Should a greater concentration of trona be available at the wells, the expense of recovery would be reduced in proportion, less oil and smaller equipment for evaporation would be necessary, all the difference going to the profit side.

Preliminary estimates have shown that a plant composed of units, each capable of processing 25 tons of carbonate per day, would be the most profitable.

With several units in operation, while the equipment would be mostly a multiple of the first unit, some parts could be joined together and worked with the assistance of automatic controls.

In this manner, one man could serve in several units at the same time and the labor expenses be accordingly reduced.

The operators who are taking care of the drilling say that the present delivery of the wells is as follows:

Well #1 :	10,000 bbls. a day,	approximately.
Well #2 :	7,500 bbls. a day,	-
Well #3 :	2,500 bbls. a day,	-
Total :	20,000 bbls a day	-

This is equivalent to 840,000 gallons of brine containing about 168 tons of recoverable sodium carbonate per day.

The investigation is being continued and decided variations in the concentration or output of the trona brine will require new reports to follow.

/s/ Roland L. Andreau

Chemical Engineer

notarized------- (1/20/1950

ESTIMATED COST OF OPERATING ONE UNIT OF 25 TONS

SODIUM CARBONATE, TECHNICAL GRADE

- DAILY -

Trona brine concentration, recoverable sodium carbonate, anhydrous basis:	5%	10%	15%
Fuel oil needed daily barrels:	150	75	50
at $2.00 a bbl. :	$ 300.00	$150.00	$100.00
Equipment, amortization, ten years basis:	30.00	30.00	30.00
Maintenance:	30.00	30.00	30.00
Labor:	100.00	100.00	100.00
Cost of production:	$ 460.00	$ 310.00	$ 260.00
Selling price, $20.00 ton, bulk, F.O.B.:	$ 500.00	$ 500.00	$ 500.00
Margin; packing and profit	$ 40.00	$ 190.00	$ 240.00

Rock Springs, Wyoming.
September 14th, 1950.

Mr. H. D. Thomas, Esq.,
Wyoming State Geologist,
Laramie, Wyoming.

Dear Mr. Thomas:

I wish to acknowledge receipt of your telephone call of yesterday and your telegram of today, both concerning information and data regarding the exploration of our Trona Project in McDermott Basin, Sweetwater County, Wyoming.

A word about our exploration. To date we have drilled and completed Four Wells and are suspended at a depth of 815 feet in our No. 5 well, namely the Patrick S. McDermott well in the center of Section 13, Twp. 23 north, Range 107 west.

In our first Four wells, we encountered Trona Brine and in addition thereto, we discovered a dark brownish-blackish liquid covered under our Associated Minerals. We encountered the black liquid first and about fifty feet deeper, we picked up the Trona Brine.

This stange black liquid, to our knowledge, never before encountered in mining and oil annals of the Rocky Mountain area, is now undergoing examination by the leading chemical concerns. Officially and unofficially, we have been advised that assays and analyses disclose it to be in the soap, glue, lacquer, shellac, paint and varnish ranges, lately it has been under examination by synthetic rubber research chemists because of its containing Butyric Acid and they have reported favorably upon its potential use along such lines. Parke-Davis Drug Company have examined it and also taken earth samples and their letter to our research chemist, Mr. Roland Andreau, Sherman Oaks, California, indicates the presence of an Anti-Biotic drug. Lately, Sharpe-Dohne Drug Company have asked for samples for examination, all together, it would appear that the Associated Minerals are assuming quite a bit of importance.

At present, we are discussing ways and means that will concern the erection of plant equipment for the evaporation of our Trona Brine to augment the Solar evaporation and thus recover the Sodium Salts. As yet, we have reached no decision as to the manner of handling the dark liquid but Chicago steel and foundry people have notified us that they could employ it in its present stage for use in connection with other ingedients in the making of molds and patterns, so it might be that we would employ tank cars to ship our product in the same manner as crude oil but further tests may show that because of the solubility in water of the organic material that it would be more feasible to evaporate.

For your information and for your office files, I am enclosing the following instruments:

1 Plat showing the filings to date in the area.
1 Original Map of McDermott Basin.
1 Blue Print showing location of wells drilled and future wells.
1 Report on analysis of black liquid from out of W. E. Shallenberger well in the SE¼SE¼ of Section 6--23--106, by the Salt Lake City, Utah Laboratory of the U. S. Bureau of Mines.
1 Report on analysis of McDermott No. 1 in Section 5 and Shallenberger No. 1 in Section 6, by the U. S. Bureau of Mines Laboratory at Laramie Wyoming.
1 Geologic Report on McDermott Basin by Christian Vrang, Consulting Geologist of Evanston, Wyoming.
1 Notes and observations by Christian Vrang, Geologist, on development of the exploration phase in McDermott Basin

ALL OF THE ABOVE, YOU MAY RETAIN FOR YOUR FILES.

The following instruments are loaned to you for the purpose of making typewritten or photostatic copies and will ask you to return these to me as soon as convenient, as they are my own copies for my own files.

1. Trona Field Preliminary Finds, dated Jan. 20, 1950, by Roland Andreau.
1. Trona Field Tests, dated Sept. 7th, 1949, by Roland Andreau.
1. Analysis Report by Casper Wyoming Laboratory of the United States Geological Survey on the Trona Brine from out of Wm. O. McDermott No. 1 in Section 5---23---106.
1. Photostatic copy of letter to Roland Andreau from Parke-Davis Drug Company on their findings from analysis of the black liquid from out of the Wm. E. Shallenberger well, sample from a depth of 419 feet, in Section 6---23---106.
1. Registration of well for appropriation of underground water, said water well being in the NW¼NE¼ of Section 8---23---106. (You appeared interested in water sources as regards the presence of oil shales in McDermott Basin, so I bring the official registration with its data to your attention.)
1. Drilling Log of Wm. O. McDermott well, Section 5--23---106.
1. Drilling Log of W. E. Shallenberger well, Section 6--23---106.
1. Drilling Log of Patricia S. McDermott well, Section 8--23---106.
1. Drilling Log of Elizabeth Shallenberger well, Section 20---23---106.
1. Drilling Log of Patrick S. McDermott well, Section 13--23---107.

I might state that the Trona content increased in the Elizabeth Shallenberger well to between 6½ and 7 percent. I find that the analyses of wells No. 3 and No. 4 are absent from my files but in an emergency, the Mineral Division, United States Geological Survey, Federal Bldg. Salt Lake City, Utah, can confirm the fact that their analysis showed the Brine to be stronger in Sodium Salts.

I hope that the enclosed documents will serve to furnish you with information concerning our activities and as you can see, we are going ahead with our further exploration. While most of our exploration has and will be upon the Public Domain, nevertheless we consider it to be a development of the natural resources of Wyoming and we will be very glad to furnish your office with information and data concerning our project and to exchange views with you and to ask you for information and guidance from time to time.

If your footsteps should wander in this direction, I will be happy to meet with you and weather permitting, to take you out to McDermott Basin for an inspection of the area and our progress to date, also if I am passing through Laramie, I shall take the opportunity to call upon you.

Do not hesitate to call upon me for any further information.

I attempted to secure permission from the Bureau of Land Management to as it were, unitize the area, not with the idea of evading exploration on each and every permit but rather because of the uniqueness of the area and the fact that we had discovered liquid Trona Brine, similar in form and in exploration and production to an oil discovery but the Department could not entertain the request at this particular time but I feel that it is possible that they may reverse their decision later on, since I will not be adopting or causing them to establish a precedent because with the exception of Searles Lake in California, I know of no other such source of liquid Trona Brine.

With every good wish, Mr. Thomas.

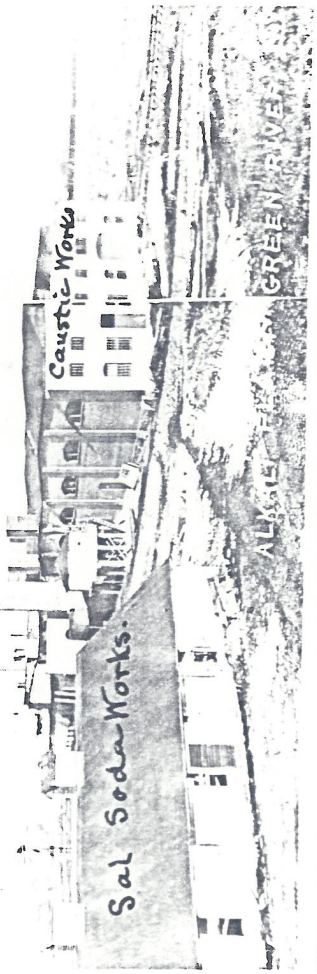
Very Truly Yours.

John R. McDermott

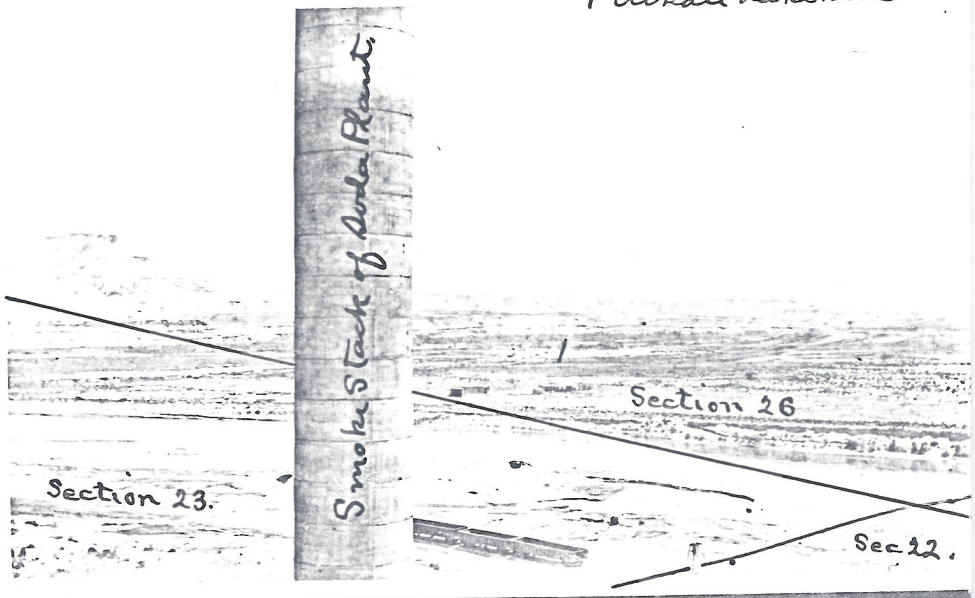
John R. McDermott,
432 Walnut Street, Apt No. 4,
Rock Springs, Wyoming.
Tele. 1553-W.

MAILING ADDRESS,
POST OFFICE BOX 576,
ROCK SPRINGS, WYOMING.

adjoining Sec 26. see Map. herein



1 alkali Lake Bed



See other side

1 location of Dry bed of alkalin Lake in Sec 26.
2 " " Soda Plant now operated " 22
View taken from Castle Rock

See Reverse side

December 5, 1950

Mr. John R. McDermott
432 Walnut Street, Apt. No. 4
Rock Springs, Wyoming

Dear Mr. McDermott:

I am returning herewith the information you sent some time ago pertaining to your trona brine development in the Eden area. According to your letter, we are to retain certain maps and documents for our files. These have been kept as follows:

Plat showing filings.
Original map of McDermott Basin.
Report of analyses by the Salt Lake City Laboratory of Bureau of Mines.
Report of analyses by Laramie Laboratory of the Bureau of Mines.
Geological report by Christian Vrang.
Notes and observations by Vrang.

The material returned to you is as follows:

Locations of the 5 wells.
Trona field tests by Andreau.
Analysis by Casper office of the U. S. Geological Survey.
Photostat of letter from Parke-Davis & Company.
Trona field preliminary finds by Andreau and the registration of water well.

We have made copies of the well logs and the other material.

I am deeply grateful to you for your kindness in supplying this information. We are in the process of getting out a new bulletin on Wyoming mineral resources and the data you gave us will be very useful in the part dealing with trona. This is indeed an interesting development and I hope you will be most successful in exploiting the discovery. If we here can ever be of any help, please let us know.

Sincerely yours,

H. D. Thomas,
State Geologist

enc.
HDT:mm

PARKE, DAVIS & COMPANY

Home Offices and Laboratories

Detroil 32, Michigan

December 27, 1949

Mr. Roland L. Andreau
4227 Van Nuys Boulevard
Sherman Oaks, California

Dear Mr. Andreau:

Thank you very kindly for the six additional samples of soil which you forwarded about the first of December, and also, the four samples forwarded several weeks later. We have already put these under test and will advise if anything interesting develops.

It is interesting to note that our preliminary work with the original samples which you sent back in October show considerable antibiotic activity, when viewed qualitatively. We are continuing our development of several of the strains isolated and will advise you when our complete report is available.

Thanking you again for your kind interest in our problem and with best wishes for a Happy New Year, I am

Very truly yours,

W. H. Mohrohoff
/s/ Supt., Antibiotic Division

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

P.O. box 400
Casper, Wyoming

September 7, 1949

AIR MAIL

Memorandum

To: District Mining Supervisor
Salt Lake City, Utah

From: Petroleum Chemist, Northwestern Region

Subject: Evanston 024436, Dr. Wm. O. McDermott, Sodium Prospecting Permit, McDermott Well No. 1, SW¼NW¼, sec. 5, T. 23 N., R. 106 W., 6th P.M.

Attention: H. B. Lindeman

Following are the results on the laboratory analysis of the two samples of brine taken from the above well September 1, 1949:

Sample No.	1	2
Time Taken	9:05 AM*	9:35AM
Date	9/1/49	9/1/49
Color	Brown	Amber
Spec. Gravity 25/25°C	1.0480	1.0485
Composition (% by wt.)		
Sodium Carbonate	3.68%	4.20%
Sodium Bicarbonate	1.44%	0.73%
Total Chloride (Cl)	0.01%	0.018%
Total Sulfate (SO_4)	0.003%	0.002%
Calcium (Ca)	0.000%	0.008%
Magnesium (Mg)	0.001%	0.003%
Potash (N_2O)	0.023%	0.050%

*Note: Sample #1 reportedly taken immediately upon opening of valve.

In addition to the above mineral constituents, each sample contained some colloidal organic material which apparently contributed the color. The quantity of this material was not determined, but it appeared to be in greatest amount in the No. 1 sample.

A portion of these analyses (the sodium carbonate and sodium bicarbonate contents) has previously been given to Mr. John R. McDermott, Rock Springs, Wyoming, via telephone, September 2, 1949. In addition to the amounts of the above two constituants, a value for total possible sodium carbonate in each sample was given. This value was made up of the sum of the per cent sodium carbonate actually found plus a calculated value of sodium carbonate which might be derived from the sodium bicarbonate present in the brine. These total values were: 4.59% and 4.66% for the #1 and #2 samples respectively.

On the vasis of a rather loose usage of the term "trona", the latter values were given as the trona content of the samples. Probably a more apt description for these values would be "soda ash" content, since trona is usually described as being the sesquicarbonate of sodium (Na_2CO_3, ^2N_2O). Reportedly, the source bed of the sodium carbonate and bicarbonate found in the brines encountered in the Green River formation of the area involved is trona. Whether trona, as such, may be recovered from water solutions, this writer is unable to advise. However, it seems rather doubtful that such would be the case if any concentration process other than atmospheric evaporation were employed. Accordingly, it has been assumed that the amount of total possible normal carbonate (sodium carbonate) was of primary interest.

/s/ Kenneth P. Moore
Petroleum Chemist

cc: Mr. John R. McDermott
Park Hotel
Rock Springs, Wyoming

These papers to be returned to:
John R. McDermott
432 Walnut Street, Rock Springs,
WYOMING P.O.Box 576

MAP OF McDERMOTT BASIN

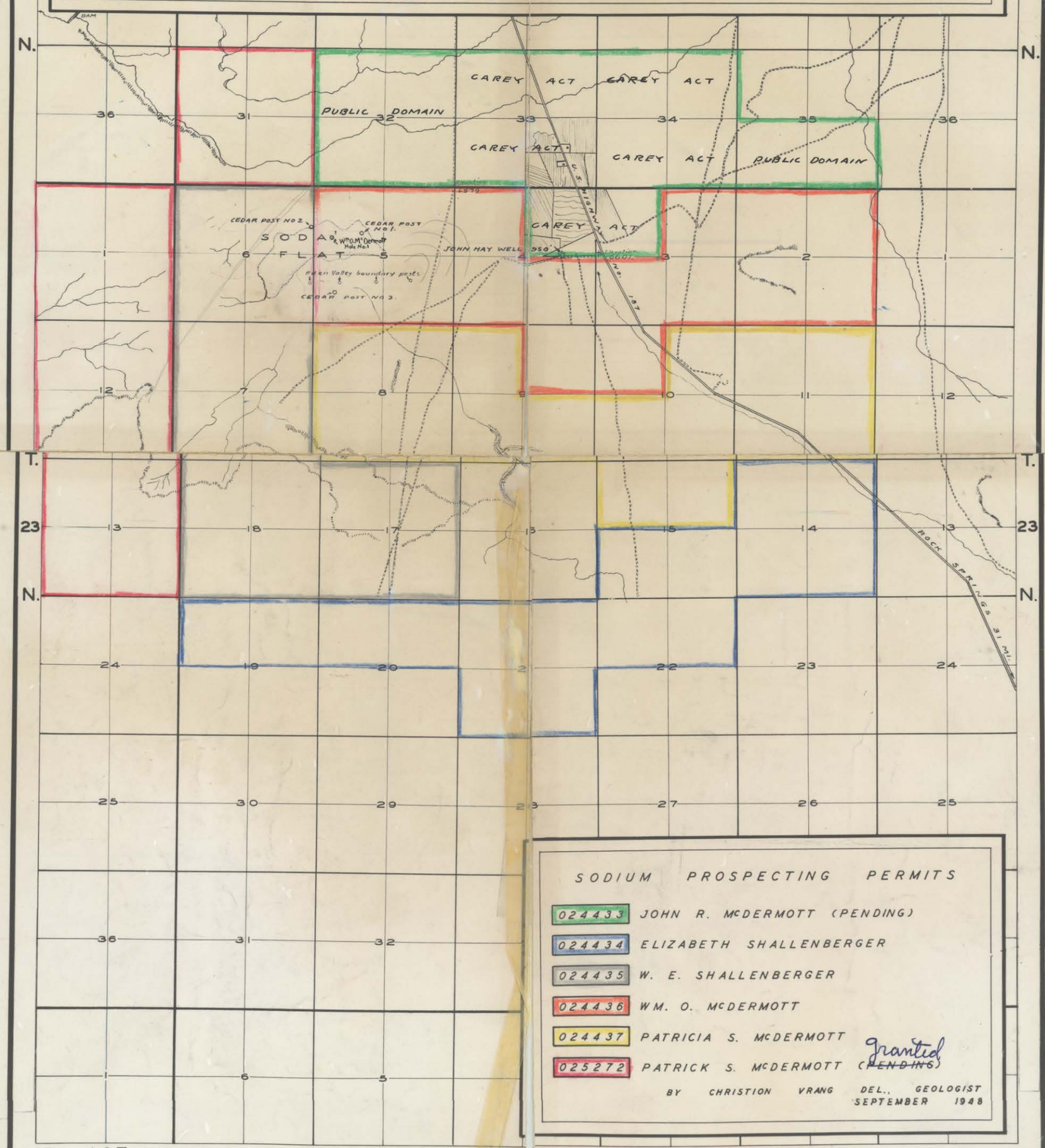
PART OF PUBLIC DOMAIN IMMEDIATELY SOUTH OF EDEN VALLEY

SWEETWATER COUNTY - WYOMING

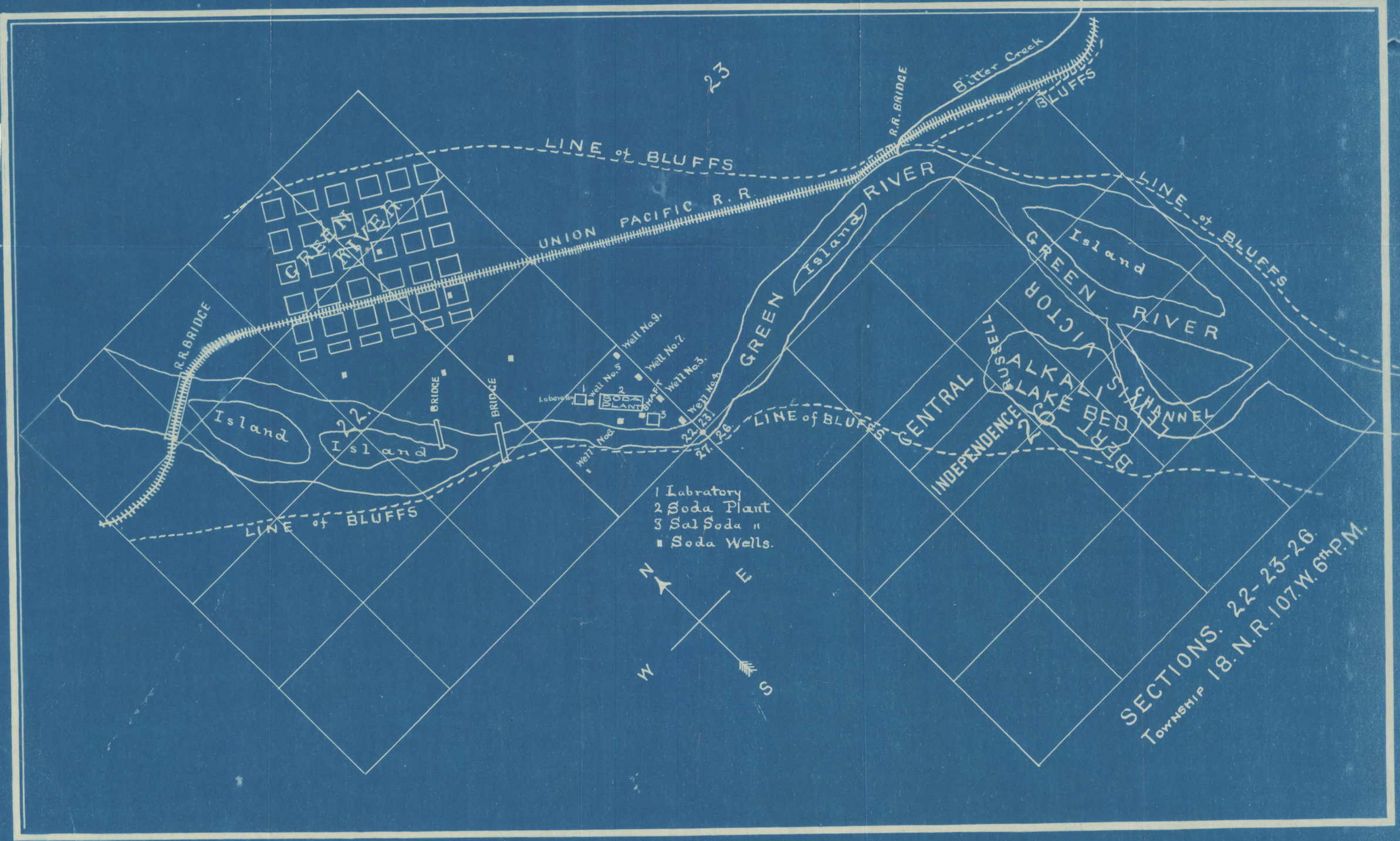
SHOWING SODIUM PROSPECTING PERMITS EVANSTON SERIAL NOS. 024433 TO 024437 INC.

SCALE 1:~~20000~~ 31,680

2" = 1 MILE



MIL-1950-3


23
LINE of BLUFFS
UNION PACIFIC R.R.
GREEN RIVER
R.R. BRIDGE
Bitter Creek
BLUFFS
LINE of BLUFFS
GREEN RIVER
Island
Island
GREEN RIVER
VICTOR
ALKALI CHANNEL
BERT LAKE BED
CENTRAL
INDEPENDENCE
R.R. BRIDGE
Island
22.
Island
BRIDGE
BRIDGE
Laboratory
Well No. 5
Well No. 9.
Well No. 7.
Well No. 3.
Well No. 4.
SODA PLANT
SHAFT
Well No. 6.
22.
23.
27.
26.
LINE of BLUFFS
LINE of BLUFFS
1 Labratory
2 Soda Plant
3 Sal Soda "
▪ Soda Wells.
N
E
W
S
SECTIONS. 22-23-26.
TOWNSHIP 18. N. R. 107. W. 6th P.M.

McDERMOTT PERMITS AND FILINGS

024433 - JOHN R. McDERMOTT - PERMIT GRANTED
024434 - ELIZABETH SHALLENBERGER - PERMIT GRANTED 7/8/48
024435 - WILLIAM EDGAR SHALLENBERGER - PERMIT GRANTED 6/11/48
024436 - WILLIAM O. McDERMOTT, M. D., ~~[PENDING]~~ Permit Granted 5-20-48.
024437 - PATRICA S. McDERMOTT - PERMIT GRANTED 6/30/48

024458 - J. H. FARRINGTON & R. A. HADLEY [PERMIT PENDING]

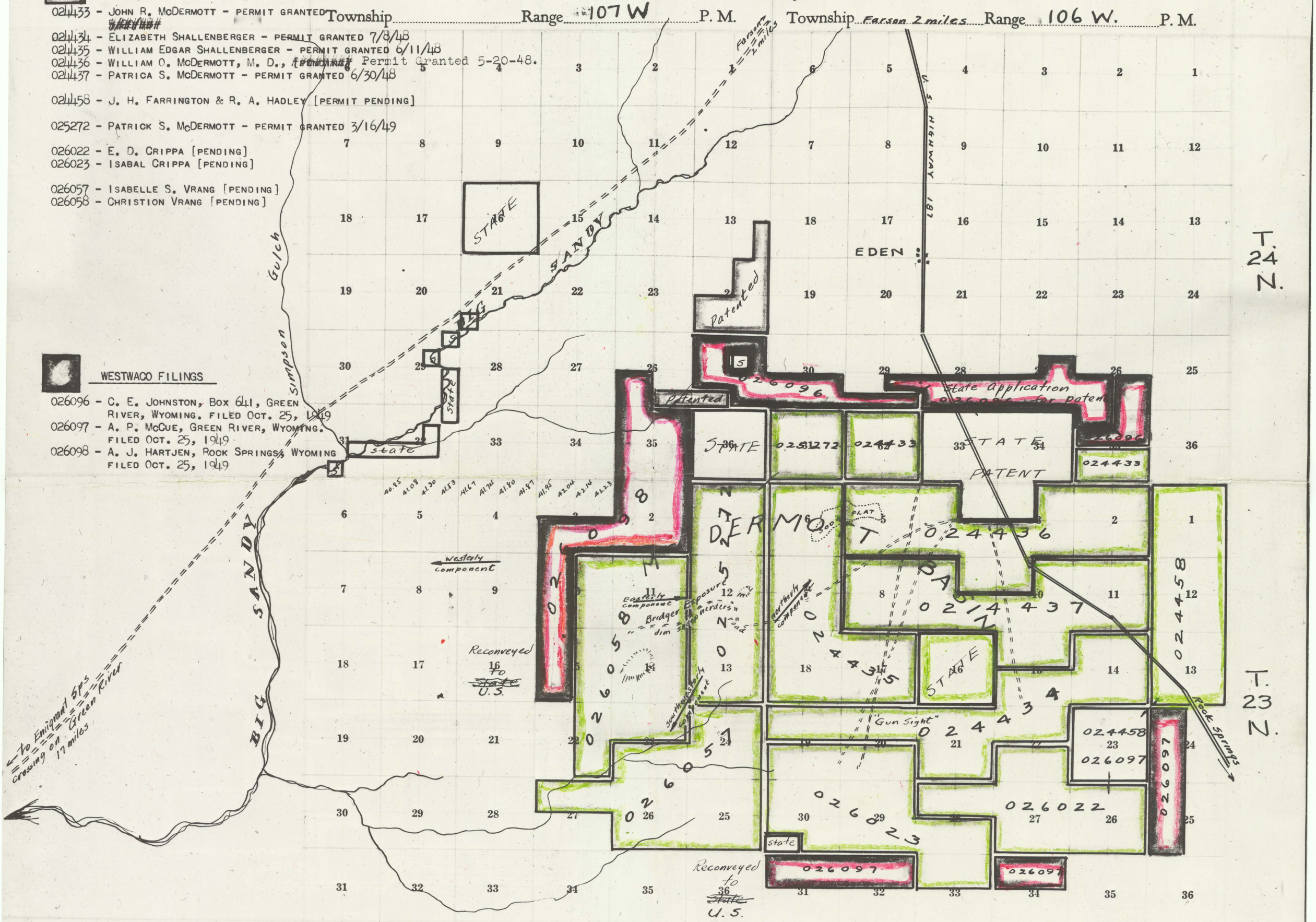
025272 - PATRICK S. McDERMOTT - PERMIT GRANTED 3/16/49

026022 - E. D. CRIPPA [PENDING]
026023 - ISABAL CRIPPA [PENDING]

026057 - ISABELLE S. VRANG [PENDING]
026058 - CHRISTION VRANG [PENDING]

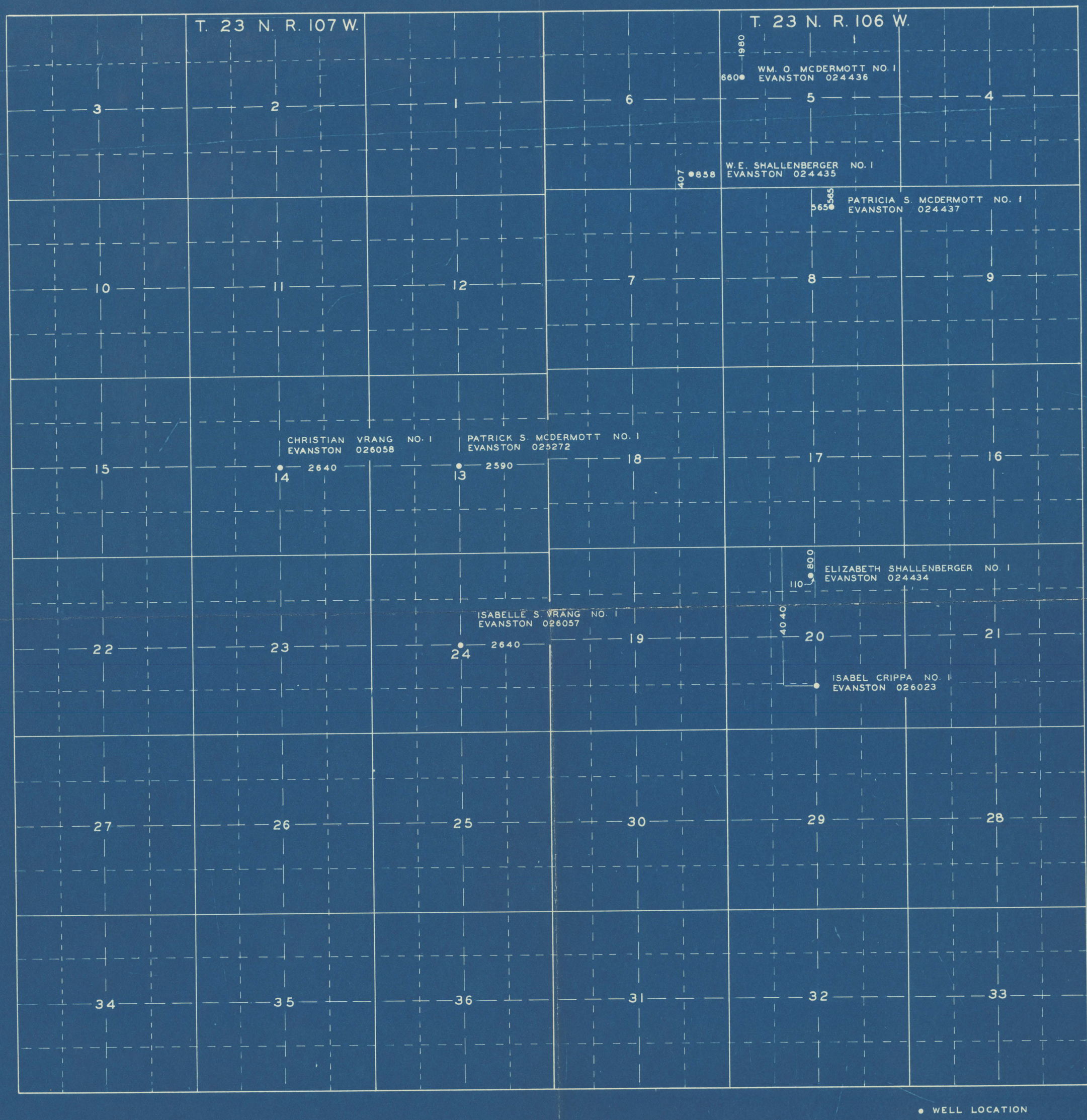
WESTWACO FILINGS

026096 - C. E. JOHNSTON, BOX 641, GREEN RIVER, WYOMING. FILED OCT. 25, 1949
026097 - A. P. McCUE, GREEN RIVER, WYOMING. FILED OCT. 25, 1949
026098 - A. J. HARTJEN, ROCK SPRINGS, WYOMING FILED OCT. 25, 1949



Township Range P. M. Township Range P. M.

KELLY CO. MFRS., SALT LAKE 1000 -5-49 FORM T4



• WELL LOCATION

TRONA WELL LOCATIONS

SCALE 1" = 2000'