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9/26/1969

OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS

State of Oregon
Department of Environmental Quality

AGENDA

Environmental Quality Commission Meeting

10:00 a.m., September 26, 1969

Portland City Council Chambers, City Hall

1220 S.W. 5th Ave., Portland, Oregon

A. Minutes of Previous Meetings

1) First meeting July 24, 1969 - Grants Pass
2) Second meeting July 25, 1969 - Roseburg
3) Special meeting August 13, 1969 - Eugene
4) Special meeting August 18, 1969 - Portland
5) Special meeting August 20, 1969 - Portland
6) Third meeting August 29, 1969 - Portland

B. Project Plans for August 1969

C. Water Quality and Waste Treatment Standards for Clackamas, Molalla and Sandy River Basins

D. Tualatin Basin Sewage Disposal - Staff Report

1) Fanno Creek Waste Discharge Permit renewal
2) Proposals for expansion of existing plants
   a) Tigard
   b) Beaverton

E. Request of City of Portland for Extension of Time for Installation of Secondary Treatment

F. Modification of Waste Discharge Permits

1) Wah Chang Albany Corp.
2) Boise Cascade Corp., St. Helens

G. Waste Discharge Permits for Columbia Slough Industries

1) Associated Meat Packers
2) H. B. Fuller Co.
3) Joslyn Manuf. & Supply Co.
4) Kenton Packing Co.
5) Malarkey Paper Co.
6) Pacific Carbide
7) Pacific Meat Co.
8) Pacific Resins & Chemicals
9) Portland Rendering Co.
10) Simpson Timber Co.
11) Union Carbide
12) Vann Barrel Co.
13) Western States Rendering

H. Waste Discharge Permits - Renewals (Domestic Sources)

1) Brown Development (Timb. Rim)
2) Cave Junction
3) Corvallis
4) Josephine Co. Sch. Dist.
5) Millersburg Sch. Dist.
6) Roseburg
7) St. Helens
8) Stanfield
9) Toledo
10) Warrenton
11) Woodburn

I. Waste Discharge Permits - Renewals (Industrial Sources)

1) Broadway Holding Co.
2) Cascade Eggs
3) Diamond Lumber Co.
4) Douglas Fir Ply., Dixonville
5) Douglas Fir Ply., Coquille
6) Fort Hill Lumber Co.
7) McCormick & Baxter
8) Swift & Company
9) Tillamook County Creamery Assn.
10) Tillamook Veneer Co.
11) U. S. Plywood, Roseburg
12) Winchester Plywood Co.
13) Zidell Explorations, Inc.

J. Waste Discharge Permits - (First Permit)

1) Auckland, Mrs. Wing Hoi
2) Battle Creek Investment
3) Western Modular Homes
4) Boise Cascade, Valsetz
5) Flynn Sand & Gravel
6) Ralf Hakanson
7) Herbert Lumber Co.
8) Keller Lumber Co.
9) F. M. Kovach
10) Norpac Growers, Dundee
11) Norpac Growers, Newberg
12) Rogue River Paving Co.
13) Round Prairie Lumber Co.
14) Stayton Canning, Silverton
15) United Flav-R-Pac, Salem
16) U. S. Plywood, Gold Beach
17) U. S. Plywood, Reedsport

K. Waste Discharge Permit Extensions

L. Authorization of Public Hearings

1) Carbon Monoxide Ambient Air Standards
2) Motor Vehicle Regulations

M. Status of Air Quality Control - Metallurgical Industries, Albany area

N. Field Burning Schedule

O. Round Prairie Lumber Co., Dillard - Progress Report

P. Forest Slash Resolution

HMP

MINUTES OF FOURTH MEETING

of the

Oregon Environmental Quality Commission

September 26, 1969

The fourth regular meeting of the Oregon Environmental Quality Commission was called to order by the Chairman at 10:00 a.m., Friday, September 26, 1969, in the City Council Chambers, City Hall, 1220 S.W. 5th Avenue, Portland, Oregon. Members present were B.A. McPhillips, Chairman, Edward C. Harms, Jr., George A. McMath, Herman P. Meierjurgen and Storrs S. Waterman.

Participating staff members included Kenneth H. Spies, Director; E.J. Weathersbee, Deputy Director; A.B. Silver, Legal Counsel; Harold M. Patterson, Air Quality Control Division Director; J.A. Jensen, Chief Engineer; Fred M. Bolton and Leo L. Baton, District Engineers; Harold L. Sawyer and E.R. Lynd, Supervising Engineers; Glen D. Carter, Water Quality Analyst; Roger C. Sherwood, Paul Rath, Harold W. McKenzie and F.A. Skirvin, Associate Engineers; R. Bruce Snyder, Meteorologist; and Richard P. Reiter, Assistant District Engineer.

MINUTES OF PREVIOUS MEETINGS

At the suggestion of Mr. Waterman the word "standard" was inserted in line 2, page 4, following the word "temperature" of the minutes for the July 24, 1969 meeting. With that change the minutes for the (1) July 24, 1969, (2) July 25, 1969, (3) August 13, 1969, (4) August 18, 1969, (5) August 20, 1969 and(6) August 29, 1969 meetings were approved as prepared by the Director.

Note: Following the September 26 meeting an addendum to the August 29, 1969 meeting regarding the Mining and Minerals Manufacturing Company was prepared.

PROJECT PLANS

It was MOVED by Mr. Waterman, seconded by Mr. McMath and carried that the actions taken by the staff during the month of August on the following 20 water pollution control and 3 solid waste disposal projects be approved:

Water Pollution Control

Date	Location	Project	Action
8/1/69	Portland	Pacific Resins and Chemicals, waste treatment	Prov. app.
8/5/69	Lake Oswego	LID #118	Prov. app.
8/6/69	Ontario	Coast Packing, preliminary	Prov. app.
8/7/69	Multnomah County	Strathmore No. 10-A sewers	Prov. app.
8/8/69	Medford	Sewage treatment plant	Prov. app.
8/8/69	Skyline West S.D.	Sewers	Prov. app.
8/13/69	Coquille, Dillard and Riddle	Roseburg Lumber and Douglas Fir Plywood, plywood glue recirculation	Prov. app.
8/14/69	West Linn	Crown Z, preliminary report, secondary treatment	Prov. app.
8/14/69	Lakeview	Lake County Fairgrounds sewer	Prov. app.
8/15/69	N. Roseburg S.D.	Newton Creek interceptor extension sewer	Prov. app.
8/18/69	Nyssa	Preliminary study	Comments sub.
8/18/69	Oakland	System and sewage treatment plant	Prov. app.
8/20/69	The Dalles	Union Pacific Pole Treatment Plant, waste treatment	Prov. app.
8/21/69	Dee	U.S. Plywood, secondary treatment	Prov. app.
8/22/69	Portland	Tom Moyer Theaters sewer and pump station	Prov. app.
8/25/69	Canby	Knights Addition sewers	Prov. app.
8/26/69	Hillsboro	Waco West Subdivision	Prov. app.
8/28/69	North Bend	Weyerhaeuser Co., preliminary report, barker effluent, plywood glue waste	Prov. app.
8/28/69	Portland	Sauvies Island Moorage, plant modifications	Prov. app.
8/29/69	Silverton	Sewage treatment plant modifications	Prov. app.

Solid Waste Disposal Facilities:

Date	Location	Project	Action
8/8/69	Roseburg	Keller Wood Waste Landfill	Prov. app.
8/13/69	Coos Bay	Roto Rooter Sewage Lagoon	Prov. app.
8/20/69	McMinnville	Koch Sanitary Landfill Expansion	Not approved

Note: No air quality control project plans were processed during August.

WATER QUALITY STANDARDS

The public hearing in the matter of proposed adoption of Water Quality and Waste Treatment Standards for the Clackamas, Molalla and Sandy Rivers having been continued from August 29, 1969, it was reported by the Director

that in the interim two additional written statements had been filed, one by Mr. A.G. Heizenrader, Managing Director of the Oregon Concrete and Aggregate Producers Association, Inc. and one by Mr. Ward Armstrong, Forest Products Director, Associated Oregon Industries. Copies of both statements have since been made a part of the Department's files in this matter.

Mr. A.G. Heizenrader was present and reviewed the statement submitted by his Association. He contended that the requirement that a berm be used in all gravel mining operations was too strict because it would interfere with the use of barges.

Mr. Weathersbee pointed out that the proposed requirement pertains to the majority of operations and would not be impractical for any of those on the Clackamas, Molalla and Sandy Rivers.

Mr. Ward Armstrong was also present and requested that in the turbidity and temperature standards the word "significant" be substituted for the word "measurable." He admitted that the word "significant" is not as definitive and that it might require a decision by the court, but he contended that the word "measurable" is too restrictive, particularly for the small tributary streams.

Mr. Silver said that in his opinion the proposed substitute is not definite enough.

The Chairman said he shared Mr. Armstrong's concern, but thought the wording in the proposed standards is as good as it is possible to make it.

There being no further testimony, it was MOVED by Mr. Waterman, seconded by Mr. Harms and carried that the water quality and waste treatment standards including Table A as proposed by the staff and amended by the Commission at the August 29, 1969 meeting for the Clackamas, Molalla and Sandy Rivers be adopted by the Commission as administrative rules and that the program of implementation including Tables B-1, B-2, C-1, C-2, D-1 and D-2 for the Clackamas, Molalla and Sandy Rivers be adopted by the Commission as administrative policy.

TUALATIN BASIN SEWAGE DISPOSAL

A public notice having been sent to interested persons that consideration would be given a proposal to ban connections to sewerage systems which discharge into the public waters of the Tualatin River Basin, a comprehensive staff report regarding the present status of pollution in the Tualatin River system and also regarding certain proposals made by the cities of

Beaverton and Tigard for modifying their sewage treatment works was presented by Mr. Jensen. A copy of his report dated September 23, 1969 has been made a part of the Department's files in this matter.

He also pointed out that in July 1968 the State Sanitary Authority had placed a ban on connections to the sewer systems served by the Fanno Creek sewage treatment plant, that on June 27, 1969, the Authority had considered and approved provisionally a proposal submitted jointly by Multnomah County and the city of Portland for diverting certain sewage flow from the Fanno Creek sewerage system to the Portland Tryon Creek system, but that said project had not yet been started, that by Council action on July 15, 1969 the city of Tigard had voluntarily placed a ban on further connections to its sewer system, and that on July 22, 1969 similar action had been taken by the Beaverton City Council.

Mr. Jensen presented the staff's recommendation that an order be adopted requiring that (1) effective immediately, except in certain instances, no further connections be made to any sewerage system discharging into the public waters of the Tualatin River system, (2) the ban be continued until an appropriate governmental agency has been created, an adequate fiscal program has been adopted, and a satisfactory implementation plan and time schedule have been established for assuring the construction of the required master sewer system, (3) in the meantime necessary improvements or modifications be made to all existing sewage treatment plants that are not operating in compliance with their respective waste discharge permits, and (4) proposals for interim facilities or additional sewer connections not be considered until item No. 2 of the order has been complied with.

Mr. Bolton then showed a series of 14 colored slides which illustrated dramatically the pollution existing in certain tributaries and portions of the main Tualatin. The pictures were taken during the period 8-20-69 to 9-16-69.

In the discussion that followed the showing of the slides it was suggested that the staff attempt to get information regarding the withdrawal of water from the river and what might be done to control the flow. It was suggested also that information might be available from the County Agent regarding the amount of river water used to irrigate row crops.

State Representative Allen B. Pynn made a statement in behalf of the residents of Clackamas County. He expressed concern about the requests of Beaverton and Tigard to enlarge their sewage treatment plants and he commented about the withdrawal of water from the river for irrigation purposes. He said that sometimes as a result of the withdrawal the flow in the stream is actually reversed. He mentioned that some of the polluted river water is used to irrigate crops such as strawberries.

Mayor Lee Gensman of Tualatin asked that the ban not include his city because they presently have under construction a new temporary tertiary treatment plant which he claimed will greatly reduce their contribution to the pollution load on the river. He said that the plant is designed to handle a flow of 280,000 gpd and a PE of 3,600, that it is being financed by a 75% research and development federal grant, that construction of the plant is about 30 to 40% complete and of the sewer system 75 to 80% complete, and that the new plant is expected to produce an effluent having BOD and suspended solids concentrations of only about 5 mg per liter. He claimed they will need to connect not only the existing homes but also proposed new construction in order to have sufficient nutrients in the combined flow of sewage and industrial wastes since one-third of the total design capacity will be utilized by the industrial wastes from the Hervin Dog Food plant. He estimated the PE of the existing homes and commercial establishments at about 700. The plant construction is scheduled to be finished by February 1970.

City Manager Dan Potter of Forest Grove stated they clearly recognize that the eastern portion of Washington County has a difficult sewage disposal problem, but because the Forest Grove plant is operating within the provisions of its waste discharge permit it is not contributing significantly to the problem. He requested therefore that the western portion of the basin be excluded from the proposed ban.

Mr. Weathersbee commented that even though the Forest Grove plant might be in compliance with the city's waste discharge permit its effluent still exerts a load on the river which does add to the problem downstream.

City Administrator Steve Telfer of Tigard said his city is concerned about water quality conditions in the river. He read a letter dated September 25, 1969 setting forth the city's position in this matter. He said they concurred with the proposed ban but would appreciate an explanation of item No. 3 of the proposed order to which Mr. Weathersbee replied that their plant would need to be upgraded to handle the existing and previously committed connections, but that no other new connections could be made until recommendation No. 2 is fulfilled.

Mayor James R. Moore of Beaverton pointed out that the city of Beaverton has attempted to cooperate toward alleviating the pollution problem in Fanno Creek by diverting in July 1968 some 485 residences and 6 industrial plants from the Multnomah County system to its own sewers and in September 1968 by installing a temporary line which diverted 2 more industries. He said they are now in the process of diverting 4 more and that in June 1969 they awarded a contract for a TV survey of their sewer system and the making of repairs for reducing ground water infiltration. He also pointed out that the engineering study of their sewage plant improvement needs was completed by CH_2M in August of this year and that on September 22 the Council placed a ban on further sewer connections. He said they have a lot of new construction pending but that they agree with the proposed ban and are willing to wait until the voters decide on the master plan implementation issue.

City Manager Larry Sprecher of Beaverton confirmed the Mayor's statement that they are in agreement with the proposed ban. He said that it is imperative that the County Service District be formed. He claimed that with the proposed interim modification of the Beaverton sewage plant they could put out an effluent better than the receiving stream.

Mr. Clayton Nyberg, Washington County property owner, said the state of Oregon had never enforced its 20-20 standard for sewage treatment plants and implied if it had the conditions would not now be so bad. He said the new tertiary plant at Tualatin would improve rather than impair the stream quality. He emphasized the need for low flow augmentation and he suggested that the nutrients from land drainage are responsible for much of the problem.

Mayor Harold Ruecher of Hillsboro objected to that city's being included in the ban. He said their Rock Creek sewage treatment plant is operating well within the waste discharge permit limitations and is 25% under capacity. He admitted, however, that the old plant (No. 2) is in very bad shape but pointed out that a new one is presently under construction.

Washington County Administrator Richard Milbrodt complimented the DEQ staff for their accurate analysis of the basin-wide problem. He reported on the status of the county's efforts to establish a County Service District. He said that they will shortly retain a financial consultant to develop an adequate program for financing construction, that Stevens, Thompson and Runyan, engineers, are already working on a construction time schedule, that a public hearing will be held on December 2, 1969, that the election for formation of a district will be held sometime in January 1970 and for approval of the financing program at the primary election in May 1970, that plans and proposals for interim solutions have been reviewed and approved, including the Beaverton and Tigard proposals, and that three alternatives are being explored for augmenting the low stream flow, namely, the Scoggins reservoir, pumping from the Trask and pumping from the Willamette.

Mr. Willis West who resides 2 miles south of the city of Tigard and adjacent to the Tualatin River complained bitterly about the pollution in the river. He described the conditions which existed in the stream this summer and urged that the strongest possible action be taken to require an area-wide solution to this problem.

Mr. Tom Miles, Chairman of the West Slope Sanitary District, stated that the Privy Council which includes the Aloha, Metzger, Sunset Valley and West Slope Sanitary Districts with a population of 35,000 is anxious to help solve the sewage disposal problem. He pointed out that their three plants (Aloha, Metzger and Sunset Valley) are all operating well within the requirements of their waste discharge permits, that they propose to expand these three plants by adding advanced waste treatment as a means of alleviating the problem until the master plan can be carried out, and that they have agreed to finance these facilities themselves. He said further that such modifications will help maintain the quantity of flow in the river system while other means of low flow augmentation are not yet available and may

not be available for some time in the future. He claimed they can treat their sewage to drinking water standards cheaper than they can import water for flow augmentation purposes.

The meeting was recessed at 12:30 p.m. and reconvened at 2:00 p.m.

During the noon recess the Commission members and staff discussed the matter of assigning state and federal grants to the applicants that were tentatively assigned priorities by the State Sanitary Authority on June 27, 1969. It was decided to use the federal funds first, beginning with the project having the highest priority point total and continuing down the list to and including the Medford project.

After the meeting was reconvened Mr. Oliver Domries of the Multnomah County Public Works Department reported that all of the new equipment had been installed and is now in operation at the Fanno Creek sewage treatment plant but, unfortunately, the desired and anticipated results had not yet been obtained. He said they were doing everything possible to improve the treatment efficiency.

He mentioned the plan to divert flow from the Fanno Creek system to the Tryon Creek plant which had been proposed by the County and City of Portland and which had been approved by the Sanitary Authority on June 27, 1969. He requested that any new order adopted by the Commission at this meeting permit them to make a gallon per gallon replacement under that diversion plan.

Following the statement by Mr. Domreis and there being no one else who wished to be heard in the matter, a proposed Order including findings of fact and conclusions prepared by Mr. Silver was read by the Director.

It was then MOVED by Mr. Harms, seconded by Mr. McMath and carried that the Order prepared by Mr. Silver, Legal Counsel, be adopted. A copy of said Order is attached to and made a part of these minutes.

It was also MOVED by Mr. Harms, seconded by Mr. McMath and carried that the staff be authorized to notify those holders of waste discharge permits within the Tualatin Basin of the intent of the Department to modify their present permits as may be required in each specific case to incorporate the intent of the Order.

REQUEST OF CITY OF PORTLAND

Mr. Weathersbee reported that by letter dated August 4, 1969 and signed by Commissioner William A. Bowes the city of Portland had requested an 18-month extension of time for providing secondary treatment at its main sewage treatment plant which discharges into the Columbia River. Copies of correspondence between the city and the Department staff regarding this matter had been furnished the Commission members in advance of the meeting.

Commissioner Bowes was present at the meeting and urged that the request for extension of time be approved. He contended that the city needed the additional time in order to raise the funds required to finance the project because initially their fiscal program had been based on the anticipated receipt of 80 to 85% state and federal grants, whereas now it appears that only a 30% grant will be available. He said the cost of the project would total some 10 to 11 million dollars.

The Chairman commented that the Commission cannot wait any longer for completion of the Portland sewage disposal project which was started many years ago.

Mr. McMath asked what the additional burden to the average home owner would be and if the city could issue revenue bonds without having to increase present sewer user rates. The Commissioner could not answer the first question, but said an increase in rates would probably be required to service a revenue bond issue.

In reply to other questions Commissioner Bowes said the present 70¢ per month charge was adopted 15 or 16 years ago and that no attempt had since been made to increase it. It was pointed out to him that Portland has one of the lowest sewer user charges in the state. Commissioner Bowes stated that to date the city of Portland has received some 2.7 million dollars in federal grants for sewage treatment works projects. (Note: The actual amount is $3,834,940.)

After further discussion by the members it was MOVED by Mr. Harms, seconded by Mr. Waterman and carried that the request of the city of Portland for an extension of 18 months in the deadline for construction of secondary treatment be denied.

ROUND PRAIRIE LUMBER CO., Dillard

Mr. McKenzie presented a brief report on the status of the steps being taken by the Round Prairie Lumber Company of Dillard to improve the operations of its wigwam burner and to design a new wood-waste fired boiler for abatement of air pollution. He said the company has shown good faith in attempting to solve its problem.

He said the only satisfactory solution appears to be through sale of the sawdust and use of the remaining bark as boiler fuel.

Mr. Ralph Sandstede was present to represent the company.

No action on the part of the Commission was considered necessary at this time.

Mr. Sherwood reviewed briefly the conditions of a new waste discharge permit proposed by the staff for this mill. Copies had been sent to both the company and the Commission members prior to the meeting.

It was MOVED by Mr. Harms, seconded by Mr. Waterman and carried that the waste discharge permit as recommended by the staff for the Round Prairie Lumber Company of Dillard be granted. (Expiration date 6-30-71)

FANNO CREEK WASTE DISCHARGE PERMIT (Renewal)

Mr. Lynd reviewed briefly the conditions proposed by the staff for renewal of the waste discharge permit for the Fanno Creek sewage treatment plant owned and operated by Multnomah County.

It was MOVED by Mr. Harms, seconded by Mr. McMath and carried that the waste discharge permit for the Fanno Creek sewage treatment plant be renewed as recommended by the staff. (Expiration date 6-30-70)

WAH CHANG ALBANY CORPORATION WDP MODIFICATION

Mr. Weathersbee discussed the proposed modifications to the waste discharge permit issued previously to the Wah Chang Albany Corporation. He pointed out that by letter dated September 18, 1969, Mr. Richard P. Blunk, Vice President of the corporation, had requested certain changes in the deadlines which the staff recommended be accepted. They were as follows: (1) Change the expiration date from 12-31-69 to 2-28-70. (2) In provision No. 1 change August 1969 to September 1969 and October 1969 to December 1969. (3) In provision No. 2 change December 15, 1969 to February 28, 1970 and October 1969 to December 1969.

Mr. Sam Worcester was present to represent the company.

It was MOVED by Mr. Waterman, seconded by Mr. Meierjurgen and carried that the waste discharge permit for Wah Chang Albany Corporation be modified as recommended by the staff including the requested changes in deadlines.

BOISE CASCADE CORP. ST. HELENS MILL WDP MODIFICATION

Mr. Weathersbee reviewed briefly the proposed modifications to the present waste discharge permit for the Boise Cascade Corporation pulp mill at St. Helens.

It was pointed out that since the August meeting the company had controlled its operations so that its waste discharges to Multnomah Channel were generally within the Waste Discharge Permit limitation of 26,000 pounds of BOD per day. It was pointed out further that the run of fall Chinook salmon up the main Willamette so far this year had exceeded by more than 50% the record run of 4,000 in 1968.

Mr. Meierjurgen emphasized the fact that stream conditions must be favorable for downstream migration as well as for upstream migration of fish.

It was MOVED by Mr. Meierjurgen, seconded by Mr. Waterman and carried that the waste discharge permit for Boise Cascade Corporation at St. Helens be modified as proposed by the staff.

WASTE DISCHARGE PERMITS FOR COLUMBIA SLOUGH INDUSTRIES

Mr. Sherwood reviewed briefly the proposed waste discharge permits which had been drafted by the staff and copies sent to the applicants and Commission members in advance of the meeting for 13 industrial plants located along Columbia Slough.

The Director suggested that in those permits specifying that all organic wastes shall be intercepted to prevent their entry into Columbia Slough the words "and thereafter" be inserted after the words "Prior to June 1, 1971,".

Mr. Sherwood pointed out that some sanitary wastes from 3 of the plants (Joslyn Mfg. and Supply Co., Pacific Resins and Chemicals, Inc., and Simpson Timber Co.) are still discharged without treatment to the slough but because of the small quantity involved it was not considered necessary to provide temporary treatment works for them prior to the June 1, 1971 deadline for treatment of all wastes.

It was MOVED by Mr. Waterman, seconded by Mr. McMath and carried that the waste discharge permits as recommended by the staff be approved for the following Columbia Slough industries: (1) Associated Meat Packers, (2) H.B. Fuller Co., (3) Joslyn Mfg. & Supply Co., (4) Kenton Packing Co., (5) Malarkey Paper Co., (6) Pacific Carbide, (7) Pacific Meat Co., (8) Pacific Resins and Chemicals, (9) Portland Rendering Co., (10) Simpson Timber Co., (11) Union Carbide, (12) Vann Barrel Co., and (13) Western States Rendering, with the words "and thereafter" being added as recommended by the Director to all the permits except those for Kenton Packing Co., Pacific Carbide and Vann Barrel Co.

WASTE DISCHARGE PERMITS - DOMESTIC SOURCES (Renewals)

Mr. Lynd reviewed briefly the proposed conditions which had been drafted by the staff for renewal of 11 domestic sewage waste discharge permits. Because of the plan to build a joint secondary treatment facility to serve both the city of St. Helens and the Boise Cascade Corporation pulp mill, Mr. Lynd suggested that the present St. Helens permit be extended for another 60 days rather than be modified and renewed at this time.

It was MOVED by Mr. Harms, seconded by Mr. McMath and carried that the waste discharge permits be renewed as recommended by the staff for the following 10 communities: (1) Brown Development (Timberline Rim), (2) Cave Junction, (3) Corvallis, (4) Josephine Co. School District, (5) Millersburg School District, (6) Roseburg, (7) Stanfield, (8) Toledo, (9) Warrenton and (10) Woodburn.

It was MOVED by Mr. Harms, seconded by Mr. Waterman and carried that the present waste discharge permit for the city of St. Helens be extended for 60 days as recommended by the staff.

WASTE DISCHARGE PERMITS - INDUSTRIAL SOURCES (Renewals)

Proposed provisions for renewal of the following waste discharge permits having been drafted by the staff and submitted in advance of the meeting to the applicants and Commission members and specific details having been discussed at this meeting by Mr. Sherwood and Mr. Bolton, it was MOVED by Mr. Waterman, seconded by Mr. Meierjurgen and carried that the waste discharge permits be renewed as recommended by the staff for the following

13 industries: (1) Broadway Holding Co., (2) Cascade Eggs, (3) Diamond Lumber Co., (4) Douglas Fir Ply., Dixonville, (5) Douglas Fir Ply., Coquille, (6) Fort Hill Lumber Co., (7) McCormick & Baxter, (8) Swift & Company, (9) Tillamook County Creamery Assn., (10) Tillamook Veneer Co., (11) U.S. Plywood, Roseburg, (12) Winchester Plywood Co., and (13) Zidell Explorations, Inc.

WASTE DISCHARGE PERMITS (New Permits)

Proposed provisions for new waste discharge permits having been drafted by the staff and submitted in advance of the meeting to the applicants and Commission members and specific details having been discussed at this meeting by Messrs. Sawyer, Reiter, Rath and Baton, it was MOVED by Mr. Harms, seconded by Mr. McMath and carried that waste discharge permits as recommended by the staff be approved for the following 16 industries and communities: (1) Auckland, Mrs. Wing Hoi, (2) Battle Creek Investment, (3) Western Modular Homes, (4) Boise Cascade, Valsetz, (5) Flynn Sand & Gravel, (6) Ralf Hakanson, (7) Herbert Lumber Co., (8) Keller Lumber Co., (9) F.M. Kovach, (10) Norpac Growers, Dundee, (11) Norpac Growers, Newberg, (12) Rogue River Paving Co., (13) Stayton Canning, Silverton, (14) United Flav-R-Pac, Salem, (15) U.S. Plywood, Gold Beach and (16) U.S. Plywood, Reedsport.

WASTE DISCHARGE PERMIT EXTENSIONS

It was MOVED by Mr. Harms, seconded by Mr. McMath and carried that as recommended by the staff the present waste discharge permits be extended 60 days for (1) Lincoln City (Taft), (2) Lincoln City (Oceanlake) and (3) South Umpqua High School, and 30 days for (1) Cornucopia Placers, (2) Walter E. Koch Lumber Company, (3) Lake Owyhee Resort, (4) Portland Mobile Home Court, (5) Roseburg Lumber Co. (Green District), (6) The Dalles, and (7) Vira Corporation (Country Squire Motel).

AUTHORIZATION OF PUBLIC HEARINGS

Mr. Patterson discussed briefly the proposed ambient air quality standard for carbon monoxide and the proposed regulation for motor vehicle visible emissions which had been drafted by the staff and he requested that a date or dates be set for public hearings for consideration of adopting such standard and regulation.

It was decided by the members to hold both hearings on Thursday November 20, 1969 in Portland. A regular Commission meeting has been scheduled for the following day, November 21, in Eugene.

STATUS OF AIR QUALITY CONTROL

Mr. Skirvin summarized a comprehensive report which he had prepared pursuant to a request of the Commission covering the status of air quality control exercised by the metallurgical industries in the Albany area. His report covered the following 6 industries: (1) Albany Metallurgical Research Center, U.S. Bureau of Mines, (2) REM Metals Corporation, (3) Zirconium Technology Inc., (4) TiLine, Inc., (5) Oregon Metallurgical Corp. and (6) Wah Chang Albany Corporation.

He reported that these industries either have effective controls in operation, in the process of being installed or have time schedules and programs adopted for installation of required facilities.

Mr. Harms commented that the report was most encouraging.

FIELD BURNING SCHEDULE

Mr. Snyder presented a proposed revised schedule of days for controlling field burning during the period November 1, 1969 to July 1, 1970. He stated that further revisions were under consideration. He suggested that a more sophisticated air pollution index based on air stability, visibility wind speeds, etc. should be used and therefore he will present definite recommendations for consideration by the members at the October meeting.

Mr. Silver suggested that all interested parties be given adequate notice. Mr. McPhillips said the Commission members should be well briefed on the air pollution index and that the proposed revised schedule should be correlated with the regions.

The Chairman complimented highly the staff and particularly Mr. Snyder for the job done this past fall in regulating field burning.

SLASH BURNING

Based on consultation with the State Forester, it was MOVED by Mr. Harms, seconded by Mr. Waterman and carried that the Department of Environmental Quality adopt a Resolution that all land lying west of the summit of the Cascade Mountains as defined in Chapter 477, Oregon Revised Statutes, is determined to be a restricted area within the meaning of Chapter 680, Oregon Laws 1969.

There being no further business the meeting adjourned at 4:45 p.m.

Respectfully submitted,

Kenneth H. Spies

Kenneth H. Spies, Director

BEFORE THE DEPARTMENT OF ENVIRONMENTAL QUALITY
FOR THE STATE OF OREGON

IN THE MATTER OF THE)
) ORDER
TUALATIN RIVER DRAINAGE BASIN)

WHEREAS, this matter having come on before the Department of Environmental Quality for consideration and evaluation of the circumstances relating to sewage treatment and disposal now existing in the Tualatin River drainage basin and served by various governmental and private sewerage and treatment facilities therein; and

WHEREAS, the Department of Environmental Quality pursuant to ORS 449.097 has caused investigations and surveys to be conducted and has received reports of conditions relating to water pollution in the Tualatin River drainage basin, and it appearing to the Department of Environmental Quality that a combination of circumstances exists in said basin pertaining to sewage disposal and treatment which have caused an emergency related to the public health, safety and welfare of the inhabitants of said basin and of surrounding areas, and it further appearing to the Department of Environmental Quality that as far as practicable under the existing emergency circumstances notice has been circulated of possible intended action to afford interested persons opportunity to submit data or views orally or in writing,

NOW, THEREFORE, based upon the aforesaid surveys and investigations and reports, the following Findings of Fact are entered:

FINDINGS OF FACT

1. Extremely low stream flows and large increased waste loads resulting from the dense population and economic development in the area within the Tualatin River drainage basin have allowed inadequately treated sewage to be disposed and discharged into the Tualatin River and its tributaries.
2. The order prohibiting connections to the Fanno Creek system adopted effective July 1, 1968 has shifted construction to other geographic areas within the Tualatin River drainage basin.
3. Several of the sewage treatment plants within the Tualatin River drainage basin are not presently meeting the discharge limitations established in their waste discharge permits.

4. The dissolved oxygen content of surface waters in certain areas of the basin based upon samples is less than six (6) milligrams per liter.

5. Objectional discoloration, scum and floating solids have been observed in the waters in certain parts of the basin.

6. Conditions offensive to human senses of sight and smell have been observed and reported within certain areas of the basin.

7. A master plan for a sewerage system to serve a major part of the Tualatin River drainage basin has been developed by Washington County; however, no means have as yet been developed to actually implement and finance this master plan.

8. The following list of treatment plants and sewerage systems marked Exhibit "A" attached hereto and by reference incorporated herein ultimately discharge wastes into the Tualatin River drainage basin.

Based upon the aforesaid Findings of Fact, the following Conclusions are entered:

CONCLUSIONS

1. The Tualatin River and its tributaries have become essentially open sewers carrying inadequately treated sewage and the Tualatin River is now functioning as a collecting sewer and treatment lagoon.

2. A public nuisance arising from severe odor and hazards to public health exists in certain areas of the basin.

3. The shifting of construction to other geographic areas within the Tualatin River drainage basin has caused an accelerated overloading of other treatment plants and increased degradation of water quality resulting from the overloaded conditions of these plants.

4. Water quality has deteriorated to the point where the connection of any additional waste loads to any of the existing sewerage systems which discharge effluent to the public waters in the Tualatin River drainage basin will further increase water quality problems therein.

5. The implementation of the Washington County master plan for sewage disposal provides the only readily available and acceptable solution to the water quality and health problems in the Tualatin River

drainage basin at this time.

The necessary authorization to implement the master plan must be secured and a definite program and time schedule for implementation of said plan must be developed to enable the Department of Environmental Quality to evaluate and act on any interim proposals that may allow development under controlled conditions until the Tualatin River drainage basin problem can be effectively solved.

6. That certain of the general water quality standards as set forth in OAR 11-015 and 11-025 have been and are now being violated in the waters of the Tualatin River drainage basin by increased waste loads.

Based upon the foregoing Findings of Fact and Conclusions, the following Order is entered:

ORDER

1. That effective immediately, no permits for connections shall be issued nor authorized by any person to any private or governmental sewerage system which discharges to the waters of the state within the Tualatin River basin, except as follows:

   (a) Existing constructed dwellings with failing subsurface disposal systems may be connected if certified by the local health officer to be failing and a health hazard.

   (b) Connections are permitted where formal building permits or sewer connection permits were issued prior to 5:00 p.m. on September 26, 1969, except for the cities of Tigard and Beaverton where connections will be allowed only for those permits formally issued prior to 5:00 p.m. on September 15, 1969 for Tigard and prior to 5:00 p.m. on September 22, 1969 for Beaverton.

   (c) Connections may be permitted by the Department of Environmental Quality for existing structures to sewerage systems served by sewage treatment plants with demonstrated unused treatment capacity which are able to continuously meet the

present waste discharge permit limitations, provided that such connections shall be in accordance with specific limits and conditions to be established by the Department of Environmental Quality.

(d) Publicly owned facilities may be connected to a sewerage system after first obtaining written approval from the Department of Environmental Quality.

2. Any proposals for interim sewage treatment and disposal facilities, for expansions of existing facilities, or for additional connections to existing facilities with demonstrated unused treatment capacity shall not be considered by the Department of Environmental Quality to accommodate new construction until:

(a) A governmental entity with authority and responsibility to carry out the adopted master plan for sewage disposal in the Tualatin River drainage basin has been legally established.

(b) The financing necessary to implement the master plan has been secured.

(c) An implementation plan and time table which includes the necessary phasing schedule and interim facility plan has been submitted to and approved by the Department of Environmental Quality.

3. Upon the conditions of Item 2 of this order being complied therewith, the Department of Environmental Quality may consider approving interim facilities which are in conformance with the approved master plan and interim facility plan and are consistent with the 1966 policy of the Department to prevent any increase in waste loads discharged to the Tualatin River drainage basin during the period June 1 to November 1 of each year.

4. Existing treatment facilities shall be required to be modified or otherwise controlled as necessary to provide treatment adequate to meet the discharge limitations of present waste discharge permits for

presently connected and committed waste loads.

5. No person shall connect a residence, business, industrial or commercial activity, or other property to a sewerage system or treatment or disposal facility except as provided in this order.

6. That a copy of this order shall be mailed to each treatment facility named herein and listed on Exhibit "A".

7. Where any other duly executed orders of the Department of Environmental Quality or the conditions of any waste discharge permits issued by the Department of Environmental Quality conflict with this order, the terms of this order shall take precedence over and supersede any conflicting provisions of earlier orders or waste discharge permits.

This order being necessary for the immediate preservation of the public peace, health and safety, and because postponement of the effective date of this order would result in serious prejudice to the public interest, an emergency is declared to exist and this order shall take effect upon its execution.

Dated this _____ day of September, 1969.

B. A. McPhillips, Chairman,
Department of Environmental Quality

TREATMENT PLANTS, SEWERAGE SYSTEMS AND FACILITIES
EXISTING WITHIN THE TUALATIN RIVER DRAINAGE BASIN

The order entered herein shall be effective against all treatment plants, facilities and sewerage systems, located totally or in part within the Tualatin River drainage basin in the counties of Washington, Multnomah and Clackamas, including but not necessarily limited to the following commonly known systems:

Public Facilities

Aloha Sanitary District

City of Banks

City of Beaverton

Broadmoor Sanitary District

Columbia Wilcox Service District

City of Cornelius

City of Forest Grove

City of Gaston

Gander Ridge Sanitary District

City of Hillsboro

Hillsboro Union High School District No. 3 jt

City of King City

Leron Sanitary District

McKay Park Sanitary District

Metzger Sanitary District

Multnomah County (Fanno Creek)

Oregon Regional Primate Research Center

City of Portland

Preslynn Park Sanitary District

Progress Sanitary District

Raleigh Sanitary District

Raleigh Scholls Sanitary District

Raleighwood Sanitary District

EXHIBIT "A"

Ramona Heights Sanitary District

Round Hill Sanitary District

St. Helens Hall Sanitary District

Scholls Terrace Sanitary District

City of Sherwood

Southwood Park Sanitary District

Sunset Valley Sanitary District

Sylvan Heights Service District

City of Tigard

City of Tualatin

Tualatin Heights Service District

Tualatin Hills Sanitary District

Upland Sanitary District

West Slope Sanitary District

Whitford McKay Sanitary District

Private Facilities

Alpenrose Dairy

Commonwealth Properties, Inc. (Oak Hills)

Hervin Co.

Homes Association of Cedar Hills

Laurelwood Academy

Panavista Park

Peerless Truck and Trailer Co.

Sweetbrier Inn

Tualatin Development Co. (King City)

Tualatin Valley Sanitation Company (Somerset West)

Tektronix, Inc.

Willow Creek Mobile Villa

Table 4

Project Plans

During the month of August, 1969, the following 20 sets of project plans and engineering reports were reviewed and the action taken as indicated by the Water Quality Control Section.

Date	Location	Project	Action
8/1/69	Portland	Pacific Resins and Chemicals, waste treatment	Prov. app.
8/5/69	Lake Oswego	LID #118	Prov. app.
8/6/69	Ontario	Coast Packing, preliminary report	Prov. app.
8/7/69	Multnomah County	Strathmore No. 10-A sewers	Prov. app.
8/8/69	Medford	Sewage treatment plant	Prov. app.
8/8/69	Skyline West S. D.	Sewers	Prov. app.
8/13/69	Coquille, Dillard and Riddle	Roseburg Lumber and Douglas Fir Plywood, plywood glue recirculation	Prov. app.
8/14/69	West Linn	Crown Z, preliminary report, secondary treatment	Prov. app.
8/14/69	Lakeview	Lake County Fairgrounds sewer	Prov. app.
8/15/69	N. Roseburg S. D.	Newton Creek interceptor extension sewer	Prov. app.
8/18/69	Nyssa	Preliminary study	Comments sub.
8/18/69	Oakland	System and sewage treatment plant	Prov. app.
8/20/69	The Dalles	Union Pacific Pole Treatment Plant, waste treatment	Prov. app.
8/21/69	Dee	U.S. Plywood, secondary treatment	Prov. app.
8/22/69	Portland	Tom Moyer Theaters sewer and pump station	Prov. app.
8/25/69	Canby	Knights Addition sewers	Prov. app.
8/26/69	Hillsboro	Waco West Subdivision	Prov. app.
8/28/69	North Bend	Weyerhaeuser Co., preliminary report, barker effluent, plywood glue waste	Prov. app.

Project Plans (Continued)

Date	Location	Project	Action
8/28/69	Portland	Sauvies Island Moorage, plant modifications	Prov. app.
8/29/69	Silverton	Sewage treatment plant modifications	Prov. app.

The indicated action was taken on the following solid waste disposal facilities:

8/8/69	Roseburg	Keller Wood Waste Landfill	Prov. app.
8/13/69	Coos Bay	Roto Rooter Sewage Lagoon	Prov. app.
8/20/69	McMinnville	Koch Sanitary Landfill Expansion	Not approved

PROJECT PLANS AND REPORTS

The following project plans or reports were received and processed by the Air Quality Control staff during the month of August 1969.

Date	Location	Project	Action
None			

TO : MEMBERS OF THE ENVIRONMENTAL QUALITY COMMISSION

B. A. McPhillips, Chairman
Herman Meierjurgen, Member
Storrs Waterman, Member
E. C. Harms, Member
George A. McMath, Member

FROM : AIR QUALITY CONTROL STAFF

DATE : September 23, 1969

SUBJECT: REQUEST FOR PUBLIC HEARING

The staff requests authorization from the Commission to establish a Public Hearing date as required for the purpose of adopting (1) Ambient Air Standards for Carbon Monoxide and (2) Regulations for Motor Vehicle Emissions.

The following proposals are attached:

(1) CARBON MONOXIDE AMBIENT AIR QUALITY STANDARD

The standard as proposed would be applicable state wide and is set forth in the attached draft.

(2) MOTOR VEHICLE EMISSIONS REGULATION

The standard as proposed is applicable state wide and applicable to both gasoline and diesel powered vehicles as set forth in the attached draft.

DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY CONTROL

PROPOSED AMBIENT AIR QUALITY STANDARD

FOR

CARBON MONOXIDE

I. Definitions

A. Ambient Air - The air that surrounds the earth excluding the general volume of gases contained within any building or structure.

B. Primary Air Mass Station (PAMS) - A station designed to measure contamination in an air mass and represent a relatively broad area. The sampling site shall be representative of the general area concerned and not be contaminated by any special source. The probe inlet shall be a minimum of twenty feet and a maximum of 150 feet above ground level. Actual elevation should vary to prevent adverse exposure conditions caused by surrounding buildings and terrain. The probe inlet shall be placed approximately twenty feet above the roof top and meteorological measurement shall be made at approximately the same level as the probe inlet.

C. Primary Ground Level Monitoring Station (PGLMS) - A station designed to provide information on contaminant concentrations near the ground and provide data valid for the immediate area only. The probe inlet shall be ten to twenty feet above ground level with a desired optimum height of twelve feet. The sampling site shall be representative of the immediate area and not be contaminated by any unique source. The probe inlet shall not be less than two feet from any building or wall.

II. Air Quality Standard

Carbon monoxide in the ambient air measured at either a Primary Air Mass of a Primary Ground Level Monitoring Station shall not exceed an average concentration of twenty (20) parts per million by volume for any consecutive eight (8) hours.

September 22, 1969

III. Method of Measurement

For determining compliance with this regulation, carbon monoxide shall be measured by an infrared carbon monoxide analyzer. The analyzer shall have a full-scale range of one hundred (100) parts per million or less and be calibrated with known zero and span gases. Measurement shall be made according to the infrared method attached herewith as Exhibit "A" and reference incorporated herein. Other continuous and manual methods of measurement may be used after approval by the Department of Environmental Quality provided they can be shown to be comparable to the infrared technique in reproducibility, selectivity, sensitivity, and accuracy.

IV. Reporting of Data

Local and regional air pollution control agencies monitoring carbon monoxide shall notify the Department of Environmental Quality each time concentrations of carbon monoxide exceed the standard. Notification shall be made by telephone immediately after validation of the violation and also by mail on forms provided by the state agency. Data to be reported shall include.

a. Location of sampler.
b. Time span involved.
c. Concentrations recorded.
d. Type of sampler used.
e. Other relevant information requested by the state.

An annual report summarizing all occurrences of concentrations exceeding the standard shall be submitted to the state agency.

EXHIBIT "A"

CARBON MONOXIDE

METHOD OF DETERMINATION & REPORTING FOR CONTINUOUS INFRARED ANALYSIS

General

The infrared absorption of a compound is a characteristic of the type and arrangement of the atoms making up its molecules.

Dual beam infrared analysis is accomplished in the following manner: Two helices of nichrome wire are heated to about 1200°F. at which temperature they emit infrared energy. This energy is passed through two parallel optical paths, one the reference path and the other the sample path, to the sensing element.

In the non-dispersive Luft infrared analyzers (LIRA)[1], the signal is generated in the following manner: An interruptor alternately blocks the sample and reference beams. The sensing element, a capacitance microphone, responds to the arithmetical difference in radiant energies between the two beams, and converts the optical signal to an electrical impulse which is then amplified to a level necessary for operation of a meter, recorder or other readout device.

Infrared analyzers are not sensitive to flow rates. However, they are sensitive to vibration and temperature changes. The long-path instruments have heaters included in the optical benches with thermostats to maintain a constant temperature for the sample stream as it passes through the analyzer.

Apparatus

To monitor atmospheric carbon monoxide with an automatic analyzer, the following equipment and materials are recommended:

1. One LIRA analyzer complete with pump, control devices, and readout unit (i.e. Strip chart recorder).
2. One two-liter Erlenmeyer flask.

3. One two-hole rubber stopper.
4. Two pieces of 8 mm glass tubing, one of sufficient length to reach within ½ inch of the bottom of the Erlenmeyer flask, the other to extend 1 inch beyond the bottom of the stopper into the flask.
5. Sufficient ¼ inch tygon tubing to allow a three-foot condensation loop between the Erlenmeyer flask and the input port of the instrument.

   (Items 3, 4, and 5 are needed when humidity control is maintained by saturation.)

6. One cylinder of span gas made of carbon monoxide and either reconstituted air or nitrogen, of a concentration to be in the upper 25% of the recorder scale (i.e. On a 0 to 100 ppm recorder, 85 ppm would be a good concentration for the span gas.).
7. One cylinder of zero gas of reconstituted air (21% O_2, 79% N_2).
8. One hopcalite tube[2].

   (Items 7 and 8 may be replaced by other zero gas known to be free of CO.)

9. Two 2-stage pressure regulators with attendant valves and restraints for installation of gas cylinders.
10. Sufficient copper tubing, ¼ inch I.D., refrigeration grade, to plumb the cylinders of zero and span gas to the control panel. The attached drawings show the method for plumbing the instrument and the method for constructing the hopcalite tube.

Operation & Calibration

The instrument must be allowed to reach operating temperature before data is recorded. (Allow at least two hours for the instrument to reach equilibrium.) It should then be balanced, zeroed and spanned. Zeroing and spanning shall be repeated at least once per week. The zero and span gases and the sample air shall be passed through a bubbler or other humidity control device to maintain a constant moisture content. It is recommended to flow the reconstituted air (zero gas) through a hopcalite filter to eliminate any measurable concentrations of CO.

The instrument shall be rebalanced whenever there is inadequate zero and span adjustment available on the control panel and whenever maintenance

is performed on the instrument's electrical or optical systems.

Interferences

Water vapor and carbon dioxide have slight overlapping absorption spectra with carbon monoxide in the infrared region. These interferences are removed somewhat in the construction of the filter cell of the instrument.

Carbon dioxide (CO_2) response should be less than 1 ppm indicated CO for 1000 ppm CO_2. As atmospheric concentrations are in the order of 300 ppm CO_2, the interference from CO_2 should always be less than 0.5 ppm CO.

Water vapor concentration varies very widely in the atmosphere, and a rejection ratio of 2500:1 (2500 ppm H_2O may cause a response of not more than 1 ppm CO) is generally accepted. To correct for conditions where wide variations in atmospheric moisture content occur, proper humidity controls must be applied to assure that sample, zero and span gases all have the same relative humidity when passed into the analyzer. Insertion of a water bubbler in the sampling line of the instrument to assure a saturated gas stream at all times is one way of correcting for water vapor interference.

Other contaminants in concentrations commonly found in the atmosphere do not interfere with the infrared carbon monoxide analysis.

Data Recording & Reporting

Data shall be recorded on strip chart recorders, tape units or other devices compatible with the analyzer and data processing system in use.

Results shall be reported in parts per million and data for each day shall include:

1. All hourly averages (A minimum of six instantaneous readings are needed each hour to calculate the average.).
2. Maximum hourly average and time of occurrence.
3. Twenty-four hour average.

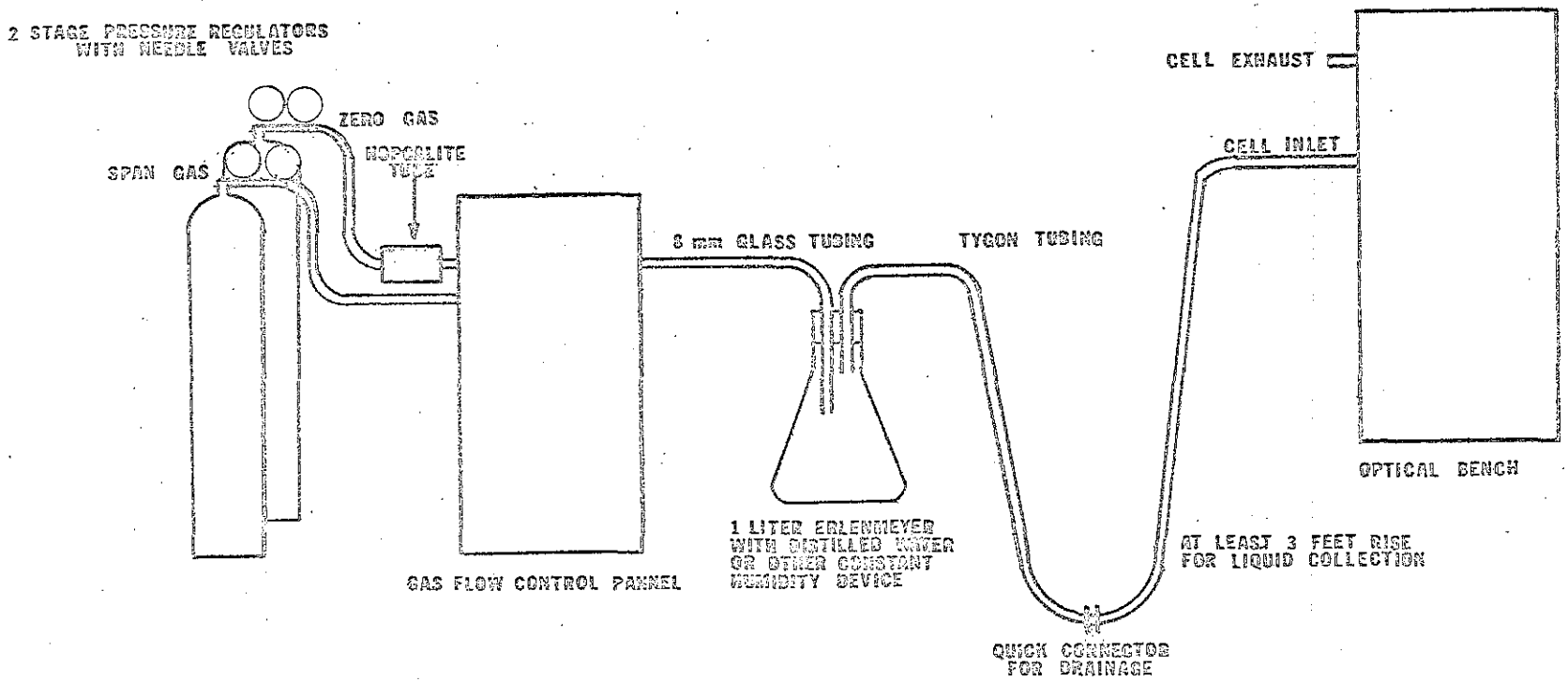
4. Number hours >20 ppm.
5. Maximum eight-hour average and time of occurrence.
6. All eight-hour averages >20 ppm and times of occurrences.

References

[1]Yaffee, C.D., Byers, D.H., and Hosly, A.D., "An Improved Luft Type Infrared Gas and Liquid Analyzer," Encyclopedia of Instrumentation for Industrial Hygiene, pp. 284-285, University of Michigan, Inst. of Industrial Health, 1956.

[2]Gordon, C.L., "Carbon Monoxide Free Gas for Analyzer Calibrations," 9th Conference on Methods in Air Pollution and Industrial Hygiene Studies, Feb. 7-9, 1968.

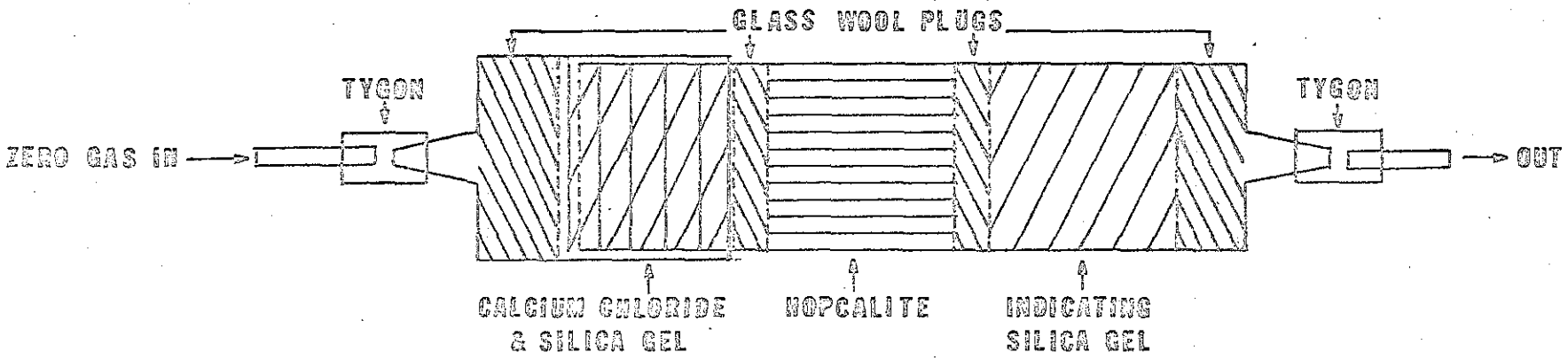
1/8/69



TYPICAL PLUMBING INSTALLATION

NON DISPERSIVE I. R. CARBON MONOXIDE ANALYZER

PLASTIC DRYING TUBE



MATERIALS:
INDICATING SILICA GEL - MATHISON CO.
HOPCALITE - MINE SAFETY APPLIANCE CO.

HOPCALITE ZERO GAS TUBE

INFRA RED CO ANALYSERS

NO SCALE CLG-68

September 26, 1969

DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY CONTROL

PROPOSED
REGULATION FOR MOTOR VEHICLE EMISSIONS

I. DEFINITIONS - As used in these regulations unless otherwise required by context:

1. Dealer - means any person who is engaged wholly or in part in the business of buying, selling, or exchanging, either outright or on conditional sale, bailment lease, chattel mortgage or otherwise, motor vehicles.
2. Department - means Department of Environmental Quality.
3. Equivalent opacity - means the obscuration to an observer's view produced by smoke of any color that is equal to an obscuration by smoke of a shade specified in Ringelmann Smoke Chart, published by the U. S. Bureau of Mines as Information Circular 8333, May 1967.
4. Motor Vehicle - means any self-propelled vehicle designed and used for transporting persons or property on a public street or highway.
5. Motor Vehicle Fleet Operation - means the ownership, control, or management or any combination thereof by any person of 5 or more motor vehicles.
6. Person - means the same as ORS 449.760 and also includes registered owners, lessees and lessors of motor vehicles.
7. Ringelmann Chart - means the Ringelmann Smoke Chart, giving numbered designation to shades of darkness of smoke emissions with instructions for use as published by the U. S. Bureau of Mines, Information Circular 8333, May 1967.
8. Regional Authority - means a regional air quality control authority established under the provisions of ORS 449.760 to 449.830 and 449.850 to 449.920.
9. Smoke - means the solid or liquid matter discharged from a motor vehicle or motor vehicle engine which obscures the transmission of light, excluding water vapor.

II. VISIBLE EMISSIONS - GENERAL REQUIREMENTS, EXCLUSIONS:

1. No person shall operate, drive, or cause or permit to be driven or operated any motor vehicle upon a public street or highway which emits into the atmosphere any visible smoke, with the sole exception of water vapor.
2. Excluded from this section are:
   a) Those motor vehicles powered by compression ignition or diesel cycle engines.

b) Those motor vehicles excluded by written order of the Department of Environmental Quality, under the provisions of ORS 449.810.

III. VISIBLE EMISSIONS - SPECIAL REQUIREMENTS FOR EXCLUDED MOTOR VEHICLES:

No person shall operate, drive, or cause or permit to be driven or operated upon a public street or highway, any motor vehicle excluded from Section II which emits smoke into the atmosphere, with the sole exception of water vapor:

1. As dark or darker in shade as #1 on the Ringelmann Chart or the equivalent opacity.
2. Provided however, that when smoke is emitted for a period not exceeding five (5) consecutive seconds, it shall not be as dark or darker in shade as #2 on the Ringelmann Chart or the equivalent opacity thereof.

IV. MOTOR VEHICLE FLEET OPERATION:

1. The Department or Regional Authority may, by written notice, require any motor vehicle fleet operation to certify annually that their motor vehicles are maintained in good working order and, if applicable, in accordance with the motor vehicle manufacturers' specifications and maintenance schedule as may or tend to affect visible emissions. Records pertaining to observations, tests, maintenance and repairs performed to control or reduce visible emissions from individual motor vehicles shall be available for review and inspection by the Department or Regional Authority.
2. The Department or Regional Authority may, by written notice, require any motor vehicle of a motor vehicle fleet operation to be tested for compliance with Sections II or III of these regulations.

V. DEALER COMPLIANCE:

No dealer shall sell, exchange or lease or offer for sale, exchange or lease, any motor vehicle, which operates in violation of Sections II or III of these regulations.

VI. ALTERNATIVE METHODS OF MEASUREMENT OF VISIBLE EMISSIONS:

1. Alternative methods of measurement to determine compliance with the visible emission standards in Sections II and III or to determine violations thereof are acceptable for utilization provided that they can be demonstrated to be reproducible, selective, sensitive, accurate and applicable to a specific program.
2. A person desiring to utilize alternative methods of measurement must submit the following:
   a) Specifications
   b) Test data
   c) A detailed specific program for the use of the required instrument (demonstration of the effectiveness and suitability of the program be required).
3. A program using an alternative method of measurement shall only be undertaken after written approval by the Department.

TO : MEMBERS OF THE ENVIRONMENTAL QUALITY COMMISSION

B. A. McPhillips, Chairman
Herman Meierjurgen, Member
Storrs Waterman, Member
E. C. Harms, Jr., Member
George A. McMath, Member

FROM : AIR QUALITY CONTROL STAFF

DATE : September 24, 1969 for Meeting of September 26, 1969

SUBJECT: AIR POLLUTION PROBLEMS RELATED TO THE METALS INDUSTRY IN ALBANY

The following is in response to the Commission's request made at the last meeting for a status report on air pollution problems related to the metals industry in Albany.

The problems are essentially limited to Albany's "space age" metals family which include the following activities:

1. Albany Metallurgy Research Center, U. S. Bureau of Mines.
2. REM Metals Corporation
3. Zirconium Technology Incorporated
4. TiLINE Incorporated
5. Oregon Metallurgical Corporation
6. Wah Chang - Albany Corporation

All of these installations are located within the jurisdictional area of Mid-Willamette Valley Air Pollution Authority. Much of the information presented in this report was obtained from that agency's files.

The Albany Metallurgy Research Center, better known as the U. S. Bureau of Mines, conducts studies in several areas, most of which are related to metallurgical technology. The overall operation because of its scope and nature does not generally degrade local air quality. However, some studies probably will cause short term gaseous and particulate emissions which may be objectionable to persons who live or work nearby.

REM Metals Corporation operates a machining and stamping facility within the city limits of Albany which does not emit air contaminants. The company also produces space age metal castings six miles south of Albany on the east side of the I-5 freeway. This operation, which is completing start-up, has particulate control equipment that is performing satisfactorily. The Mid-Willamette Valley Air Pollution Authority feels that REM can easily control any problem that might develop.

Zirconium Technology Incorporated, located in the industrial area in southern Albany, will begin producing zirconium and titanium tubing in late September, 1969. A packed-bed scrubber will be used to control emissions from an acid treating operation. Mid-Willamette Valley Air Pollution Authority plans to require performance testing on the scrubber.

TiLINE Incorporated produces zirconium and titanium castings in a light industrial area in south Albany. Air pollution control equipment is installed and operating satisfactorily.

Oregon Metallurgical Corporation is a producer of titanium castings and ingots at 120 West 34th Street, an industrial area in south Albany. The Company is presently working on a building program to make its operation more integrated and enhance its position in the titanium market. This program is scheduled for completion in February 1970. Oremets' effects on air quality will be dependent on performances of proposed control equipment which is currently being reviewed by Mid-Willamette Valley Air Pollution Authority. The Regional Authority anticipates requiring performance testing as proof of compliance with its regulations.

Wah Chang Albany Corporation produces and/or fabricates a variety of "space-age" metals at its plant, located West of Interstate Highway, I-5, on the northern boundary of Albany. During the past two years the Company has installed several pieces of control equipment and effected many process changes which have resulted in decreasing atmospheric emissions. Probably the most noticeable was the discontinuation of the zircon sand carbiding operation, noted for its persistent white particulate plume. This was accomplished on August 29, 1969. Improved as well as additional scrubbing devices were installed during 1969 which lowered the discharges of chlorides and ammonium ion, thereby effecting a reduction in the visibility reducing cloud or mist attributable to Wah Chang.

The success to date by the Company is offset by the failure of its efforts to control the odor problem and frequent upsets or accidents which result in visible emissions. The Company has abandoned wet chemistry approaches as a means of odor control. Current efforts are directed towards high temperature incineration. A consulting engineer has been retained to assist them on this problem. The Company has indicated that it expects preliminary design to be finished in time for testing sometime in November, 1969. An employee training program is being conducted to minimize upset and accident occurrences.

Additional efforts are underway or programmed for further reduction of emissions from reduction retort cleaning, magnesium recovery, clarifier and settling ponds.

Wah Chang Corporation has been successful in meeting its commitments in the compliance agreement with Mid-Willamette Valley Air Pollution Authority. Both the Company and the Regional Authority realize that additional efforts are necessary and plan to proceed with emphasis to be placed on the odor problem.

ALBANY METALLURTY RESEARCH CENTER
UNITED STATES BUREAU OF MINES

The AMRC is located on West Queen Avenue within the Albany city limits. Immediately to the East lies the Albany Union High School. The remaining three sides are bordered by residential areas.

The AMRC is noted for its studies in areas directly and indirectly related to space-age metals technology. An Air Quality Control staff member visited AMRC on September 15, 1969 to discuss current and proposed efforts which do or will affect air quality. Presently, studies related to space age metals do not result in the emission of air contaminants. However, the AMRC activity is not limited to this discipline. Three areas of study are responsible for essentially all of the atmospheric emissions.

A current effort involves the utilization of automobile scrap. A one-ton, 3-phase, arc furnace is used to melt fragmented auto scrap (small pieces of magnetic car components containing some grease and dirt) and pre-reduced iron ore pellets. The varying grease and dirt content of the scrap is a major contributor to the visible emission from this furnace. The annual average operating time was estimated to be 1 hour per week. During operation the emission violates MWVAPA and the State opacity regulations. Due to the size and frequency of operation, little or no off-station visual effects can be detected. (It is worth noting that design and bids were obtained for controlling particulate emissions in this laboratory area. To achieve the necessary $65,000 under present Federal funding for the project would require reducing the current labor force by 50% for two years.) A proposed smelting experiment scheduled for next January is expected to have a visible emission which will violate MWVAPA regulations.

A copper sulfide smelting study occasionally emits visible and odiferous matter. The purpose is to produce blister grade copper and SO_2 gas. The SO_2 can then be used to produce elemental sulfur.

Although the SO_2 rich off gas is treated to remove SO_2, the scope is small, and the operation is intermittant (4 to 12 hours per week), incidents can be expected when detectable emissions will occur. They will be very local episode situations and should not contribute to significant degradation of air quality.

Another study involving SO_2 has been evaluating alkalyzed alumina as an SO_2 adsorbing media in fluid bed type reactors. Although odiferous gases have been detected in the immediate lab area, it is not likely that these gases can be detected off station.

Initial work is now proceeding on utilizing slag material and low grade ores containing sulfides and pyrites. These materials are presently considered to be waste materials or non-economic resources. The approaches will involve chlorination in bench scale fixed and fluid-bed reactors. Annual combined atmospheric emissions of gaseous chlorine and chlorides were estimated by AMRC personnel to be approximately 100 pounds. This quantity can be considered very insignificant.

SUMMARY

The Albany Metallurgy Research Center, better known as the United States Bureau of Mines, conducts studies in several areas, most of which are related to metallurgical technology. The overall operation because of its scope and nature does not generally degrade local air quality. However, some studies probably will cause short term gaseous and particulate emissions which may be objectionable to persons who live or work nearby.

REM METALS CORPORATION

REM operates at two locations in the Albany area. The Company activity includes the Fabrication Division at 320 West Queen Avenue and the Precision Casting Division located six miles south of Albany immediately adjacent to the east side of Interstate I-5 (access via Hwy. 34 exit). The Fabrication Division is located in a light industrial area with nearby residences whereas the Precision Casting Division has no neighbors except for I-5 traffic.

REM has acquired necessary skills for machining and stamping space age metals which it performs in the Fabrication Division. This operation does not create an air pollution problem.

The Precision Casting Division employs vacuum arc melting and casting procedures in addition to a proprietory mold process to produce titanium castings weighing up to 100 pounds. This division is now completing the final phases of start-up. Since the melting and casting operations are performed in vacuum, the generation of potential air contaminants is essentially limited to particulates from mold preparation and casting clean-up. An attached Mid-Willamette Valley Air Pollution Authority file memorandum indicates that principal areas of concern are now under adequate degrees of air pollution control. The Regional Authority considers REM's current controls adequate although a minor source (estimated to be 5 pounds of particulates per hour) is being evaluated.

SUMMARY:

REM Metals Corporation operates a machining and stamping facility within the city limits of Albany which does not emit air contaminants. The company also produces space age metal castings six miles south of Albany on the east side of the I-5 freeway. This operation, which is completing start-up, has particulate control equipment that is performing satisfactorily. The Mid-Willamette Valley Air Pollution Authority feels that REM can easily control any problems that might develop.

FILE MEMO

TO : Rem Metals Inc. File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

Background Information:

Rem Metal is in the process of completing a new precision cast part plant. The plant will manufacture small precise castings for the Aero Space Industry. Yet to be installed is a vacuum furnace. Past applications of such furnaces have indicated that a pollution problem is nonexistent; however, this furnace will be reviewed as soon as installation has been completed.

The Problem and Control

The existing pollution problem and the control are as follows: The plant has both a sandblaster and a shotblaster where the exhaust of each is controlled through a Wheelabrator baghouse. The exhaust air is exhausted directly into the building, and we consider this not to be a pollution problem. They have a grinder which is used for grinding the molds. It has a one-horse power, 600 CFM exhaust motor. It exhausts directly into the atmosphere. The present operating schedule for this unit is one hour per day, and we estimate that 5 pounds of particulate matter is exhausted per day into the atmosphere. A small package dust collector could be installed for less than $600. Final recommendations are being held in abeyance until the entire plant becomes operational. At this time, it appears that the air pollution potential from Rem will be slight and easily and inexpensively controlled.

ZIRCONIUM TECHNOLOGY INCORPORATED

Zirtech is now completing construction of a facility which will produce titanium and zirconium tubing in diameters ranging from 1/2 to 2 inches. Start-up is scheduled for the last 2 weeks in September. The company address, 3615 South Pacific Blvd., is in the south Albany industrial area along Hwy. 99-E.

The Company will convert purchased tubing hollows (extruded cylinders with a hole in the center) to product,using a cold tube-reducing process which involves reciprocating rolls and a mandril. Prior to annealing in a vacuum furnace, the tubing will be washed in water (to remove lubricants) and treated with a nitric-hydrofluoric acid mixture (to remove surface contaminants such as oxides). The acid treating facilities will be vented to a packed-bed scrubber. Mid-Willamette Valley Air Pollution Authority plans to require performance test data when the scrubber becomes operational. Additional details on the acid treating and scrubber are presented in the attached Mid-Willamette Valley Air Pollution Authority file memo.

SUMMARY

Zirconium Technology Incorporated, located in the industrial area in southern Albany, will begin producing zirconium and titanium tubing in late September, 1969. A packed-bed scrubber will be used to control emissions from an acid treating operation. Mid-Willamette Valley Air Pollution Authority plans to require performance testing on the scrubber.

FILE MEMO

TO : Zirconium Technology Inc. File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

Zirconium Technology, or ZIRTECH as the Company is properly known, will produce titanium and zirconium tubing. The tubing produced is small, about ½ inch diameter and is produced from larger tubing approximately 2 inches in diameter. The tubing will be used for nuclear power plant heat exchangers and for piping of caustic materials.

The Problem and Proposed Control

The only air pollution source that this plant is expected to have will be the exhaust air from the pickling tanks. These pickling tanks will contain 20 to 30 percent nitric acid and 3 percent hydrofluoric acid. The fumes will be pulled through a packed bed scrubber. This unit is 6 feet wide 13 feet 8 inches high and handles 10,000 CFM. Polypropylene packing material is used. The company feels that the scrubber will be 100 percent efficient, of course, nothing is 100 percent efficient, there will be some losses. In any event the loss will be quite small. The pickling solution will not be highly volatile, thus there will not be a large quantity of fumes to scrub. According to company officers, the scrubber is oversized. It was designed by CH_2M, the vendor is Corrosive Controls, Inc. of Camis, Washington. The fumes will be emitted four hours out of each day. Unless this company and engineering firm can furnish figures which indicate what the atmospheric emissions will be, stack tests will be required prior to start up.

Two Pickling Tanks

One is 32½ feet long x 18 inches wide x 36 inches deep

Other, 17 feet long x 8 inches wide x 18 inches deep

Tanks are open four hours per day. The pickup system is a surface unit that surrounds the entire tanks. It operates four hours per day.

The packed tower scrubber is a 10,000 CFM @ 6" H_2O. It measures 13 feet by 8 inches high by 6 inches wide.

Packing is polypropylene 1 inch intalox.

TiLINE INCORPORATED

TiLINE produces zirconium and titanium castings, primarily valves and pump casings, at 150 West Queen Avenue in Albany. This location is a light industrial area with nearby residences.

The Company purchases metal in billet form, vacuum arc melts it, and uses a skull casting technique to pour into graphite molds. Centrifugal force assists the molten metal into the molds. Castings are cleaned by sandblasting and checked for imperfections. Minor defects are repaired. Mold material is recycled. The mold production resembles iron foundry practices except for a baking operation which removes volatiles, coal tar pitch and water. Removal of the volatiles is required because of the vacuum melting and casting procedure. Gates and risers most likely are reclaimed.

A dust collector (baghouse) is provided for the mold production. It is estimated (Mid-Willamette Valley Air Pollution Authority file memo) that the annual loss of particulates to the atmosphere from this unit is approximately 780 pounds. The sandblast unit, used to clean castings, is connected to a small baghouse which exhausts to the work room. Therefore, no particulates are directly vented to the atmosphere from the casting cleaning operation.

Mid-Willamette Valley Air Pollution Authority does not consider TiLINE to be an air pollution problem.

SUMMARY

TiLINE Incorporated produces zirconium and titanium castings in a light industrial area in south Albany. Air pollution control equipment is installed and operating satisfactorily.

FILE MEMO

TO : Tyline Inc. File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

Tyline produces zirconium and titanium castings consisting primarily of valves and pump casings.

The Problem:

The primary source of pollution is with the graphite mold recovery and with the graphite mold covering material. This covering material is powdered graphite that is put over the mold to prevent oxidation of the mold during firing.

Control Program:

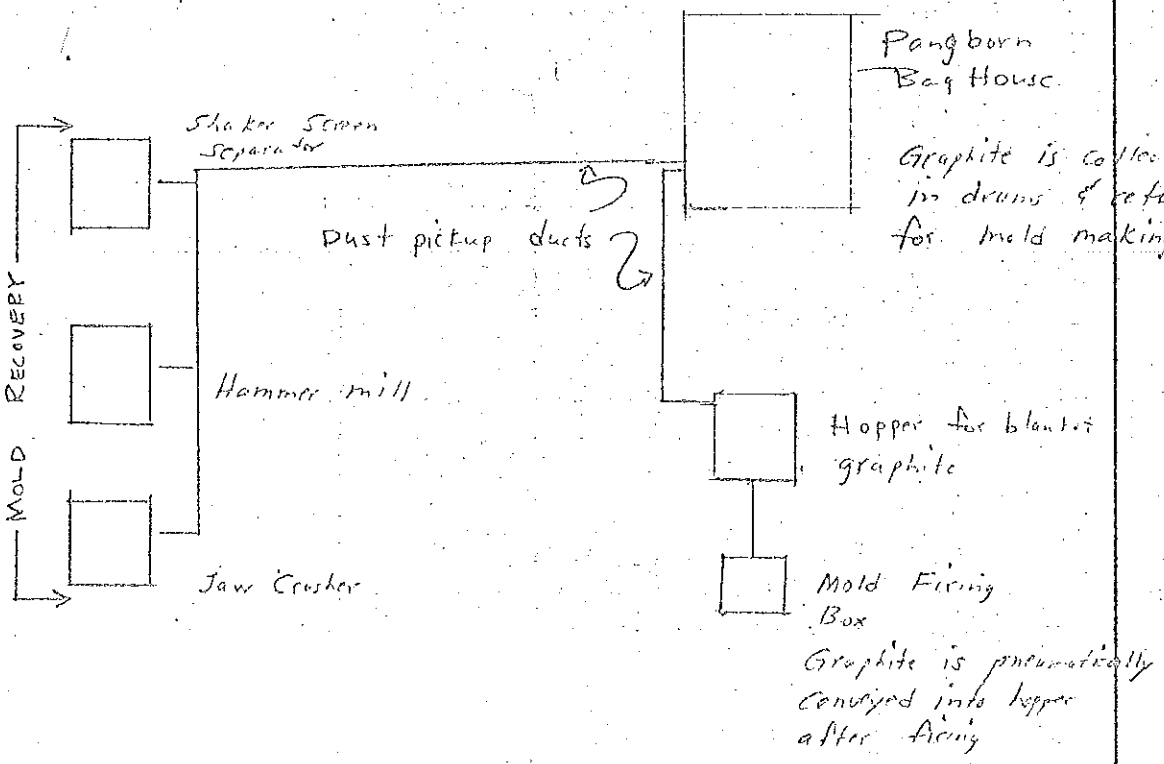
Control of inplant dust is with the Pangborn Model 1500 CN baghouse dust collector. Actual production records show that 1,000 to 1,500 pounds per week of graphite is collected. The Pangborn unit eliminates a potential air pollution problem plus enables Tyline to recover the expensive graphite material. Based upon a 99 percent collection efficiency factor for the Pangborn unit and using the maximum recovery quantity of 1,500 pounds per week, the total annual loss of particulate matter to the atmosphere would be 780 pounds. The attached process flow diagram shows the operations that produce dust and the dust pick-up location.

Of secondary importance as a potential air pollution problem is the core oven. This oven bakes the graphite mold which is a combination of graphite with about 5 percent coal tar pitch and a small

amount of starch. Household type starch is baked at 1,650 degrees Fahrenheit. The furnace is vented directly into the atmosphere. According to company officers, no visible emission is evident. This is probably partly because the entire mold is covered with graphite material which would tend to absorb the gases. At this time, it is impossible to have any estimates of gases that may be released to the atmosphere; however, it does not appear to be significant. In my estimation, Tyline Corporation has taken the necessary steps to prevent air pollution.

TILINE CORP. — Albany — Dust Control System

9-12-69 M.R. Spurgeon



OREGON METALLURGICAL CORPORATION

Oremet produces titanium in ingot form and cast-products at 120 West 34th Street. The area is industrial and essentially void of private residences.

Present production at Oremet involves converting sponge-like titanium metal to ingot and cast products via vacuum melting techniques. Sponge metal is compacted and welded to form large electrodes which are double melted into ingots. The ingots are used by various fabricators. The casting (or foundry) operation is very similar to that used by TiLINE. Molds are pressed and baked to remove volatiles. Skull casting techniques are used to produce valve and pump components. Castings are cleaned by sand blasting in closed units. Surplus metal and mold materials are reclaimed. Dust control equipment is provided in the foundry. Control devices do not appear warranted at this time in the melt shop. Repairable defects in the castings are corrected using methods common to the titanium industry.

Oremet has been purchasing most of their required sponge, primarily from Japan and England. Presently they are also purchasing titanium tetrachloride which they convert to titanium sponge in reduction facilities. Atmospheric emissions from the present reduction operation occur for 10 to 15 seconds about 4 or 5 times during a 20 hour period. Only 1 reduction run is now being made per week. This equipment will be phased out around February, 1970.

Oremet is in the process of building a more integrated production facility. Completion of this program in February 1970 will make the Company more competitive and less dependent on external sources of sponge and titanium tetrachloride. The program includes a rutile ore (TiO_2) chlorination, a new reduction facility (sponge plant), and magnesium and chlorine recovery (magnesium plant).

Attached is a previously prepared Department of Environmental Quality staff memorandum which describes processes in the completed

project. It should be noted that the current melting and casting facilities will not be altered. (A portion of the melting facility was just completed in October 1968.)

Essentially, Oremets effect on air quality relies on performance of forthcoming processes and associated air pollution control equipment. An attached Mid-Willamette Valley Air Pollution Authority file memo discusses three areas of concern, each of which will have control devices. Mid-Willamette Valley Air Pollution Authority is currently reviewing Oremet's proposal and is expecting the operation to comply with the Regional Authority regulations. However, Mid-Willamette Valley Air Pollution Authority anticipates requiring source measurements to determine if the operation is satisfactory.

SUMMARY

Oregon Metallurgical Corporation is a producer of titanium castings and ingots at 120 West 34th Street, an industrial area in South Albany. The Company is presently working on a building program to make its operation more integrated and enhance its position in the titanium market. This program is scheduled for completion in February 1970. Oremets effects on air quality will be dependent on performances of proposed control equipment which is currently being reviewed by Mid-Willamette Valley Air Pollution Authority. The Regional Authority anticipates requiring performance testing as proof of compliance with its regulations.

PRODUCTION PROCESSES AT OREMET

The following information, which is presented as reference material, was obtained from Oremet employees at a conference with air pollution control officials on May 1, 1969. Whether or not the installed-process will adhere strictly to the following information is not known. A very brief process diagram is presented in Figure 1.

I. CHLORINATION AND PURIFICATION

Rutile (an ore containing approximately 95% TiO_2), coke (relatively small particle size) and chlorine are fed to fluidized-bed reactors (chlorinators) in a continuous manner. The reactions can be summarized ideally as follows:

1) $TiO_2 + C + 2Cl_2 \rightarrow TiCl_4$ (gas) + CO_2 (gas)

2) $Me_uO_v^{*} + C + Cl_2 \rightarrow Me_xO_yCl_2^{**}$ (gas) + CO_2 (gas)

* Fe_2O_3, Al_2O_3, Cb_2O_5, V_2O_5, SnO, SiO_2

** $FeCl_3$, $AlCl_3$, $CbCl_5$, $VOCl_3$, $SnCl_2$, $SiCl_4$

Equation 1 represents the behavior of the product material, whereas equation 2 indicates the reactions for impurity metal oxides. Some CO and $COCl_2$ most likely is formed in the chlorinator(s). However, these materials are supposedly converted to CO_2 and HCl prior to scrubbing for HCl removal followed by release to the atmosphere. This will be explained later. A chlorinator is schematically represented in Figure 2.

The exhaust from the chlorinator(s) is subjected to the purification scheme indicated in Figure 3. The coke particles can be recycled to the chlorinator(s). The columbium or niobium (Cb), iron (Fe), aluminum (Al), and vanadium (V) chloride solids are waste materials. Supposedly the Cb value is such that it might someday be recovered if a feasible scheme could be developed. Presently, these materials will be discarded. The silicon (Si), tin (Sn), and small amount of titanium (Ti) liquid chlorides are also waste materials. These will react very easily with any atmospheric moisture to form a white HCl fume and the corresponding metal oxides.

Storage of these liquids for any period will involve sealed vessels. All $TiCl_4$ systems will have to be oxygen and moisture free to maintain the chloride form.

The gas phase leaving the refrigerated condenser (shown in Figure 3) will contain $TiCl_4$, Cl_2, $COCl_2$, CO and CO_2. Scrubber treatment of such a mixture can create technical problems primarily because of the formation of hypochlorite ion (ClO^-). The purpose of the HCl burner is to overcome this complication by converting all chlorine to chloride ion (Cl^-) and CO to CO_2. The chloride ion will leave the burner as HCl, which is relatively easy to remove by scrubbing.

The chelating additive, an organic compound, will selectively complex with the impurity metal chlorides thereby lowering the respective boiling points and allow for impurity removal. Textbook descriptions of chelates cite solubility in organic solvents and low aqueous solubility. Behavior in a halogenaceous - what have you admixture cannot be postulated by myself.

II. REDUCTION

Liquid $TiCl_4$ will be introduced into the reduction vessels containing Mg at monitored rates to control temperature and reaction rate. The reduction reaction is given below:

$$TiCl_4 + 2\ Mg \rightarrow Ti + MgCl_2$$

Titanium metal is formed in a large sponge-like mass or cake. By product $MgCl_2$ is tapped as a liquid intermittently. Final $MgCl_2$ removal is accomplished by elevated temperature ($\simeq$ 1000° C) inert gas purging or vacuum treating. The metal sponge is conditioned to prevent ignition upon atmospheric exposure. Then the cake is chopped, inspected and sent to melting.

III. MELTING

Operations conducted in the melt shop include sponge compaction, vacuum arc and electron beam melting, Ti-electrode fabrication, casting and ingot and casting machining, testing and clean-up. Vacuum melting techniques are used to promote metal purity and integrity.

IV. MAGNESIUM AND CHLORINE RECOVERY

Fused salt electrolysis is employed to convert $MgCl_2$ to Mg and Cl_2. The reactions are:

$$Mg^{++} + 2e^- \rightarrow Mg\ (liquid)$$

$$2\ Cl^- - 2e^- \rightarrow Cl_2\ (gas)$$

Since the $MgCl_2$ feed will be reasonably pure, little or no purification of Mg or Cl_2 is required. The flow diagram given in Figure 4 is representative of this process. The Mg will most likely be cast into ingots before going to $TiCl_4$ reduction. Cl_2 can be sent directly to chlorination or stored.

V. SUMMARY

The information presented above is meant to be representative of the installed process. However, it must be remembered that it is a simplification and changes by the company are possible.

Although some similar operations, terminology, etc. are employed by all "space-age" metal producers, the processes employed vary considerably and direct comparisons are not always correct.

Figure 1.- Schematic Overall Flow Diagram

Oremet Corp., Albany, Ore.

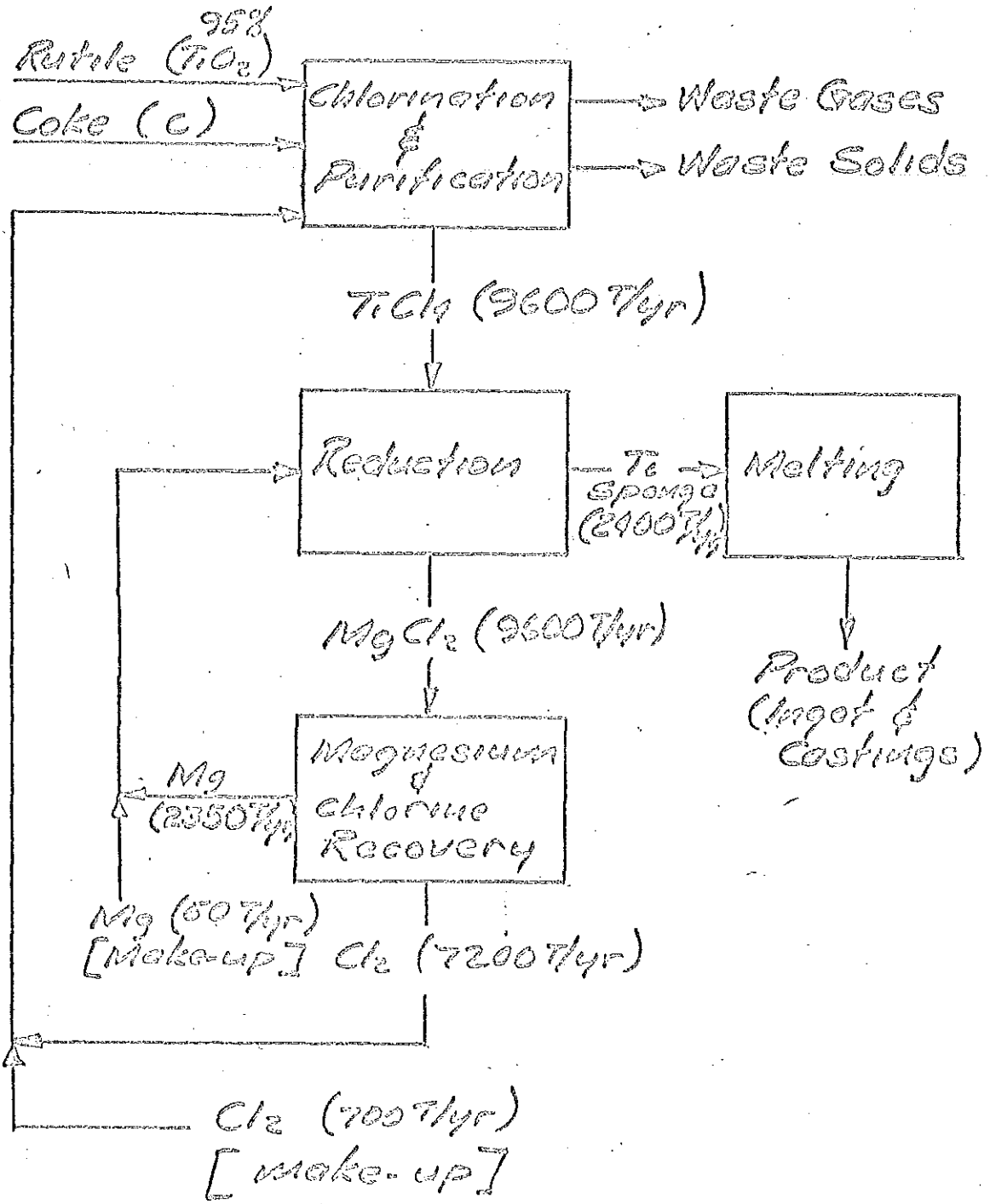


Figure 2.- Schematic Chlorinator Diagram

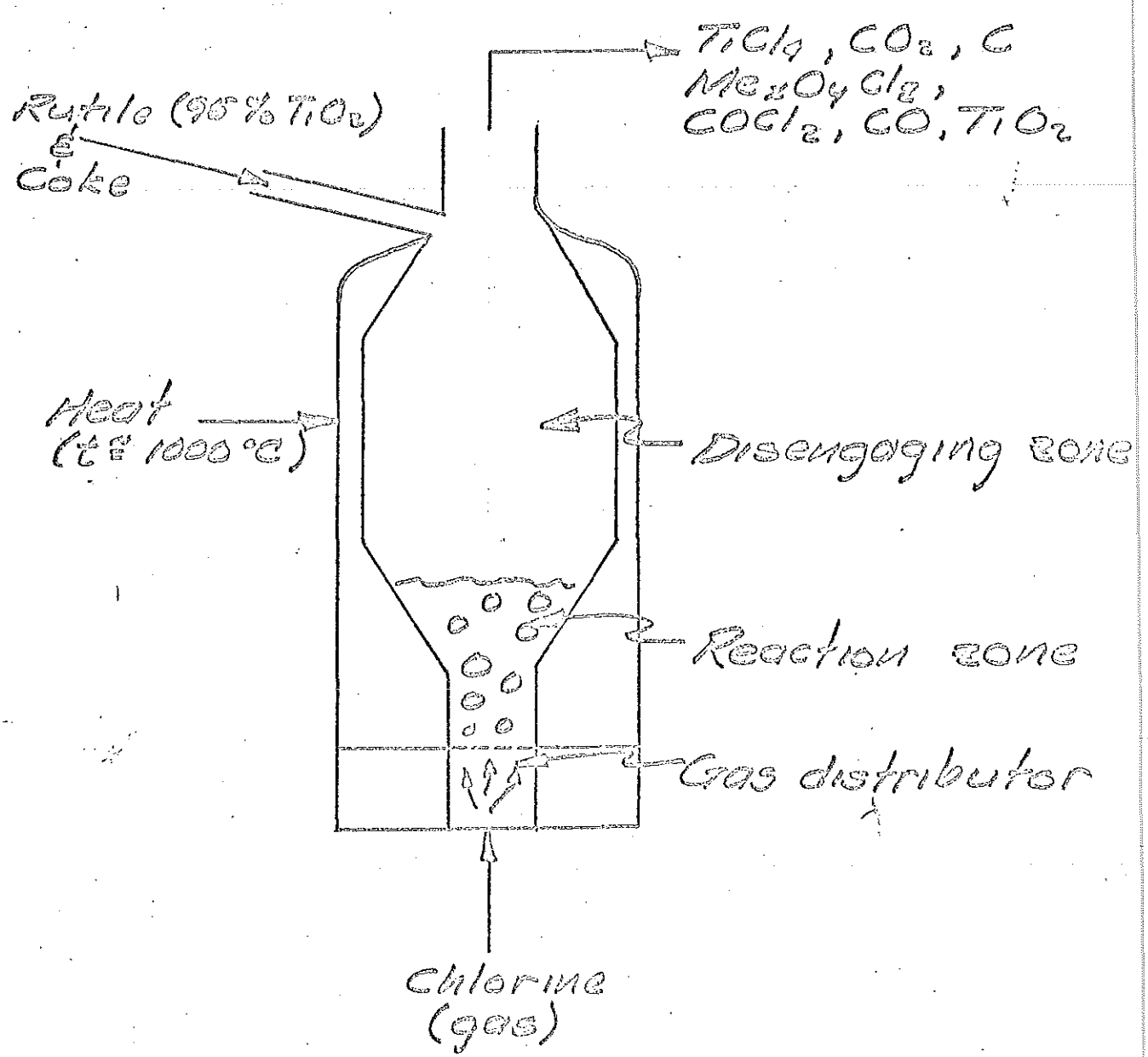


Figure 3.- Schematic Chloride Purification Flow Diagram

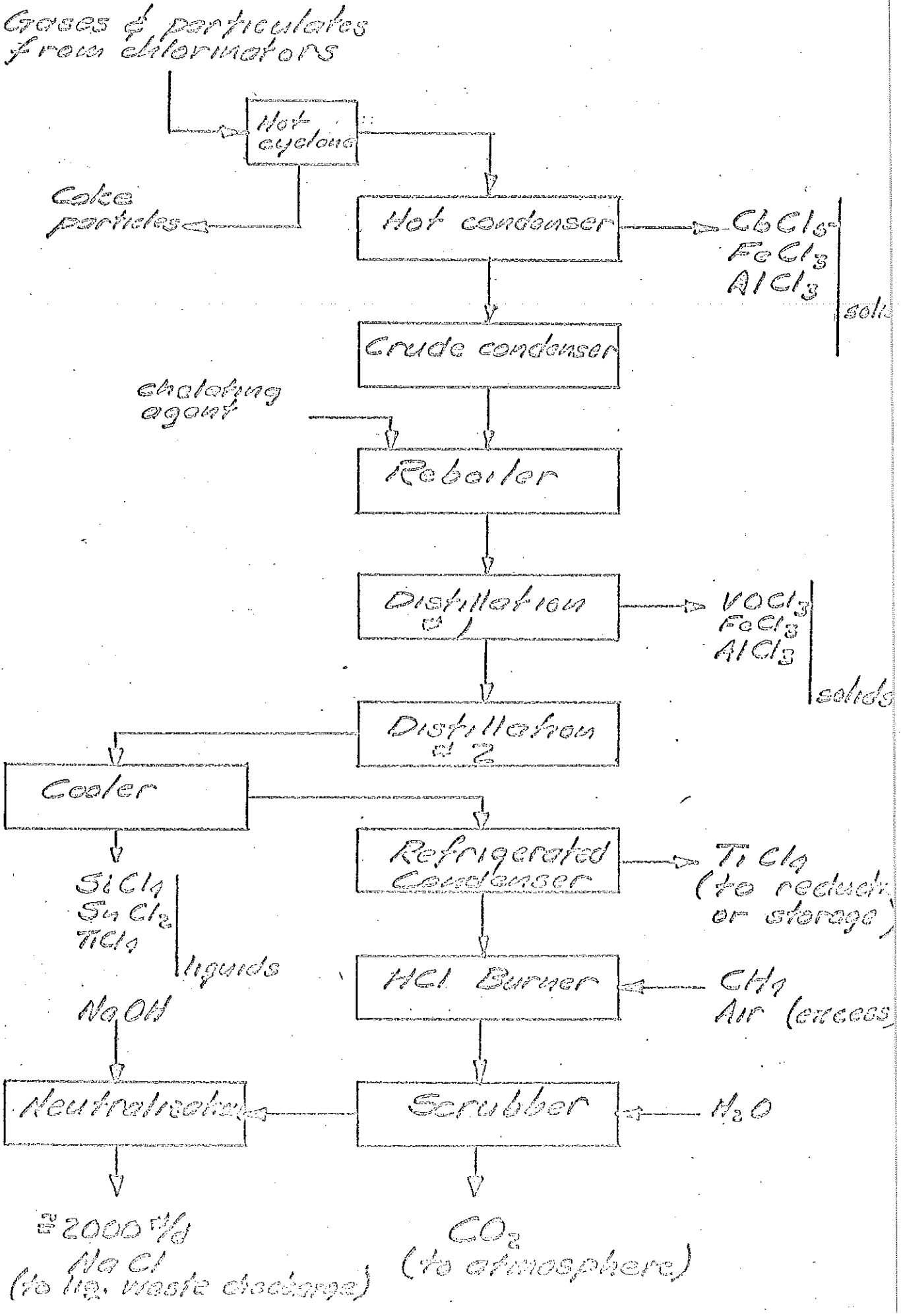
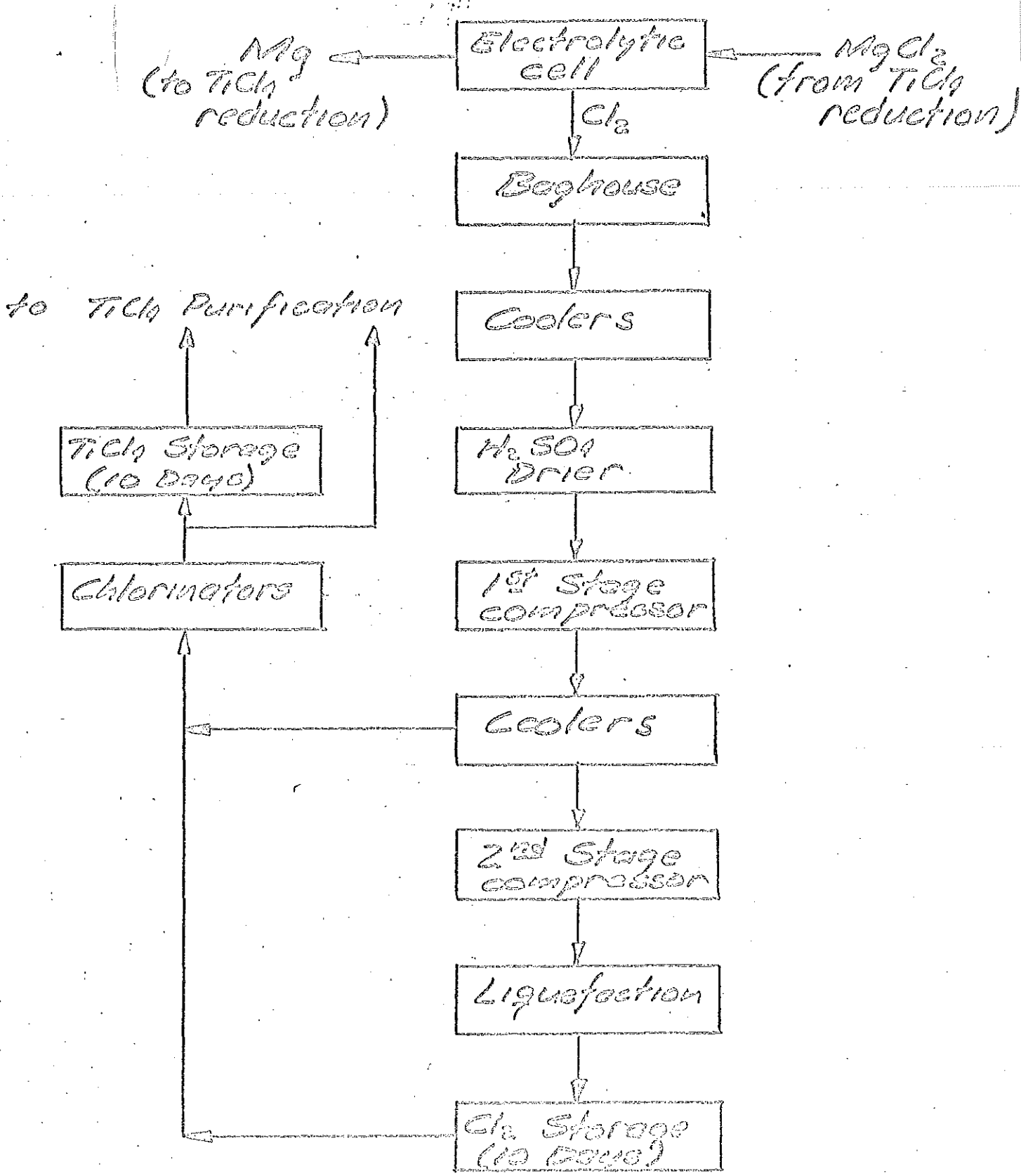


Figure 4. - Schematic Chlorine and Magnesium Recovery Flow Diagram



FILE MEMO

TO : Oregon Metallurgical Corporation File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

OREMET is in the process of building a titanium sponge manufacturing plant and magnesium recovery plant.

The Problem and Proposed Control Program

There are three control systems that will emit pollutants to the atmosphere. One is a baghouse which controls dust from the rutile and coke dryer, the others are scrubbers. One scrubber is off the hydrochloric acid burner where titanium tetrachloride is made and the other is off the sponge plant where pure titanium is porduced. Two baghouses are used in the magnesium recovery operation but because they are not vented to the atmosphere and are only used to take out the abrasive materials before it goes through the compressor and chiller it is not considered to be a pollutant. A sketch is enclosed which shows this operation.

Sponge Baghouse

The baghouse operation is for controlling the dust emissions from the rutile and coke dryer, prior to combining these two ingredients, they must be dried. The dryer operates at 200°. The present schedule calls for a normal five-day per month or 40-hour per month operation. A total of 13,400,000 pounds per year will be handled for an average of 28,000 pounds per hour. It is estimated that of this 28,000 pounds handled, 1 percent will be pulled off into the baghouse or 280 pounds per hour. Based upon a baghouse

efficiency of 99 percent, the grain loading will be .034 grains per standard cubic foot. Annual loss to the atmosphere will be 1,340 pounds. Attached are calculations which verify these figures.

Titanium Chloride Scrubber

For the titanium tetrachloride operation, Mr. Charlie Pope of OREMET estimates that the CL_2 discharge will be 10 parts per million. This is based upon his actual experience with Timet at the Henderson Nevada plant. Threshold level for chlorine gas is 3½ parts per million and at 15 parts per million there will be irritation to the eyes and throat. Mr. Pope has taken readings from the gas stream in his previous operation, which is quite similar to the OREMET operation, and finds that the gas stream can be expected to be 10 parts per million.

Sponge Scrubber

The next scrubber is used in the sponge plant; the only expected emissions from this scrubber will be in the form of titanium hydroxide which is virtually unwettable. This scrubber is used to scrub the gasses from the venting process on the vacuum furnaces. The bulk of the gas will be helium. Actual production information from Charlie Pope's file reveals that approximately 1 percent of the gases will reach the scrubber. This amounts to 534 pounds per day. The scrubber is estimated to be 95 percent efficient. This gives a 5 percent loss for apparent loss of 27 pounds per day; however, actual experience shows that the chlorine is scrubbed out leaving a titanium hydroxide which when calculated by the

molecular weight amounts to 12 pounds per day. This 12 pounds will be vented 12 times per day for a duration of 30 seconds at each vent cycle. Therefore, the total 12 pounds will be vented within a total time of 6 minutes per each 24-hour period. The titanium hydroxide shows up as a dense white cloud. Attached are calculations showing how this figure was arrived at.

Stack Sampling

It is my recommendation that after these operations are on stream that we require stack samples to actually measure the emissions. In discussing this with OREMET, they seemed willing to do stack sampling for us. My overall opinion of the OREMET operation at this time, and of course additional time will be spent on the plan review, is that they will have their emissions under control and in the limitations set by the Mid-Willamette Valley Air Pollution Authority.

Baghouse

The baghouse will operate 480 hours/year.

Annual quanity dried

13,400,000 pounds or 28,000 pounds/hour

1 percent reach baghouse or 280 pounds/hour.

$\frac{280}{60}$ = 4.64 pounds/minute

Bahouse is 99 percent efficient for a 1 percent loss to atmosphere.

4.64 x .01 = .046 pounds/minute lost

$\frac{.046 \text{ pounds/minute} \times 7000 \text{ grains/pound}}{9400 \text{ ft}^3\text{/minute}}$ = .034 grains per cu. ft.

Total annual loss is 2.8 pounds/hour x 480 pounds/year = 1,340 lbs./yr.

Sponge Plant Vent Scrubber

$\frac{9700 \text{ tons/year} \times 2000 \text{ ton/pound} \times .01}{365}$ = 534 pounds of T_1Cl_4 scrubbed/day

95 percent efficiency

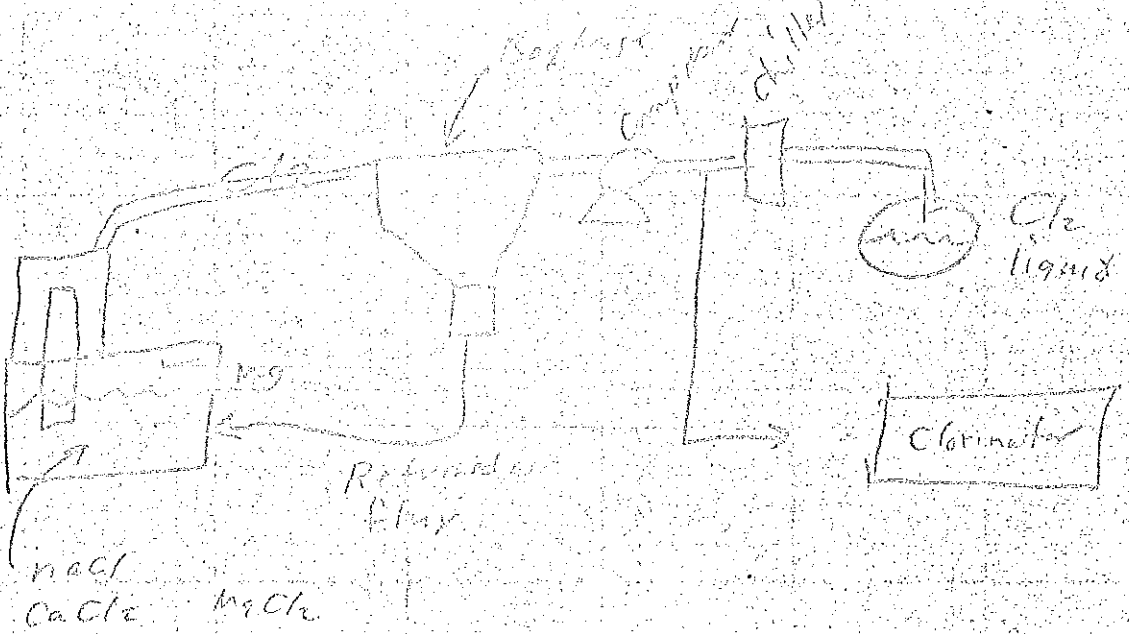
540 pounds x 5 percent = 27 pounds of T_1Cl_4

	$T_1(OH_2)$	T_1Cl_4
mol. wt.	$49 + (16 + 1)_2$	$49 + (35)_4$
	83	189

$\frac{27}{189} \div \frac{x}{83}$ $\quad x \approx 12$ pounds/day lost to atmosphere

These 12 pounds will be vanted 12 times at 30 second duration. Total vent time will be 6 minutes/24 hours. This will be a dense white cloud consisting almost entirely of $T_1(OH)_2$. Annual loss

12 x 365 = 4380 pounds/year.


Cl2
Liquid
Clorinator
NaCl
CaCl2
MgCl2

WAH CHANG ALBANY CORPORATION

Wah Chang Albany is located at 1600 Old Pacific Highway, which is West of Interstate I-5 on the northern Albany boundary. The Company produces and/or fabricates zirconium, hafnium, columbium (niobium), tantalum and tungsten in such forms as sheet, plate, rod, tube and special shapes.

Historically, the metal production processes, zirconium - hafnium and columbium-tantalum, are the contributors to air pollution problems. Since the fabrication operations themselves are not air pollution problems, they are not pertinent here and further discussion is not necessary.

An attached flow sheet schematically illustrates Wah Chang's former zirconium-hafnium process. The company uses zircon sand after it has passed the ore dressing stage. This material is a mineral containing zirconium oxide, hafnium oxide and silicon oxide (zirconium to hafnium ratio of about 50 to 1 on a metal basis). The major applications of zirconium and hafnium require them to be essentially free of each other so a separation of the two is necessary. Wah Chang's separation process employs a liquid/liquid extraction procedure which means that the zircon has to be converted to a water soluble form (in this case, the tetrachloride form). The conversion to chloride previously was accomplished by forming a zirconium-hafnium carbide-nitride mixture which readily reacted with chlorine to produce the crude chloride (zirconium tetrachloride/hafnium tetrachloride mixture). The silicon dioxide (SiO_2) contained in the zircon sand was emitted to the atmosphere as a continuous white plume of very small particulate. The carbide chlorination operation released chloride ion to the atmosphere which reacted with moisture and ammonium ion to form low level white mists or clouds. Both of these operations have been discontinued as of late August and early September, 1969. Wah Chang is currently purchasing more of its crude chloride than it was doing a few months ago. This practice in conjunction with a new direct sand chlorination technique has allowed the company to discontinue the use of the carbide plant earlier than anticipated a year ago. Although the new breed of crude chlorinators are not without their own difficulties, they have resulted in lowering atmospheric chloride emissions. Eventually they will allow disposal of silicon tetrachloride (from the SiO_2 in zircon sand) as a by-

product. When this occurs, under normal operation essentially no atmospheric chloride discharge is expected. Presently the direct sand chlorinators are using the control equipment previously used by carbide chlorination. The load is much less and the performance more satisfactory.

The feed make-up operation dissolves the crude chlorides in water and prepares the resulting solution for separations. Historically, this area has been a source of chloride which reacted with moisture and ammonium ion to contribute to the low level mist or cloud. Improved crude chloride handling techniques and fume controls (a venturi type scrubber) have reduced atmospheric discharges from this source.

The separation, precipitation and rotary vacuum filter systems have been a major source of ammonium ion which is the other contributor to the mist or cloud. A scrubber now controls the ammonium ion from these sources.

The zirconium oxide and hafnium oxide filter cakes are dried in separate calciners (rotary kilns). Emissions from the zirconium oxide calciner, which are treated by a high efficiency scrubber system, are not considered to be a problem at this time. Emissions from the hafnium calciner, hafnium filters, and two holding tanks are being treated by the previously mentioned ammonium scrubber. These areas are generally recognized as the sources of Wah Chang's odor problem. Although peroxide is being added in an attempt to reduce the odor level, performance of the odor control efforts is regarded as unsatisfactory by the company, all air pollution agencies and the public. The company has employed a consultant to investigate high temperature incineration as a means of odor control. Wah Chang personnel have indicated that a realistic time schedule for testing this approach indicates sometime in November 1969 as the earliest testing date. The company has also indicated its intent to control minor odor sources which they expect to be able to detect after elimination of the major ones mentioned above.

The remaining process chemistry and procedure being equally pertinent and identical for both zirconium and hafnium, no further mention of hafnium need be made since its production is about 2% that of zirconium.

Pure chlorination involves continuously reacting high purity zirconium oxide, carbon and chlorine to form high purity zirconium tetrachloride and carbon dioxide. Excess chlorine and uncondensed chloride are treated in a 3-stage scrubber system. The third stage was installed during 1969. This area is not considered to be a problem at this time.

Zirconium metal is produced by reacting zirconium tetrachloride with magnesium to form the metal and magnesium chloride ($MgCl_2$). The major portion of $MgCl_2$ and unreacted magnesium is removed physically prior to a distillation operation which accomplishes final $MgCl_2$ and magnesium removal. Occasional venting is required during the metal forming reaction (reduction operation). These gases are routed to a system containing a cyclone, baghouse and scrubber. (The scrubber follows the baghouse to capture gaseous chlorides.) Modifications of reduction equipment and procedures which were completed in February 1969 has resulted in eliminating an estimated 200 pounds per day chloride emission from this area. Reduction and distillation which are much improved, are not considered to be major areas of concern at this time.

The pure metal, in the form of a sponge-like material, proceeds through a series of fabrication operations. Since these procedures are not considered to be air pollution sources as previously mentioned, no discussion of these procedures is provided.

Reduction apparatus clean-up is accomplished by washing with water to remove unreacted zirconium chlorides followed by acid pickling to remove some unreacted magnesium. The acid pickling is essentially free of visible emissions. However, the washing operation, done on an as required basis, does release chlorides to the atmosphere which contribute to the mist or cloud formation. The Company does plan to enclose the washing area and treat the resulting fumes.

The material obtained by the previously mentioned physical removal of magnesium chloride and unreacted magnesium undergoes further processing. The bulk of this material is relatively pure magnesium chloride which is separated by hand and shipped in sealed railroad cars to a purchaser. The magnesium rich portion is fed to a melting furnace for magnesium recovery. Although a fume treatment system serves this area, some magnesium oxide excapes as a white smoke. The Company anticipates improving the effectiveness of this control system (a venturi scrubber) in conjunction with their efforts on the aforementioned washing area.

The company indefinitely discontinued columbium and tantalum production in November 1968. The schedule for compliance agreement between the Company and Mid-Willamette Valley Air Pollution Authority required engineering plans for fume control on this activity by May 15, 1969. This was

accomplished. The agreement also requires installation of the controls prior to renewing production.

The remaining atmospheric emission source considered as significant at this time is the clarifier and settling pond system. This area gives off undesirable odor and ammonia when pH goes beyond a certain range. A reduction in ammonia emission is expected when the ammonia distillation goes on stream later this year (start-up in October 1969 and continuous operation expected by January 1970). Improvements in pH control have been accomplished and efforts for further improvements are being made.

A chronological arrangement of the Wah Chang and Mid-Willamette Valley Air Pollution Authority compliance agreement is attached. Also included are documents from the Regional Authority indicating that the Company has met its commitments outlined in the schedule. In addition, a letter from the Company to Mid-Willamette Valley Air Pollution Authority indicating reduced emissions, control installations, process changes and future efforts is attached.

The current situation is apparently susceptible to operator mistakes or upset episodes. The company is conducting operator training programs to alleviate these problems.

SUMMARY

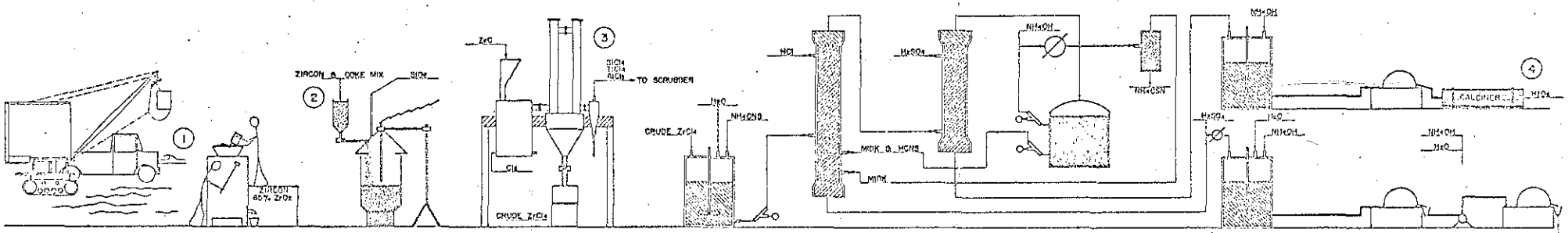
Wah Chang Albany Corporation produces and/or fabricates a variety of "space-age" metals at its plant, located West of Interstate Hwy. I-5 on the northern boundary of Albany. During the past two years the Company has installed several pieces of control equipment and effected many process changes which have resulted in decreasing atmospheric emissions. Probably the most noticeable was the discontinuation of the zircon sand carbiding operation, noted for its persistant white particulate plume. This was accomplished on August 29, 1969. Improved as well as additional scrubbing devices were installed during 1969 which lowered the discharges of chlorides and ammonium ion thereby effecting a reduction in the visibility reducing cloud or mist attributable to Wah Chang.

The success to date by the Company is offset by the failure of its efforts to control the odor problem and frequent upsets or accidents which result in visible emissions. The company has abandoned wet chemistry

approaches as a means of odor control. Current efforts are directed toward high temperature incineration. A consulting engineer has been retained to assist them on this problem. The company has indicated that it expects preliminary design to be finished in time for testing sometime in November 1969. An employee training program is being conducted to minimize upset and accident occurrences.

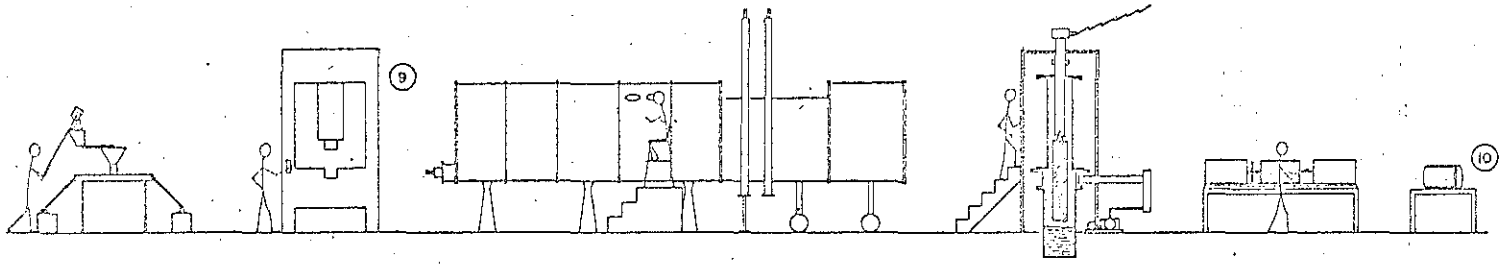
Additional efforts are underway or programmed for further reduction of emissions from reduction retort cleaning, magnesium recovery, clarifier and settling ponds.

Wah Chang Corporation has been successful in meeting its commitments in the compliance agreement with Mid-Willamette Valley Air Pollution Authority. Both the Company and the Regional Authority realize that additional efforts are necessary and plan to proceed with emphasis to be placed on the odor problem.



1. BEACH SAND
2. ORE DRESSING
3. CARBIDE FURNACE
4. CHLORINATOR
5. FEED MAKE-UP
6. SEPARATION SYSTEM
7. PRECIPITATION
8. ROTARY VACUUM SYSTEM

14. CRUSHER
13. BREAKOUT PRESS
12. DISTILLATION FURNACE
11. REDUCTION FURNACE
10. CHLORINATOR
9. BLENDER



15. BLENDER
16. PRESS
17. ELECTRON BEAM WELDER
18. VACUUM ARC FURNACE
19. MACHINING
20. ZIRCONIUM INGOT

FLOW SHEET
PRODUCTION OF ZIRCONIUM

WAH CHANG ALBANY
ALBANY, OREGON

A TELEDYNE COMPANY

MID-WILLAMETTE VALLEY AIR POLLUTION AUTHORITY

WAH CHANG ALBANY CORPORATION

Chronological Schedule of Compliance

October 15, 1968	--	Operator check list on Crude Chlorination barrel filling operation.
	--	Odor survey on Hafnium calciner.
October 31, 1968	--	Close down Columbium-Tantalum operation until next year.
November 1, 1968	--	Engineering plans submitted to Authority for New feed make-up.
November 15, 1968	--	Engineering plans submitted to Authority for Ammonia control on Zirconium-Hafnium side.
	--	Accurate test results on Precipitation tank in Building 11.
December 31, 1968	--	Procurement of control equipment for Rotary Vacuum System.
January 31, 1969	--	Monitor for Chlorine on Pure Chlorination scrubber--Results available.
February 28, 1969	--	Monitor crude chlorinator scrubber efficiency.
	--	Scrubber installed on New feed make-up.
	--	Operator check list submitted & implemented on New feed make-up.
	--	Old feed make-up shut down.
April 1, 1969	--	Controls installed and operating on Rotary Vacuum System.
	--	Routine monitoring of Rotary Vacuum System controls.
May 15, 1969	--	Engineering plans for fume control in Columbium-Tantalum process.
July 1, 1969	--	Feasibility report on conversion of crude chlorinator to Direct Sand Chlorinator.
	--	Engineering plans for control of direct sand chlorinator submitted to Authority.
	--	Review of Variance on Carbide plant.
	--	Engineering plans submitted for Carbide plant controls.

September 1, 1969	--	Engineering plans for control of Crude Chlorination submitted if conversion to Direct Sand Chlorinator not feasible.
October 31, 1969 (or startup)	--	Fume controls on Columbium-Tantalum process.
December 31, 1969	--	Crude Chlorinators converted to Direct Sand Chlorinators, if feasible.
	--	Crude Chlorinators either converted or adequately controlled.
	--	Direct Sand Chlorinators adequately controlled.

New Zirconium Calciner

7 days after startup	--	Notify Mid-Willamette Valley Air Pollution Authority.
30 days after startup	--	Supply test results.
90 days after startup	--	Engineering plans for adequate controls submitted to Authority.
270 days after startup	--	Adequate controls installed and operating.

CS:ks

FILE MEMO

TO : Wah Chang Albany Corporation File

FROM : Vic Prodehl

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRESS

Wah Chang Albany Corporation produces and fabricates zirconium, hafnium, columbium, and tantalum tubing, sheeting, rods, and plates as a major supplier of refractory and reactive metals for the nuclear power generating industry.

The Problem

Wah Chang Albany's complex has many processes most emitting varying amounts and types of particulate and/or gaseous pollutants.

The complex has been well known for odor and blue haze visibility reduction problems. These problems have been readily detected on Interstate 5 during periods of atmospheric stagnation. Many of these observations have indicated that upset conditions as well as processes without controls have caused these problems.

Recognizing the magnitude and extent of the air pollution problem, the Mid-Willamette Valley Air Pollution Authority entered into a study of the control necessary during late summer 1968 which culminated in a Schedule for Compliance Agreement October 15, 1968.

Control Program

The Schedule required control of all significant particulate and gaseous emissions by December 31, 1969. (Please find attached an itemization of control projects which reflect the extent of control required.) The Authority is most pleased to report that Wah Chang has complied with the Schedule and terminated two processes contributing significant emissions ahead of schedule.

One of these processes is the source of the most significant visible emission known as the Zirconium Carbide Plant. The shutdown of this plant two months ahead of schedule resulted in a reduction of particulate emissions of 11,000 pounds per day. Control of ammonia fumes has resulted in a reduction of 1,000 pounds per day.

The Schedule has resulted in a reduction of pollutants emitted from 14,506 pounds per day to 1,144 pounds per day. Attached to the main body of this report is an itemization of emissions showing a comparison of the 1967 emission inventory versus the present estimated emissions.

The Authority is aware of the existing kitty odor emanating from Wah Chang. Attempts by Wah Chang to correct this problem, including periodic shutdown of the Hafnium Kiln, has not corrected the problem. The Authority is continuing to work with Wah Chang on this problem and it is expected a second Schedule for Compliance, including odor control, shall be completed late fall 1969.

PARTICIPATING COUNTIES:
BENTON
LINN
MARION
POLK
YAMHILL

To: EJW

MID-WILLAMETTE VALLEY AIR POLLUTION AUTHORITY
2585 State Street - Salem, Oregon 97301
Telephone 581-1715

August 21, 1969

Mr. Ken Spies, Director
Department of Environmental Quality
Control
1400 SW Fifth Avenue
Portland, Oregon 97201

SUBJECT: WAH CHANG AIR POLLUTION CONTROL STATUS REPORT

Dear Mr. Spies:

I express regret that I have not answered your inquiry regarding the status of the air pollution control schedule of compliance program for Wah Chang Albany Corporation. Inadvertently the letter was filed before an appropriate answer was prepared.

I am happy to report that the Wah Chang Albany Corporation has made very fine progress in complying with the schedule drawn up in 1968. As of this date, Wah Chang Albany has satisfied the requirements of the schedule and in some cases are ahead of the original schedule. Of special note is the zirconium carbide plant that has been a source of most obvious particulate emission. This plant is scheduled to be shutdown August 31, 1969, which is approximately two months ahead of the original schedule.

Regarding the inquiry pertaining to odor control and the original schedule, please be advised that the Authority has discussed this with the management of Wah Chang and corrective measures have been implemented. It must be noted that the odor problem associated with the Wah Chang process is one that will have to be corrected in successive steps. This is due to the basic requirement of controlling the major sources in the first phase and successive control of the remaining minor sources. I am sure that we can look forward to a schedule in the latter part of fall 1969, which will incorporate the remaining control for odor emissions.

I trust this resume shall provide you with the information necessary and should additional information be required, please feel free to give me a call.

Sincerely yours,

Michael D. Roach

Michael D. Roach
Director

MDR:dy

WAH CHANG ALBANY
P.O. BOX 460
ALBANY, OREGON 97321
(503) 926-4211

A TELEDYNE COMPANY

September 16, 1969

Mr. Victor H. Prodehl, Technical Director
Mid-Willamette Valley Air Pollution Aughority
2585 State Street
Salem, Oregon 97301

Dear Mr. Prodehl;

In response to your telephone request of September 15, 1969, I am sending a comparison of the quantities of contaminants in the Wah Chang gasseous emissions as measured in the Spring of 1967, and estimated at the present time. They are shown below:

Pounds Per Day

	1967					1969				
	SiO_2	NH_3	Cl_2	Cl^-	ZrO_2	NH_3	Cl_2	Cl^-	ZrO_2	MgO*
Zr-Hf Reduction & Chlorination Blg.1			158	902	8		4	118	7	
Zr/Hf Separations Bldg. #11		1500		76	600	400		4	50	
Crude & Sand Chl. Bldg. #14			54	208			3.5	8		
Carbide, Bldg.30	11,000									
Mag/Recovery and Pickle slab								50		500
	11,000	1500	212	1186	608	400	7.5	180	57	500
Total			14,506					1,144		

*and miscellaneous smokes

The control devices installed during the last two years are as follows:

	Type	When Installed	Efficiency	Emmission
1)	Three stage scrubber on Crude Chlorination, water and two caustic packed towers.	1st caustic-1967 2nd caustic-1968 3rd water-1969	99+ %	4#/day
2)	Three stage scrubber on Pure Chlorination. One caustic packed tower, one water packed tower, TriMer water scrubber.	1st caustic-1967 2nd water-1968 3rd water-1969	99+ %	2#/day
3)	Venturi Scrubber at Feed-makeup.	1969	99%	<1#/day
4)	H_2SO_4 scrubber for NH_3 at Zr/Hf Separations.	1969	99%	<10#/day
5)	Venturi & Cyclone scrubber on Zr/Oxide kiln at separations.	1969	99+ %	<50#/day
6)	Venturi - 3000 CPM at Mag/Oxide (pickle slab area).		97+ %	<20#/day

In addition, we have eliminated the carbiding process and its inherent particulate emmission by developing a method for direct chlorination of sand, and built a plant to perform the operation.

During the period 1967 - 1969, the process for reducing zirconium tetrachloride by magnesium was modified to allow a completely different furnace to be utilized. This change virtually stopped a tendency to evolve some 200 pounds per day of chlorine and chlorides.

Conversion from fixed bed to fluid bed chlorinators designed from the start to eliminate emissions, and a complete revision of material handling procedures, have contributed greatly toward further reducing discharges of both chlorine and chlorides.

The persistant mercaptan odor has been minimized by hooding and venting the hafnium calciner, hooding and venting two holding tanks, and the hafnium filters. Vents from these areas are presently fed under pressure into the ammonia scrubber system, and peroxide is being added to oxidize the odor. As these strong sources are controlled, lesser areas of odor generation are uncovered. As fast as these points are verified, they are being added to the oxidizer treatment system. Plans for the immediate future call for collection of all emissions containing this odor, and passing them through either an afterburner or a chemical oxidizer in a packed scrubbing tower. Efforts to neutralize the odor chemically have not proven satisfactory.

We appreciate the help and cooperation your office has given us during this period.

Very truly yours,

W. A. Aschoff
Chief Engineer

WAA:eh

TO : MEMBERS OF THE ENVIRONMENTAL QUALITY COMMISSION

B. A. McPhillips, Chairman
Herman Meierjurgen, Member
Storrs Waterman, Member
E. C. Harms, Jr., Member
George A. McMath, Member

FROM : AIR QUALITY CONTROL STAFF

DATE : September 22, 1969 for Meeting of September 26, 1969

SUBJECT: REVISED BURNING SCHEDULE

Since the heavy rains have ended the major field burning season, the staff submits for your consideration the establishment of a new burning schedule along the lines of the attached draft. This schedule should adequately regulate agricultural burning during the balance of this year and through June 15 of next year.

Attachment

SCHEDULE OF DAYS FOR PERIOD OCTOBER 1, 1969 to JUNE 15, 1970

1. Meteorological Conditions

Forecast wind speeds of less than 8 mph shall constitute prohibition conditions.

Forecast wind speeds of 8 mph or greater shall constitute marginal conditions.

2. Type of Burning

No cereal grain fields may be burned.

No annual grass seed fields used for grass seed production may be burned.

The following types of agricultural burning may take place on marginal days:

1. Agricultural land clearing debris, consisting of trees, stumps and brush, when such debris is generated in clearing land specifically for the purpose of providing additional crop or pasture land.

2. Prunings and cuttings from fruit or nut trees or berries.

3. Perennial grass seed fields used for grass seed production.

Propane flaming of mint fields, strawberry fields, and perennial grass seed fields used for grass seed production may be carried out on marginal and prohibited days, contingent upon local fire protection regulations.

3. Extent of Burning

1. Burning hours for all types of burning shall be from 9:00 a.m. until sunset, but may be reduced at the option of the fire chief or his deputy when necessary to protect from danger of fire. Material to be burned shall be prepared and the burning shall be conducted, subject to local fire protection regulations, such that burning will be completed during the allotted time.

2. On marginal days, permits may be issued in each fire district for burning up to 50 acres of perennial grass seed fields used for grass seed production.

Subdivision 8

FIELD BURNING

[ED NOTE: Unless otherwise specified sections 28-005 through 28-035 of this chapter of The Oregon Administrative Rules Compilation were adopted by the Environmental Quality Commission August 20, 1969, and filed with the Secretary of State August 26, 1969 as Administrative Order SA 46, effective August 20, 1969. Replaces SA 43, SA 44 and SA 45.]

28-005 BURNING PREREQUISITES. That all straw, stubble and residue shall be removed from a field prior to its being burned by the use of propane or liquid petroleum gas methods and a permit shall be obtained from the responsible permit-issuing agency prior to the utilization thereof which shall insure nearly complete combustion.

28-010 PERMITS. (1) That in all cases where a permit for propane or liquid petroleum gas burning is requested, the office of the State Fire Marshal, as a condition precedent to the issuance of such permit shall inspect and approve all burning equipment and fuel prior to its utilization and shall prohibit their use in the event combustion will not be nearly complete.

(2) That all permits issued subsequent to this order shall be in writing and during the burning operations shall be maintained at the burning site by the person granted said permit for inspection by appropriate authorities.

(3) No permit-issuing agency or other person authorized to grant permits shall give oral permission to burn fields and future permits shall only be issued in writing, upon a day-to-day basis and shall be issued only upon the schedule for burning adopted by the Department of Environmental Quality. At all times proper and accurate records of the transaction and copies of permits granted shall be maintained for inspection by the proper authority.

28-015 FIELD BURNING SCHEDULE. This schedule has been developed pursuant to 1969 Legislation for application in the Willamette Valley counties of Multnomah, Clackamas, Washington, Linn, Yamhill, Marion, Polk, Benton and Lane during the summer agriculture burning season, July through October. Other schedules will be developed for this and other areas as necessary.

As the Statute directs, certain types of atmospheric conditions have been classified "marginal" conditions. The specified type and extent of burning allowed has been established.

28-020 SCHEDULE OF METEOROLOGICAL CONDITIONS.

Class	Meteorological Conditions
Marginal:	Forecast Maximum Mixing Depth greater than 3500 feet.
Prohibited:	Forecast Maximum Mixing Depth 3500 feet or less.

NOTE: ALL SATURDAYS AND SUNDAYS ARE PROHIBITED, and under "prohibited" class all burning is prohibited except when a fuel such as propane is used so that combustion is nearly complete.

28-025 SCHEDULE OF EXTENT AND TYPES. (1) Beginning Time for Burning. Burning shall begin in Zone 1 and the beginning hour for burning, unless otherwise specified in the daily advisory, shall be 11:00 a.m. (the average time the mixing depth is forecast to reach 3000 feet). Zone 2 burning shall begin one hour after Zone 1, and Zone 3 shall begin burning 2 hours after Zone 1. Therefore, unless otherwise specified in the daily advisory, burning will begin as follows: Zone 1 - 11:00 a.m., PDT, Zone 2 - 12 noon PDT, Zone 3 - 1:00 p.m., PDT. The period for starting fires shall be limited to one hour after the stated beginning time.

(2) Burning Duration: The burning shall be completed within two hours after the fire is set.

(3) Further Provisions: (a) Permits shall be issued on a day-to-day basis and each permittee shall have a current valid written permit for that day issued in

Monitor	100
Molalla	50
Scotts Mills	50

Marion County

Fire District	Quota
Jefferson	50
Turner	75
Aumsville	175
Stayton	150
Sublimity	350
Silverton	350
Four Corners	100
Liberty	50
S. Canyon Hills	
Keizer	50
Brooks	50
Mt. Angel	50
Woodburn	125
St. Paul	125
Aurora	50
Hubbard	50
Scotts Mills	100
Clackamas-Marion FPA	125

Polk County

Fire District	Quota
Southeast	100
Southwest	75
Wallace-Sheridan	50
Orchard Heights	
North Polk	50
Sheridan	50
Valley Junction	50

Washington County

Fire District	Quota
Forest Grove	50
Gaston	50
Hillsboro	50
Tri-City	50
Beaverton	50

Yamhill County

Fire District	Quota
McMinnville	125
Dayton	50
Sheridan	50
Carlton	50
Yamhill-Polk	50
Yamhill	50

28-035 OTHER FIRE DISTRICTS IN THE WILLAMETTE VALLEY. All fire districts not specifically named in the schedule shall follow the 50-acre daily limitation.

TO : MEMBERS OF THE ENVIRONMENTAL QUALITY COMMISSION

B. A. McPhillips, Chairman
Herman Meierjurgen, Member
Storrs Waterman, Member
E. C. Harms, Jr., Member
Geo. A. McMath, Member

FROM : AIR QUALITY CONTROL STAFF

DATE : September 23 for September 26, 1969 Meeting

SUBJECT: ROUND PRAIRIE LUMBER CO., DILLARD - PROGRESS REPORT

At the July 26 meeting of the Commission in Roseburg, the staff and Round Prairie Lumber Co. were requested to present a progress report at the Commission's September meeting regarding:

a) The design and installation of a wood-waste fired boiler to be fueled with wood residues presently burned in the Company's wigwam burner.

b) More efficient interim operation of the wigwam burner.

As also instructed by the Commission, the staff has since provided the Company with recommendations toward improved performance of its wigwam burner, and has conferred both with the Company and with its design engineering firm regarding the proposed boiler installation.

Round Prairie Lumber Co. anticipates sale of its sawdust either to Forest Industries at Dillard, or to Roseburg Lumber Co.'s new particle board plant, whichever is first able to receive it. The staff feels that the wigwam burner, which now burns a marginal quantity of high moisture content sawdust and bark can be modified and operated to perform in an improved manner. With the present oversized burner, it is unlikely that smoke emissions can be reduced sufficiently to satisfy discharge standards, however. Removal of the sawdust will further reduce the fuel quantity, but it will at the same time improve the average moisture content.

The only satisfactory solution appears to be through sale of the sawdust and utilization of the remaining bark as boiler fuel.

A representative of Round Prairie Lumber Co. is present to report on the Company's progress in its program to phase out the wigwam burner and to improve its interim performance.

TO : MEMBERS OF THE ENVIRONMENTAL QUALITY COMMISSION

B. A. McPhillips, Chairman
Herman Meierjurgen, Member
Storrs Waterman, Member
E. C. Harms, Jr., Member
Geo. A. McMath, Member

FROM : AIR QUALITY CONTROL STAFF

DATE : September 24 for September 26, 1969 Meeting

SUBJECT: MEMORANDUM OF AGREEMENT, SLASH BURNING
ADDED AGENDA ITEM

As Authorized at the Meeting in Grants Pass on July 24, 1969, the Department concluded an agreement with the Department of Forestry, U. S. Forest Service, Bureau of Land Management, Oregon Forest Protective Association and Bureau of Indian Affairs relative to slash burning smoke.

A copy of the agreement to minimize or eliminate smoke accumulation in the designated areas of air quality concern is shown on the attached map.

In order to extend the restricted area for slash burning purposes beyond the end of the "closed season", and to have the Forest Department require year around permits for slash burning, a resolution for your consideration has been prepared designating essentially all that area west of the Cascades as restricted. A copy of the prepared resolution is attached.

MOTION

for

RESOLUTION OF THE

DEPARTMENT OF ENVIRONMENTAL QUALITY

REGARDING SLASH BURNING

After due consultation with the State Forester, it is hereby MOVED that the Department of Environmental Quality adopt a Resolution that all land lying west of the summit of the Cascade Mountains as defined in Chapter 477, Oregon Revised Statutes is determined to be a restricted area within the meaning of Chapter 680, Oregon Laws 1969.

RESOLUTION

of the

DEPARTMENT OF ENVIRONMENTAL QUALITY

WHEREAS, it is in the public interest to manage smoke from slash burning so as to have minimal effect on designated areas as shown on Exhibit "I" attached hereto, and

WHEREAS, the most positive approach for managing such smoke is to at this time control slash burning by a system that requires permits to burn at all times of the year, and

WHEREAS, Chapter 680, Oregon Laws 1969, provides that the State Forester may require permits to burn slash as well as other substances at any time of the year on forest land within the boundaries of a forest protection district, if such land lies within a restricted area as determined by the Department of Environmental Quality, as successor agency to the Oregon State Sanitary Authority, in consultation with the State Forester.

NOW THEREFORE, pursuant to Chapter 680, Oregon laws 1969, after consultation with the State Forester, all land lying west of the summit of the Cascade Mountains as defined in Chapter 477, Oregon Revised Statutes, is hereby determined to be a restricted area.

Such determination shall be for the purpose of requiring permits to burn slash on forest land and shall be effective from the end of the closed season 1969 to the start of the closed season 1970 as designated by the State Forester pursuant to ORS 477.505.

This resolution is dated the ____ day of September 1969 and consists of one (1) page.

For the Environmental Quality Commission

B. A. McPhillips, Chairman
Environmental Quality Commission

Kenneth H. Spies, Director
Department of Environmental Quality

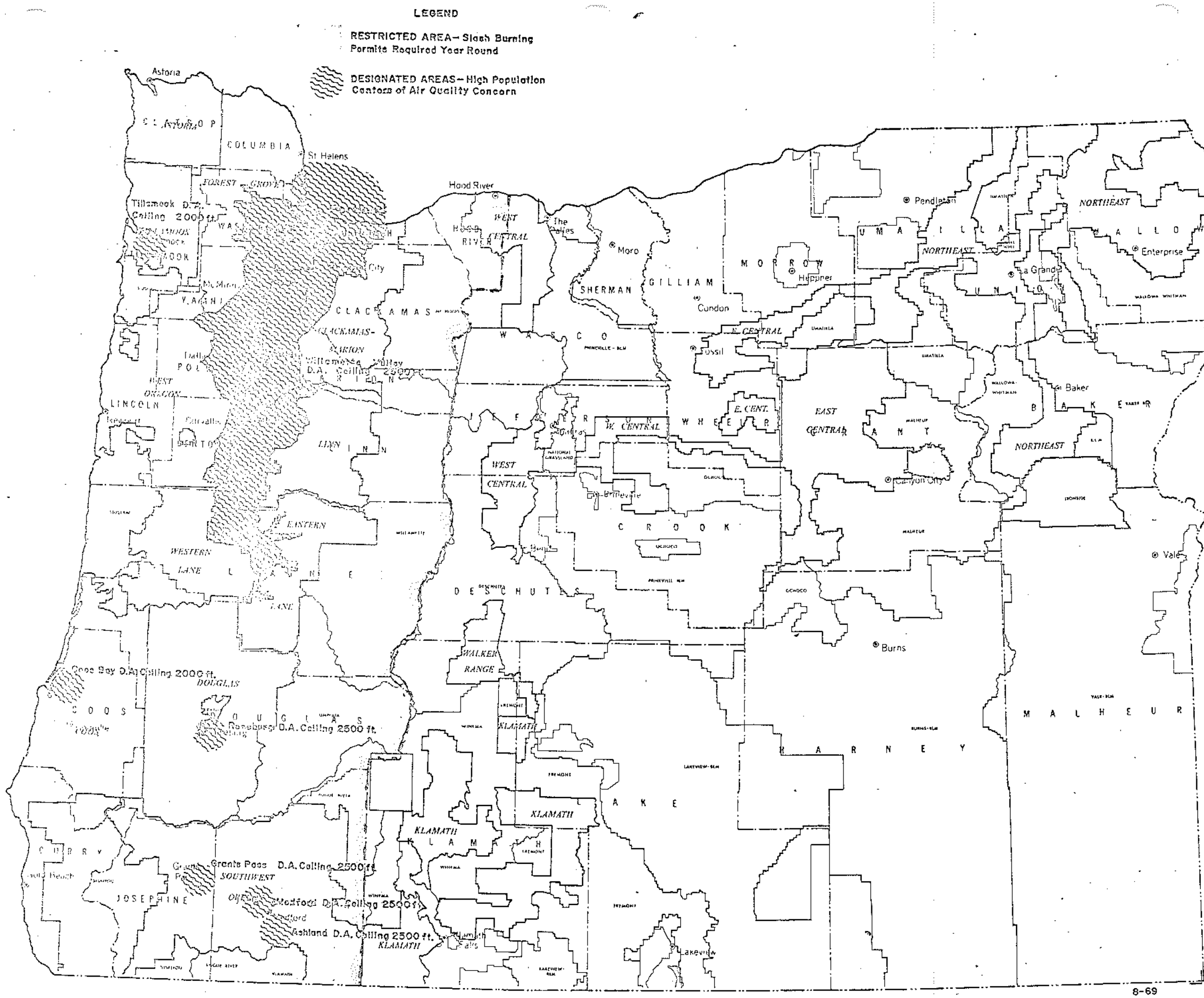

LEGEND
RESTRICTED AREA– Slash Burning Permits Required Year Round
DESIGNATED AREAS– High Population Centers of Air Quality Concern
Astoria
COLUMBIA
St Helens
Hood River
Tillamook D.A. Ceiling 2000 ft.
The Dalles
Moro
SHERMAN
GILLIAM
Condon
MORROW
Heppner
Pendleton
UMATILLA
NORTHEAST
WALLOWA
Enterprise
La Grande
UNION
CLACKAMAS
CLACKAMAS-MARION
Willamette Valley D.A. Ceiling 2500 ft.
WASCO
E. CENTRAL
Fossil
WHEELER
E. CENT.
W. CENTRAL
EAST CENTRAL
GRANT
Baker
BAKER
NORTHEAST
Canyon City
LINCOLN
LINN
WEST CENTRAL
Prineville
CROOK
EASTERN
WESTERN LANE
LANE
DESCHUTES
Vale
Burns
WALKER RANGE
Coos Bay D.A. Ceiling 2000 ft.
DOUGLAS
COOS
Roseburg D.A. Ceiling 2500 ft.
KLAMATH
MALHEUR
HARNEY
LAKE
CURRY
Grants Pass D.A. Ceiling 2500 ft.
SOUTHWEST
JOSEPHINE
Medford D.A. Ceiling 2500 ft.
Ashland D.A. Ceiling 2500 ft.
Lakeview
8-69

EXHIBIT I

MEMORANDUM OF AGREEMENT

September 9, 1969

The Department of Environmental Quality enters into an agreement with the Department of Forestry, U. S. Forest Service, Bureau of Land Management, Oregon Forest Protective Association, and Bureau of Indian Affairs, for a cooperative slash smoke management plan to minimize slash smoke accumulation in designated areas of high population density.

The parties of this memorandum are agreed that the objectives of the program include the following:

1. Initiate the management program during the 1969 season with the further objectives of evaluating the program, reviewing this agreement and improving the program where feasible.
2. Minimize or eliminate smoke accumulation in the designated areas as shown on the map, Exhibit 1, attached, which includes the following areas: (1) Willamette Valley, (2) Roseburg, (3) Ashland, (4) Medford, (5) Grants Pass, (6) Coos Bay, and (7) Tillamook.

It is further agreed that the Department of Forestry in cooperation with the other parties to the agreement will develop and coordinate a detailed slash smoke management plan to assist local administrators in preparation and disposal of forest residues, and that the general operating basis will include the following guidelines:

1. Limit burning within designated areas to conditions which permit venting of the convective column 2,500 feet above the valley floor, or when winds will blow the main plume and drift smoke directly out of the designated area.

2. Where burning is outside designated areas:

   a. Regulate burning when wind flow is downslope toward a designated area.

   b. Regulate venting main plume into calm air.

   c. Allow burning when smoke will vent into a deep mixing layer, greater than 2,000 feet above the fire.

   d. Allow burning when smoke will vent into actively precipitating cloud systems, thereby providing for rapid smoke washout.

AGREED TO BY:

Agency	Signature	Date
DEPARTMENT OF ENVIRONMENTAL QUALITY	Kenneth H Spies	9/9/69
OREGON STATE DEPARTMENT OF FORESTRY	J O Schroeder	9/9/69
U. S. FOREST SERVICE	Merle Stevenson Jr	9/9/69
BUREAU OF LAND MANAGEMENT	Archie D Craft	9/9/69
OREGON FOREST PROTECTIVE ASSOCIATION	Robert Sanders	9/9/69
BUREAU OF INDIAN AFFAIRS	Area Hallmark	9/23/69

RESOLUTION

of the

DEPARTMENT OF ENVIRONMENTAL QUALITY

WHEREAS, it is in the public interest to manage smoke from slash burning so as to have minimal effect on designated areas as shown on Exhibit "I" attached hereto, and

WHEREAS, the most positive approach for managing such smoke is to at this time control slash burning by a system that requires permits to burn at all times of the year, and

WHEREAS, Chapter 680, Oregon Laws 1969, provides that the State Forester may require permits to burn slash as well as other substances at any time of the year on forest land within the boundaries of a forest protection district, if such land lies within a restricted area as determined by the Department of Environmental Quality, as successor agency to the Oregon State Sanitary Authority, in consultation with the State Forester.

NOW THEREFORE, pursuant to Chapter 680, Oregon laws 1969, after consultation with the State Forester, all land lying west of the summit of the Cascade Mountains as defined in Chapter 477, Oregon Revised Statutes, is hereby determined to be a restricted area.

Such determination shall be for the purpose of requiring permits to burn slash on forest land and shall be effective from the end of the closed season 1969 to the start of the closed season 1970 as designated by the State Forester pursuant to ORS 477.505.

This resolution is dated the 26th day of September 1969 and consists of one (1) page.

For the Environmental Quality Commission

B. A. McPhillips, Chairman
Environmental Quality Commission

Kenneth H. Spies, Director
Department of Environmental Quality

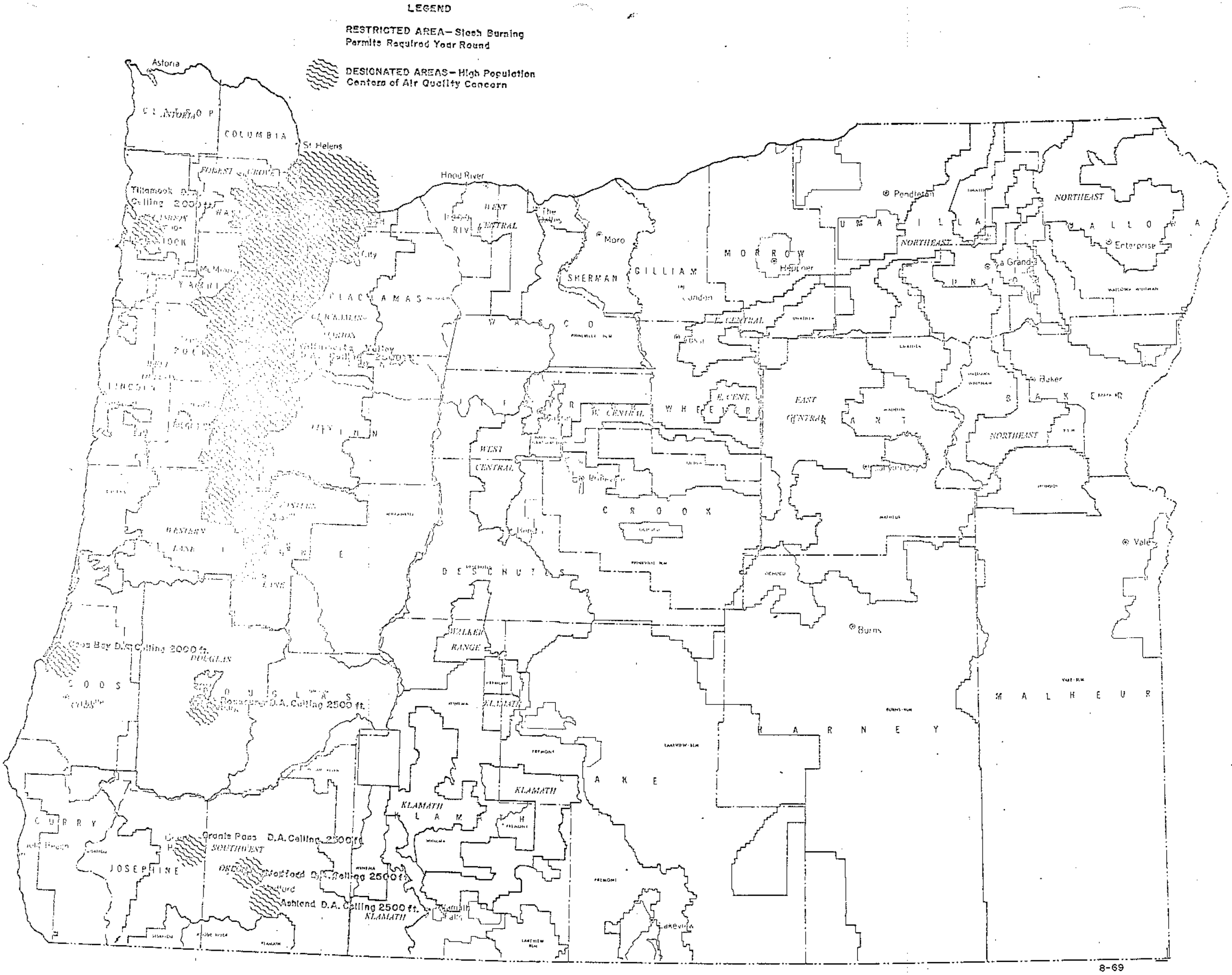

LEGEND
RESTRICTED AREA—Slash Burning Permits Required Year Round
DESIGNATED AREAS—High Population Centers of Air Quality Concern
Astoria
COLUMBIA
St Helens
Hood River
Tillamook D.A. Ceiling 2000 ft.
FOREST GROVE
WEST CENTRAL
The Dalles
Moro
SHERMAN
GILLIAM
MORROW
Heppner
Condon
Pendleton
UMATILLA
NORTHEAST
La Grande
UNION
Enterprise
WALLOWA
Baker
BAKER
EAST CENTRAL
GRANT
WHEELER
E. CENT.
W. CENTRAL
E. CENTRAL
WASCO
CLACKAMAS
Willamette Valley D.A. Ceiling 2500 ft.
LINN
LINCOLN
POLK
YAMHILL
WESTERN LANE
LANE
CROOK
Prineville
DESCHUTES
Bend
WALKER RANGE
Burns
HARNEY
Vale
MALHEUR
Coos Bay D.A. Ceiling 2000 ft.
DOUGLAS
Roseburg D.A. Ceiling 2500 ft.
COOS
CURRY
JOSEPHINE
Grants Pass D.A. Ceiling 2500 ft.
SOUTHWEST
Medford D.A. Ceiling 2500 ft.
Ashland D.A. Ceiling 2500 ft.
KLAMATH
Klamath Falls
LAKE
Lakeview
FREMONT
8-69

EXHIBIT I

M

TO : MEMBERS OF THE ENVIRONMENTAL QUALITY COMMISSION

B. A. McPhillips, Chairman
Herman Meierjurgen, Member
Storrs Waterman, Member
E. C. Harms, Jr., Member
George A. McMath, Member

FROM : AIR QUALITY CONTROL STAFF

DATE : September 24, 1969 for Meeting of September 26, 1969

SUBJECT: AIR POLLUTION PROBLEMS RELATED TO THE METALS INDUSTRY IN ALBANY

The following is in response to the Commission's request made at the last meeting for a status report on air pollution problems related to the metals industry in Albany.

The problems are essentially limited to Albany's "space age" metals family which include the following activities:

1. Albany Metallurgy Research Center, U. S. Bureau of Mines.
2. REM Metals Corporation
3. Zirconium Technology Incorporated
4. TiLINE Incorporated
5. Oregon Metallurgical Corporation
6. Wah Chang - Albany Corporation

All of these installations are located within the jurisdictional area of Mid-Willamette Valley Air Pollution Authority. Much of the information presented in this report was obtained from that agency's files.

The Albany Metallurgy Research Center, better known as the U. S. Bureau of Mines, conducts studies in several areas, most of which are related to metallurgical technology. The overall operation because of its scope and nature does not generally degrade local air quality. However, some studies probably will cause short term gaseous and particulate emissions which may be objectionable to persons who live or work nearby.

REM Metals Corporation operates a machining and stamping facility within the city limits of Albany which does not emit air contaminants. The company also produces space age metal castings six miles south of Albany on the east side of the I-5 freeway. This operation, which is completing start-up, has particulate control equipment that is performing satisfactorily. The Mid-Willamette Valley Air Pollution Authority feels that REM can easily control any problem that might develop.

Zirconium Technology Incorporated, located in the industrial area in southern Albany, will begin producing zirconium and titanium tubing in late September, 1969. A packed-bed scrubber will be used to control emissions from an acid treating operation. Mid-Willamette Valley Air Pollution Authority plans to require performance testing on the scrubber.

TiLINE Incorporated produces zirconium and titanium castings in a light industrial area in south Albany. Air pollution control equipment is installed and operating satisfactorily.

Oregon Metallurgical Corporation is a producer of titanium castings and ingots at 120 West 34th Street, an industrial area in south Albany. The Company is presently working on a building program to make its operation more integrated and enhance its position in the titanium market. This program is scheduled for completion in February 1970. Oremets' effects on air quality will be dependent on performances of proposed control equipment which is currently being reviewed by Mid-Willamette Valley Air Pollution Authority. The Regional Authority anticipates requiring performance testing as proof of compliance with its regulations.

Wah Chang Albany Corporation produces and/or fabricates a variety of "space-age" metals at its plant, located West of Interstate Highway, I-5, on the northern boundary of Albany. During the past two years the Company has installed several pieces of control equipment and effected many process changes which have resulted in decreasing atmospheric emissions. Probably the most noticeable was the discontinuation of the zircon sand carbiding operation, noted for its persistent white particulate plume. This was accomplished on August 29, 1969. Improved as well as additional scrubbing devices were installed during 1969 which lowered the discharges of chlorides and ammonium ion, thereby effecting a reduction in the visibility reducing cloud or mist attributable to Wah Chang.

The success to date by the Company is offset by the failure of its efforts to control the odor problem and frequent upsets or accidents which result in visible emissions. The Company has abandoned wet chemistry approaches as a means of odor control. Current efforts are directed towards high temperature incineration. A consulting engineer has been retained to assist them on this problem. The Company has indicated that it expects preliminary design to be finished in time for testing sometime in November, 1969. An employee training program is being conducted to minimize upset and accident occurrences.

Additional efforts are underway or programmed for further reduction of emissions from reduction retort cleaning, magnesium recovery, clarifier and settling ponds.

Wah Chang Corporation has been successful in meeting its commitments in the compliance agreement with Mid-Willamette Valley Air Pollution Authority. Both the Company and the Regional Authority realize that additional efforts are necessary and plan to proceed with emphasis to be placed on the odor problem.

ALBANY METALLURTY RESEARCH CENTER
UNITED STATES BUREAU OF MINES

The AMRC is located on West Queen Avenue within the Albany city limits. Immediately to the East lies the Albany Union High School. The remaining three sides are bordered by residential areas.

The AMRC is noted for its studies in areas directly and indirectly related to space-age metals technology. An Air Quality Control staff member visited AMRC on September 15, 1969 to discuss current and proposed efforts which do or will affect air quality. Presently, studies related to space age metals do not result in the emission of air contaminants. However, the AMRC activity is not limited to this discipline. Three areas of study are responsible for essentially all of the atmospheric emissions.

A current effort involves the utilization of automobile scrap. A one-ton, 3-phase, arc furnace is used to melt fragmented auto scrap (small pieces of magnetic car components containing some grease and dirt) and pre-reduced iron ore pellets. The varying grease and dirt content of the scrap is a major contributor to the visible emission from this furnace. The annual average operating time was estimated to be 1 hour per week. During operation the emission violates MWVAPA and the State opacity regulations. Due to the size and frequency of operation, little or no off-station visual effects can be detected. (It is worth noting that design and bids were obtained for controlling particulate emissions in this laboratory area. To achieve the necessary $65,000 under present Federal funding for the project would require reducing the current labor force by 50% for two years.) A proposed smelting experiment scheduled for next January is expected to have a visible emission which will violate MWVAPA regulations.

A copper sulfide smelting study occasionally emits visible and odiferous matter. The purpose is to produce blister grade copper and SO_2 gas. The SO_2 can then be used to produce elemental sulfur.

Although the SO_2 rich off gas is treated to remove SO_2, the scope is small, and the operation is intermittant (4 to 12 hours per week), incidents can be expected when detectable emissions will occur. They will be very local episode situations and should not contribute to significant degradation of air quality.

Another study involving SO_2 has been evaluating alkalyzed alumina as an SO_2 adsorbing media in fluid bed type reactors. Although odiferous gases have been detected in the immediate lab area, it is not likely that these gases can be detected off station.

Initial work is now proceeding on utilizing slag material and low grade ores containing sulfides and pyrites. These materials are presently considered to be waste materials or non-economic resources. The approaches will involve chlorination in bench scale fixed and fluid-bed reactors. Annual combined atmospheric emissions of gaseous chlorine and chlorides were estimated by AMRC personnel to be approximately 100 pounds. This quantity can be considered very insignificant.

SUMMARY

The Albany Metallurgy Research Center, better known as the United States Bureau of Mines, conducts studies in several areas, most of which are related to metallurgical technology. The overall operation because of its scope and nature does not generally degrade local air quality. However, some studies probably will cause short term gaseous and particulate emissions which may be objectionable to persons who live or work nearby.

REM METALS CORPORATION

REM operates at two locations in the Albany area. The Company activity includes the Fabrication Division at 320 West Queen Avenue and the Precision Casting Division located six miles south of Albany immediately adjacent to the east side of Interstate I-5 (access via Hwy. 34 exit). The Fabrication Division is located in a light industrial area with nearby residences whereas the Precision Casting Division has no neighbors except for I-5 traffic.

REM has acquired necessary skills for machining and stamping space age metals which it performs in the Fabrication Division. This operation does not create an air pollution problem.

The Precision Casting Division employs vacuum arc melting and casting procedures in addition to a proprietory mold process to produce titanium castings weighing up to 100 pounds. This division is now completing the final phases of start-up. Since the melting and casting operations are performed in vacuum, the generation of potential air contaminants is essentially limited to particulates from mold preparation and casting clean-up. An attached Mid-Willamette Valley Air Pollution Authority file memorandum indicates that principal areas of concern are now under adequate degrees of air pollution control. The Regional Authority considers REM's current controls adequate although a minor source (estimated to be 5 pounds of particulates per hour) is being evaluated.

SUMMARY:

REM Metals Corporation operates a machining and stamping facility within the city limits of Albany which does not emit air contaminants. The company also produces space age metal castings six miles south of Albany on the east side of the I-5 freeway. This operation, which is completing start-up, has particulate control equipment that is performing satisfactorily. The Mid-Willamette Valley Air Pollution Authority feels that REM can easily control any problems that might develop.

FILE MEMO

TO : Rem Metals Inc. File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

Background information:

Rem Metal is in the process of completing a new precision cast part plant. The plant will manufacture small precise castings for the Aero Space Industry. Yet to be installed is a vacuum furnace. Past applications of such furnaces have indicated that a pollution problem is nonexistent; however, this furnace will be reviewed as soon as installation has been completed.

The Problem and Control

The existing pollution problem and the control are as follows: The plant has both a sandblaster and a shotblaster where the exhaust of each is controlled through a Wheelabrator baghouse. The exhaust air is exhausted directly into the building, and we consider this not to be a pollution problem. They have a grinder which is used for grinding the molds. It has a one-horse power, 600 CFM exhaust motor. It exhausts directly into the atmosphere. The present operating schedule for this unit is one hour per day, and we estimate that 5 pounds of particulate matter is exhausted per day into the atmosphere. A small package dust collector could be installed for less than $600. Final recommendations are being held in abeyance until the entire plant becomes operational. At this time, it appears that the air pollution potential from Rem will be slight and easily and inexpensively controlled.

ZIRCONIUM TECHNOLOGY INCORPORATED

Zirtech is now completing construction of a facility which will produce titanium and zirconium tubing in diameters ranging from 1/2 to 2 inches. Start-up is scheduled for the last 2 weeks in September. The company address, 3615 South Pacific Blvd., is in the south Albany industrial area along Hwy. 99-E.

The Company will convert purchased tubing hollows (extruded cylinders with a hole in the center) to product, using a cold tube-reducing process which involves reciprocating rolls and a mandril. Prior to annealing in a vacuum furnace, the tubing will be washed in water (to remove lubricants) and treated with a nitric-hydrofluoric acid mixture (to remove surface contaminants such as oxides). The acid treating facilities will be vented to a packed-bed scrubber. Mid-Willamette Valley Air Pollution Authority plans to require performance test data when the scrubber becomes operational. Additional details on the acid treating and scrubber are presented in the attached Mid-Willamette Valley Air Pollution Authority file memo.

SUMMARY

Zirconium Technology Incorporated, located in the industrial area in southern Albany, will begin producing zirconium and titanium tubing in late September, 1969. A packed-bed scrubber will be used to control emissions from an acid treating operation. Mid-Willamette Valley Air Pollution Authority plans to require performance testing on the scrubber.

FILE MEMO

TO : Zirconium Technology Inc. File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

Zirconium Technology, or ZIRTECH as the Company is properly known, will produce titanium and zirconium tubing. The tubing produced is small, about ½ inch diameter and is produced from larger tubing approximately 2 inches in diameter. The tubing will be used for nuclear power plant heat exchangers and for piping of caustic materials.

The Problem and Proposed Control

The only air pollution source that this plant is expected to have will be the exhaust air from the pickling tanks. These pickling tanks will contain 20 to 30 percent nitric acid and 3 percent hydrofluoric acid. The fumes will be pulled through a packed bed scrubber. This unit is 6 feet wide 13 feet 8 inches high and handles 10,000 CFM. Polypropylene packing material is used. The company feels that the scrubber will be 100 percent efficient, of course, nothing is 100 percent efficient, there will be some losses. In any event the loss will be quite small. The pickling solution will not be highly volatile, thus there will not be a large quantity of fumes to scrub. According to company officers, the scrubber is oversized. It was designed by CH_2M, the vendor is Corrosive Controls, Inc. of Camis, Washington. The fumes will be emitted four hours out of each day. Unless this company and engineering firm can furnish figures which indicate what the atmospheric emissions will be, stack tests will be required prior to start up.

Two Pickling Tanks

One is 32½ feet long x 18 inches wide x 36 inches deep

Other, 17 feet long x 8 inches wide x 18 inches deep

Tanks are open four hours per day. The pickup system is a surface unit that surrounds the entire tanks. It operates four hours per day.

The packed tower scrubber is a 10,000 CFM @ 6" H_2O. It measures 13 feet by 8 inches high by 6 inches wide.

Packing is polypropylene 1 inch intalox.

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The packed tower scrubber is a 10,000 CFM @ 6" H_2O. It measures 13 feet by 8 inches high by 6 inches wide.

Packing is polypropylene 1 inch intalox.

TiLINE INCORPORATED

TiLINE produces zirconium and titanium castings, primarily valves and pump casings, at 150 West Queen Avenue in Albany. This location is a light industrial area with nearby residences.

The Company purchases metal in billet form, vacuum arc melts it, and uses a skull casting technique to pour into graphite molds. Centrifugal force assists the molten metal into the molds. Castings are cleaned by sandblasting and checked for imperfections. Minor defects are repaired. Mold material is recycled. The mold production resembles iron foundry practices except for a baking operation which removes volatiles, coal tar pitch and water. Removal of the volatiles is required because of the vacuum melting and casting procedure. Gates and risers most likely are reclaimed.

A dust collector (baghouse) is provided for the mold production. It is estimated (Mid-Willamette Valley Air Pollution Authority file memo) that the annual loss of particulates to the atmosphere from this unit is approximately 780 pounds. The sandblast unit, used to clean castings, is connected to a small baghouse which exhausts to the work room. Therefore, no particulates are directly vented to the atmosphere from the casting cleaning operation.

Mid-Willamette Valley Air Pollution Authority does not consider TiLINE to be an air pollution problem.

SUMMARY

TiLINE Incorporated produces zirconium and titanium castings in a light industrial area in south Albany. Air pollution control equipment is installed and operating satisfactorily.

FILE MEMO

TO : Tyline Inc. File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

Tyline produces zirconium and titanium castings consisting primarily of valves and pump casings.

The Problem:

The primary source of pollution is with the graphite mold recovery and with the graphite mold covering material. This covering material is powdered graphite that is put over the mold to prevent oxidation of the mold during firing.

Control Program:

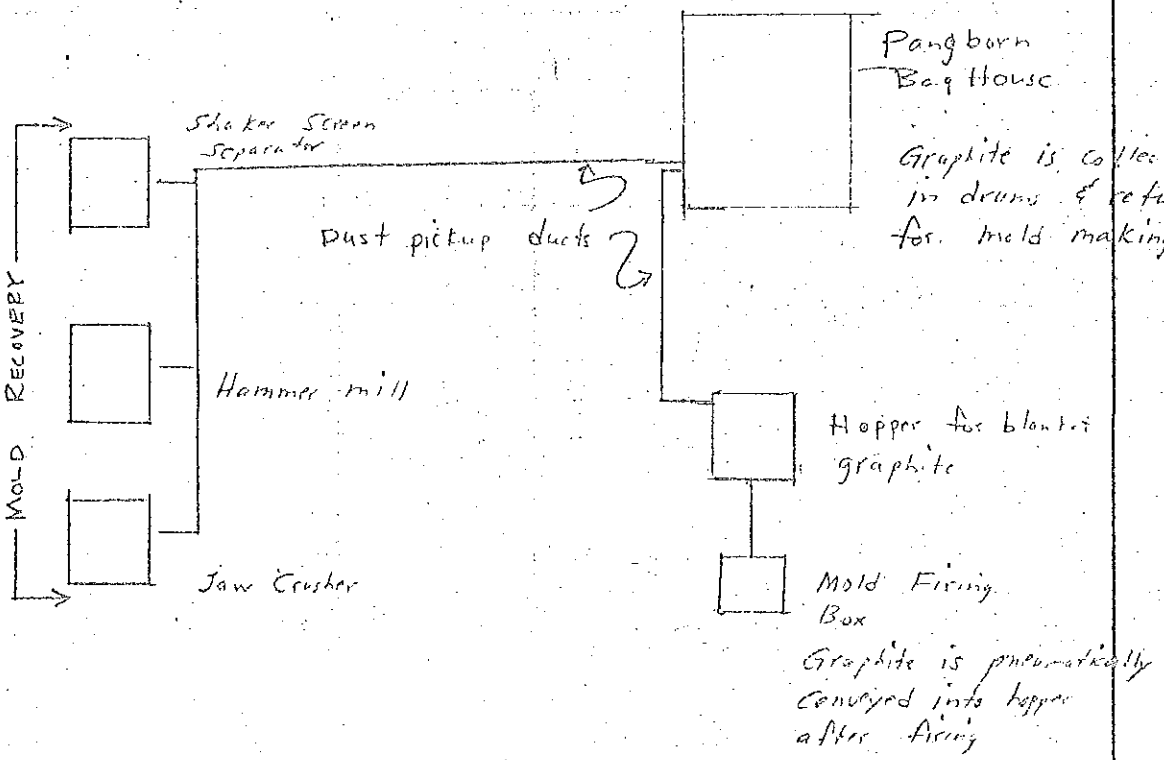
Control of inplant dust is with the Pangborn Model 1500 CN baghouse dust collector. Actual production records show that 1,000 to 1,500 pounds per week of graphite is collected. The Pangborn unit eliminates a potential air pollution problem plus enables Tyline to recover the expensive graphite material. Based upon a 99 percent collection efficiency factor for the Pangborn unit and using the maximum recovery quantity of 1,500 pounds per week, the total annual loss of particulate matter to the atmosphere would be 780 pounds. The attached process flow diagram shows the operations that produce dust and the dust pick-up location.

Of secondary importance as a potential air pollution problem is the core oven. This oven bakes the graphite mold which is a combination of graphite with about 5 percent coal tar pitch and a small

amount of starch. Household type starch is baked at 1,650 degrees Fahrenheit. The furnace is vented directly into the atmosphere. According to company officers, no visible emission is evident. This is probably partly because the entire mold is covered with graphite material which would tend to absorb the gases. At this time, it is impossible to have any estimates of gases that may be released to the atmosphere; however, it does not appear to be significant. In my estimation, Tyline Corporation has taken the necessary steps to prevent air pollution.

TILINE CORP. — Albany — Dust Control System

9-12-69 M.E. Spurgeon



OREGON METALLURGICAL CORPORATION

Oremet produces titanium in ingot form and cast-products at 120 West 34th Street. The area is industrial and essentially void of private residences.

Present production at Oremet involves converting sponge-like titanium metal to ingot and cast products via vacuum melting techniques. Sponge metal is compacted and welded to form large electrodes which are double melted into ingots. The ingots are used by various fabricators. The casting (or foundry) operation is very similar to that used by TiLINE. Molds are pressed and baked to remove volatiles. Skull casting techniques are used to produce valve and pump components. Castings are cleaned by sand blasting in closed units. Surplus metal and mold materials are reclaimed. Dust control equipment is provided in the foundry. Control devices do not appear warranted at this time in the melt shop. Repairable defects in the castings are corrected using methods common to the titanium industry.

Oremet has been purchasing most of their required sponge, primarily from Japan and England. Presently they are also purchasing titanium tetrachloride which they convert to titanium sponge in reduction facilities. Atmospheric emissions from the present reduction operation occur for 10 to 15 seconds about 4 or 5 times during a 20 hour period. Only 1 reduction run is now being made per week. This equipment will be phased out around February, 1970.

Oremet is in the process of building a more integrated production facility. Completion of this program in February 1970 will make the Company more competitive and less dependent on external sources of sponge and titanium tetrachloride. The program includes a rutile ore (TiO_2) chlorination, a new reduction facility (sponge plant), and magnesium and chlorine recovery (magnesium plant).

Attached is a previously prepared Department of Environmental Quality staff memorandum which describes processes in the completed

project. It should be noted that the current melting and casting facilities will not be altered. (A portion of the melting facility was just completed in October 1968.)

Essentially, Oremets effect on air quality relies on performance of forthcoming processes and associated air pollution control equipment. An attached Mid-Willamette Valley Air Pollution Authority file memo discusses three areas of concern, each of which will have control devices. Mid-Willamette Valley Air Pollution Authority is currently reviewing Oremet's proposal and is expecting the operation to comply with the Regional Authority regulations. However, Mid-Willamette Valley Air Pollution Authority anticipates requiring source measurements to determine if the operation is satisfactory.

SUMMARY

Oregon Metallurgical Corporation is a producer of titanium castings and ingots at 120 West 34th Street, an industrial area in South Albany. The Company is presently working on a building program to make its operation more integrated and enhance its position in the titanium market. This program is scheduled for completion in February 1970. Oremets effects on air quality will be dependent on performances of proposed control equipment which is currently being reviewed by Mid-Willamette Valley Air Pollution Authority. The Regional Authority anticipates requiring performance testing as proof of compliance with its regulations.

PRODUCTION PROCESSES AT OREMET

The following information, which is presented as reference material, was obtained from Oremet employees at a conference with air pollution control officials on May 1, 1969. Whether or not the installed-process will adhere strictly to the following information is not known. A very brief process diagram is presented in Figure 1.

I. CHLORINATION AND PURIFICATION

Rutile (an ore containing approximately 95% TiO_2), coke (relatively small particle size) and chlorine are fed to fluidized-bed reactors (chlorinators) in a continuous manner. The reactions can be summarized ideally as follows:

1) $TiO_2 + C + 2Cl_2 \rightarrow TiCl_4$ (gas) + CO_2 (gas)

2) $Me_uO_v^{*} + C + Cl_2 \rightarrow Me_xO_yCl_2^{**}$ (gas) + CO_2 (gas)

* Fe_2O_3, Al_2O_3, Cb_2O_5, V_2O_5, SnO, SiO_2

** $FeCl_3$, $AlCl_3$, $CbCl_5$, $VOCl_3$, $SnCl_2$, $SiCl_4$

Equation 1 represents the behavior of the product material, whereas equation 2 indicates the reactions for impurity metal oxides. Some CO and $COCl_2$ most likely is formed in the chlorinator(s). However, these materials are supposedly converted to CO_2 and HCl prior to scrubbing for HCl removal followed by release to the atmosphere. This will be explained later. A chlorinator is schematically represented in Figure 2.

The exhaust from the chlorinator(s) is subjected to the purification scheme indicated in Figure 3. The coke particles can be recycled to the chlorinator(s). The columbium or niobium (Cb), iron (Fe), aluminum (Al), and vanadium (V) chloride solids are waste materials. Supposedly the Cb value is such that it might someday be recovered if a feasible scheme could be developed. Presently, these materials will be discarded. The silicon (Si), tin (Sn), and small amount of titanium (Ti) liquid chlorides are also waste materials. These will react very easily with any atmospheric moisture to form a white HCl fume and the corresponding metal oxides.

Storage of these liquids for any period will involve sealed vessels. All $TiCl_4$ systems will have to be oxygen and moisture free to maintain the chloride form.

The gas phase leaving the refrigerated condenser (shown in Figure 3) will contain $TiCl_4$, Cl_2, $COCl_2$, CO and CO_2. Scrubber treatment of such a mixture can create technical problems primarily because of the formation of hypochlorite ion (ClO^-). The purpose of the HCl burner is to overcome this complication by converting all chlorine to chloride ion (Cl^-) and CO to CO_2. The chloride ion will leave the burner as HCl, which is relatively easy to remove by scrubbing.

The chelating additive, an organic compound, will selectively complex with the impurity metal chlorides thereby lowering the respective boiling points and allow for impurity removal. Textbook descriptions of chelates cite solubility in organic solvents and low aqueous solubility. Behavior in a halogenaceous - what have you admixture cannot be postulated by myself.

II. REDUCTION

Liquid $TiCl_4$ will be introduced into the reduction vessels containing Mg at monitored rates to control temperature and reaction rate. The reduction reaction is given below:

$$TiCl_4 + 2\ Mg \rightarrow Ti + MgCl_2$$

Titanium metal is formed in a large sponge-like mass or cake. By product $MgCl_2$ is tapped as a liquid intermittently. Final $MgCl_2$ removal is accomplished by elevated temperature ($\sim$ 1000° C) inert gas purging or vacuum treating. The metal sponge is conditioned to prevent ignition upon atmospheric exposure. Then the cake is chopped, inspected and sent to melting.

III. MELTING

Operations conducted in the melt shop include sponge compaction, vacuum arc and electron beam melting, Ti-electrode fabrication, casting and ingot and casting machining, testing and clean-up. Vacuum melting techniques are used to promote metal purity and integrity.

IV. MAGNESIUM AND CHLORINE RECOVERY

Fused salt electrolysis is employed to convert $MgCl_2$ to Mg and Cl_2. The reactions are:

$$Mg^{++} + 2e^- \rightarrow Mg\ (liquid)$$

$$2\ Cl^- - 2e^- \rightarrow Cl_2\ (gas)$$

Since the $MgCl_2$ feed will be reasonably pure, little or no purification of Mg or Cl_2 is required. The flow diagram given in Figure 4 is representative of this process. The Mg will most likely be cast into ingots before going to $TiCl_4$ reduction. Cl_2 can be sent directly to chlorination or stored.

V. SUMMARY

The information presented above is meant to be representative of the installed process. However, it must be remembered that it is a simplification and changes by the company are possible.

Although some similar operations, terminology, etc. are employed by all "space-age" metal producers, the processes employed vary considerably and direct comparisons are not always correct.

Figure 1.- Schematic Overall Flow Diagram

Oregon Corp., Albany, Ore.

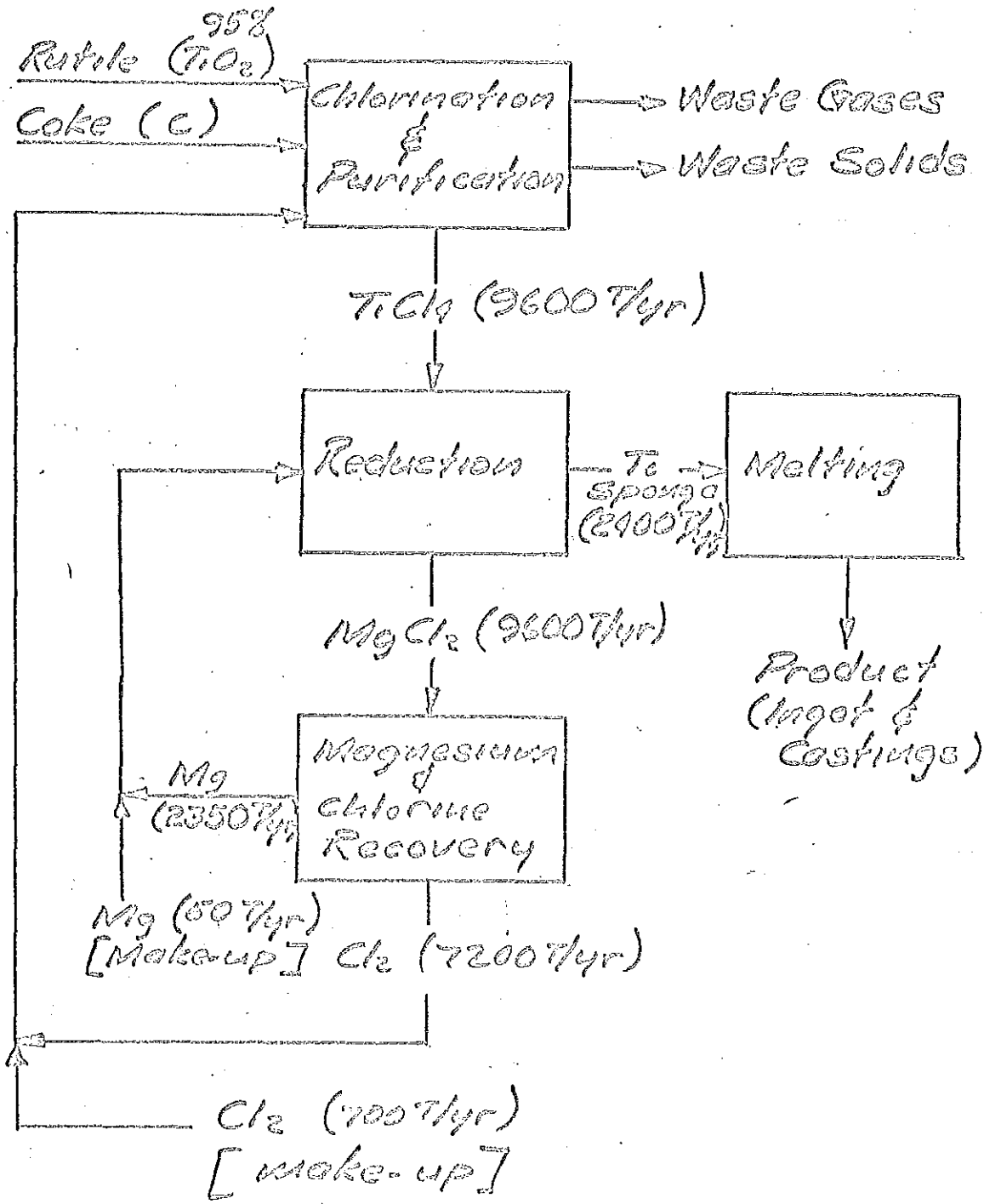


Figure 2.- Schematic Chlorinator Diagram

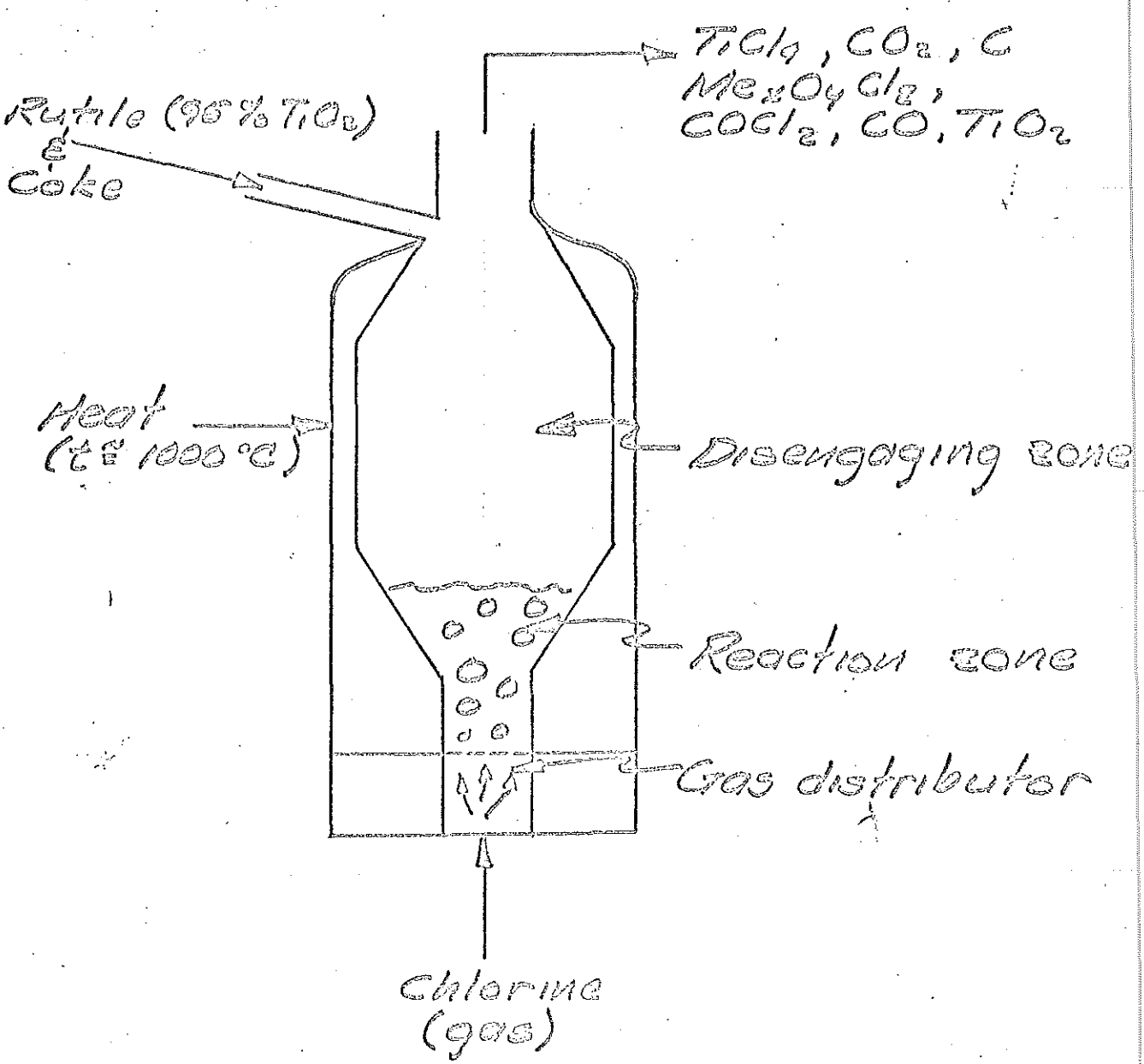


Figure 3.- Schematic Chloride Purification Flow Diagram

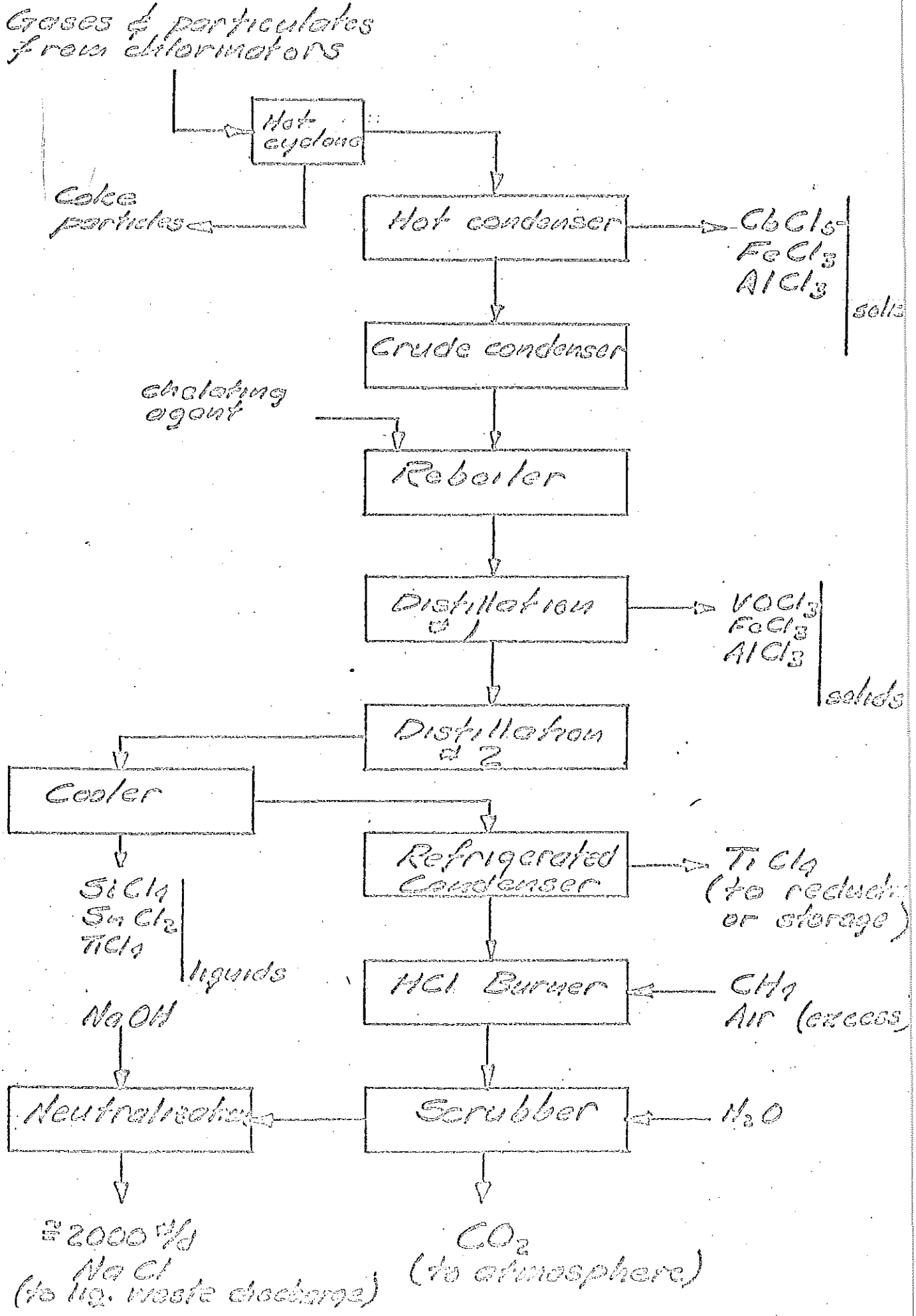
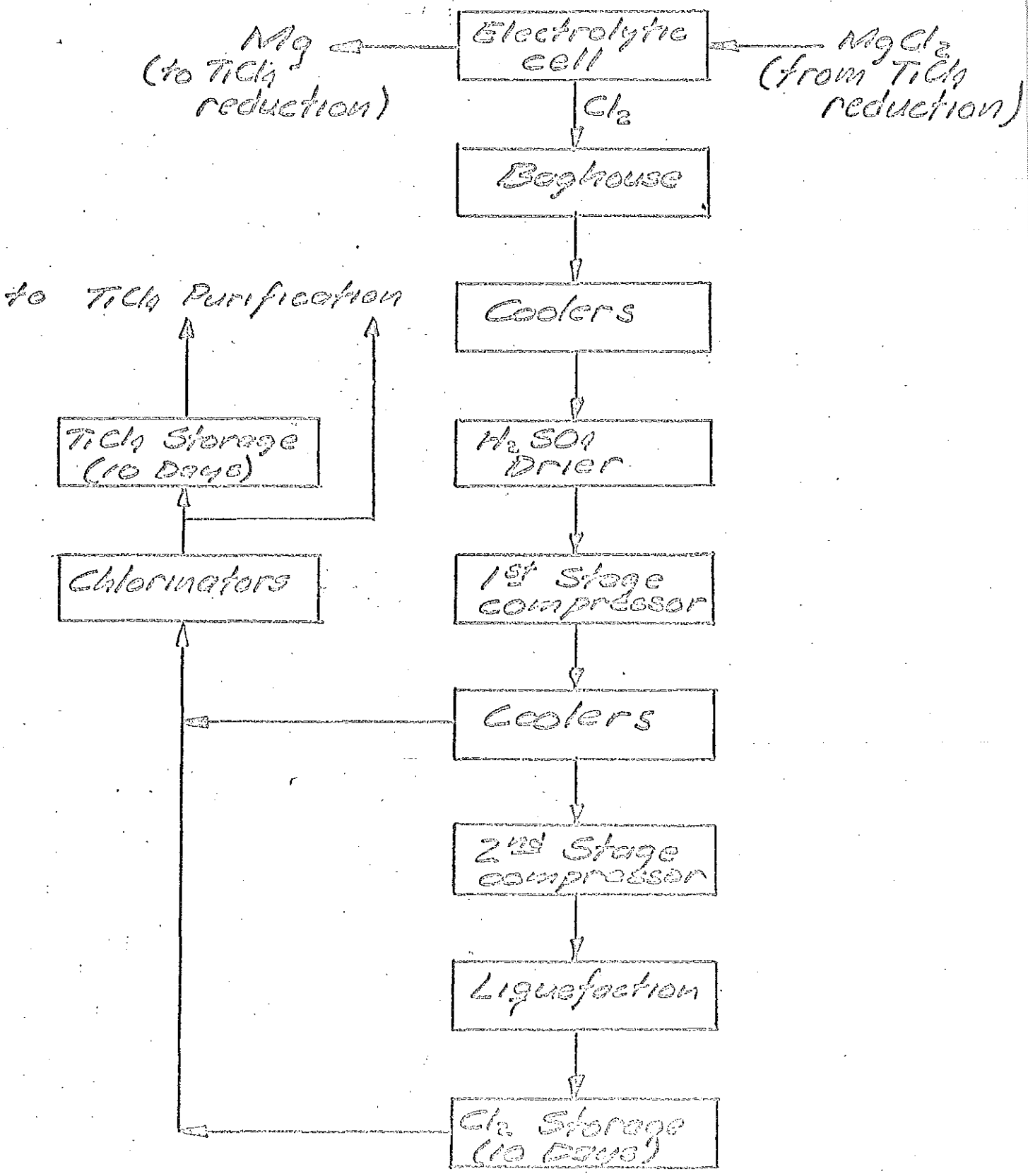


Figure 4. - Schematic Chlorine and Magnesium Recovery Flow Diagram



FILE MEMO

TO : Oregon Metallurgical Corporation File

FROM : Bill Spurgeon

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRAM

OREMET is in the process of building a titanium sponge manufacturing plant and magnesium recovery plant.

The Problem and Proposed Control Program

There are three control systems that will emit pollutants to the atmosphere. One is a baghouse which controls dust from the rutile and coke dryer, the others are scrubbers. One scrubber is off the hydrochloric acid burner where titanium tetrachloride is made and the other is off the sponge plant where pure titanium is porduced. Two baghouses are used in the magnesium recovery operation but because they are not vented to the atmosphere and are only used to take out the abrasive materials before it goes through the compressor and chiller it is not considered to be a pollutant. A sketch is enclosed which shows this operation.

Sponge Baghouse

The baghouse operation is for controlling the dust emissions from the rutile and coke dryer, prior to combining these two ingredients, they must be dried. The dryer operates at 200°. The present schedule calls for a normal five-day per month or 40-hour per month operation. A total of 13,400,000 pounds per year will be handled for an average of 28,000 pounds per hour. It is estimated that of this 28,000 pounds handled, 1 percent will be pulled off into the baghouse or 280 pounds per hour. Based upon a baghouse

efficiency of 99 percent, the grain loading will be .034 grains per standard cubic foot. Annual loss to the atmosphere will be 1,340 pounds. Attached are calculations which verify these figures.

Titanium Chloride Scrubber

For the titanium tetrachloride operation, Mr. Charlie Pope of OREMET estimates that the CL_2 discharge will be 10 parts per million. This is based upon his actual experience with Timet at the Henderson Nevada plant. Threshold level for chlorine gas is 3½ parts per million and at 15 parts per million there will be irritation to the eyes and throat. Mr. Pope has taken readings from the gas stream in his previous operation, which is quite similar to the OREMET operation, and finds that the gas stream can be expected to be 10 parts per million.

Sponge Scrubber

The next scrubber is used in the sponge plant; the only expected emissions from this scrubber will be in the form of titanium hydroxide which is virtually unwettable. This scrubber is used to scrub the gases from the venting process on the vacuum furnaces. The bulk of the gas will be helium. Actual production information from Charlie Pope's file reveals that approximately 1 percent of the gases will reach the scrubber. This amounts to 534 pounds per day. The scrubber is estimated to be 95 percent efficient. This gives a 5 percent loss for apparent loss of 27 pounds per day; however, actual experience shows that the chlorine is scrubbed out leaving a titanium hydroxide which when calculated by the

molecular weight amounts to 12 pounds per day. This 12 pounds will be vented 12 times per day for a duration of 30 seconds at each vent cycle. Therefore, the total 12 pounds will be vented within a total time of 6 minutes per each 24-hour period. The titanium hydroxide shows up as a dense white cloud. Attached are calculations showing how this figure was arrived at.

Stack Sampling

It is my recommendation that after these operations are on stream that we require stack samples to actually measure the emissions. In discussing this with OREMET, they seemed willing to do stack sampling for us. My overall opinion of the OREMET operation at this time, and of course additional time will be spent on the plan review, is that they will have their emissions under control and in the limitations set by the Mid-Willamette Valley Air Pollution Authority.

Baghouse

The baghouse will operate 480 hours/year.

Annual quanity dried

13,400,000 pounds or 28,000 pounds/hour

1 percent reach baghouse or 280 pounds/hour.

$\frac{280}{60}$ = 4.64 pounds/minute

Bahouse is 99 percent efficient for a 1 percent loss to atmosphere.

4.64 x .01 = .046 pounds/minute lost

$\frac{.046 \text{ pounds/minute} \times 7000 \text{ grains/pound}}{9400 \text{ ft}^3\text{/minute}}$ = .034 grains per cu. ft.

Total annual loss is 2.8 pounds/hour x 480 pounds/year = 1,340 lbs./yr.

Sponge Plant Vent Scrubber

$\frac{9700 \text{ tons/year} \times 2000 \text{ ton/pound} \times .01}{365}$ = 534 pounds of T_1Cl_4 scrubbed/day

95 percent efficiency

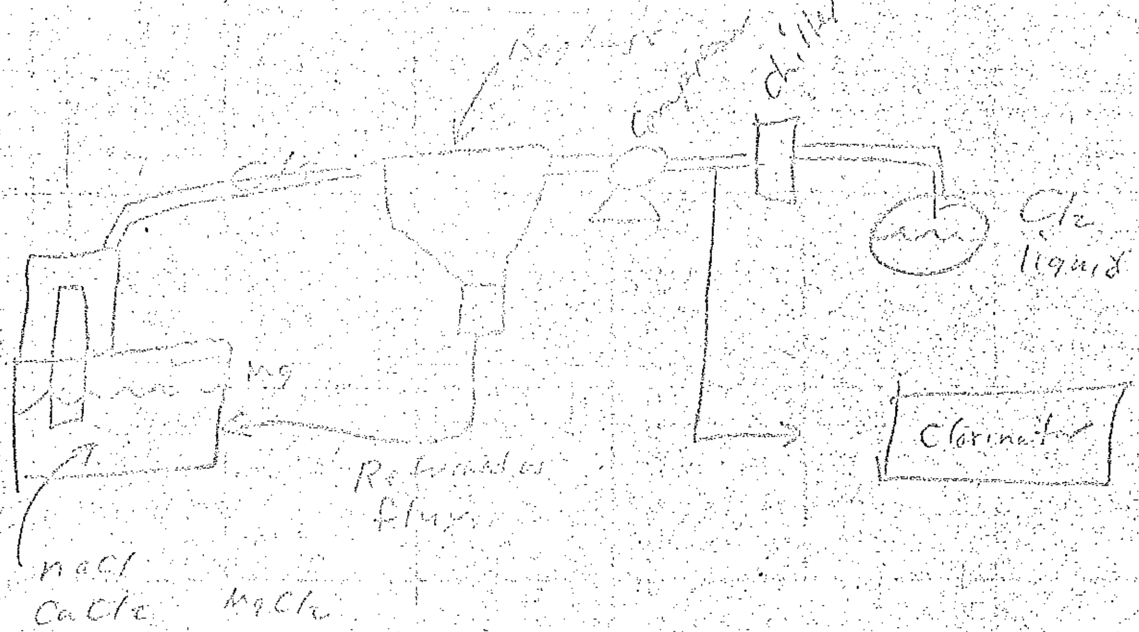
540 pounds x 5 percent = 27 pounds of T_1Cl_4

	$T_1(OH_2)$	T_1Cl_4
mol. wt.	$49 + (16 + 1)_2$	$49 + (35)_4$
	83	189

$\frac{27}{189} \div \frac{x}{83}$ $\quad x \approx 12$ pounds/day lost to atmosphere

These 12 pounds will be vented 12 times at 30 second duration. Total vent time will be 6 minutes/24 hours. This will be a dense white cloud consisting almost entirely of $T_1(OH)_2$. Annual loss

12 x 365 = 4380 pounds/year.


Cl2
Compressor
Chiller
Cl2
liquid
Mg
Refinadas
flux
Clorinator
NaCl
CaCl2
MgCl2

WAH CHANG ALBANY CORPORATION

Wah Chang Albany is located at 1600 Old Pacific Highway, which is West of Interstate I-5 on the northern Albany boundary. The Company produces and/or fabricates zirconium, hafnium, columbium (niobium), tantalum and tungsten in such forms as sheet, plate, rod, tube and special shapes.

Historically, the metal production processes, zirconium - hafnium and columbium-tantalum, are the contributors to air pollution problems. Since the fabrication operations themselves are not air pollution problems, they are not pertinent here and further discussion is not necessary.

An attached flow sheet schematically illustrates Wah Chang's former zirconium-hafnium process. The company uses zircon sand after it has passed the ore dressing stage. This material is a mineral containing zirconium oxide, hafnium oxide and silicon oxide (zirconium to hafnium ratio of about 50 to 1 on a metal basis). The major applications of zirconium and hafnium require them to be essentially free of each other so a separation of the two is necessary. Wah Chang's separation process employs a liquid/liquid extraction procedure which means that the zircon has to be converted to a water soluble form (in this case, the tetrachloride form). The conversion to chloride previously was accomplished by forming a zirconium-hafnium carbide-nitride mixture which readily reacted with chlorine to produce the crude chloride (zirconium tetrachloride/hafnium tetrachloride mixture). The silicon dioxide (SiO_2) contained in the zircon sand was emitted to the atmosphere as a continuous white plume of very small particulate. The carbide chlorination operation released chloride ion to the atmosphere which reacted with moisture and ammonium ion to form low level white mists or clouds. Both of these operations have been discontinued as of late August and early September, 1969. Wah Chang is currently purchasing more of its crude chloride than it was doing a few months ago. This practice in conjunction with a new direct sand chlorination technique has allowed the company to discontinue the use of the carbide plant earlier than anticipated a year ago. Although the new breed of crude chlorinators are not without their own difficulties, they have resulted in lowering atmospheric chloride emissions. Eventually they will allow disposal of silicon tetrachloride (from the SiO_2 in zircon sand) as a by-

product. When this occurs, under normal operation essentially no atmospheric chloride discharge is expected. Presently the direct sand chlorinators are using the control equipment previously used by carbide chlorination. The load is much less and the performance more satisfactory.

The feed make-up operation dissolves the crude chlorides in water and prepares the resulting solution for separations. Historically, this area has been a source of chloride which reacted with moisture and ammonium ion to contribute to the low level mist or cloud. Improved crude chloride handling techniques and fume controls (a venturi type scrubber) have reduced atmospheric discharges from this source.

The separation, precipitation and rotary vacuum filter systems have been a major source of ammonium ion which is the other contributor to the mist or cloud. A scrubber now controls the ammonium ion from these sources.

The zirconium oxide and hafnium oxide filter cakes are dried in separate calciners (rotary kilns). Emissions from the zirconium oxide calciner, which are treated by a high efficiency scrubber system, are not considered to be a problem at this time. Emissions from the hafnium calciner, hafnium filters, and two holding tanks are being treated by the previously mentioned ammonium scrubber. These areas are generally recognized as the sources of Wah Chang's odor problem. Although peroxide is being added in an attempt to reduce the odor level, performance of the odor control efforts is regarded as unsatisfactory by the company, all air pollution agencies and the public. The company has employed a consultant to investigate high temperature incineration as a means of odor control. Wah Chang personnel have indicated that a realistic time schedule for testing this approach indicates sometime in November 1969 as the earliest testing date. The company has also indicated its intent to control minor odor sources which they expect to be able to detect after elimination of the major ones mentioned above.

The remaining process chemistry and procedure being equally pertinent and identical for both zirconium and hafnium, no further mention of hafnium need be made since its production is about 2% that of zirconium.

Pure chlorination involves continuously reacting high purity zirconium oxide, carbon and chlorine to form high purity zirconium tetrachloride and carbon dioxide. Excess chlorine and uncondensed chloride are treated in a 3-stage scrubber system. The third stage was installed during 1969. This area is not considered to be a problem at this time.

Zirconium metal is produced by reacting zirconium tetrachloride with magnesium to form the metal and magnesium chloride ($MgCl_2$). The major portion of $MgCl_2$ and unreacted magnesium is removed physically prior to a distillation operation which accomplishes final $MgCl_2$ and magnesium removal. Occasional venting is required during the metal forming reaction (reduction operation). These gases are routed to a system containing a cyclone, baghouse and scrubber. (The scrubber follows the baghouse to capture gaseous chlorides.) Modifications of reduction equipment and procedures which were completed in February 1969 has resulted in eliminating an estimated 200 pounds per day chloride emission from this area. Reduction and distillation which are much improved, are not considered to be major areas of concern at this time.

The pure metal, in the form of a sponge-like material, proceeds through a series of fabrication operations. Since these procedures are not considered to be air pollution sources as previously mentioned, no discussion of these procedures is provided.

Reduction apparatus clean-up is accomplished by washing with water to remove unreacted zirconium chlorides followed by acid pickling to remove some unreacted magnesium. The acid pickling is essentially free of visible emissions. However, the washing operation, done on an as required basis, does release chlorides to the atmosphere which contribute to the mist or cloud formation. The Company does plan to enclose the washing area and treat the resulting fumes.

The material obtained by the previously mentioned physical removal of magnesium chloride and unreacted magnesium undergoes further processing. The bulk of this material is relatively pure magnesium chloride which is separated by hand and shipped in sealed railroad cars to a purchaser. The magnesium rich portion is fed to a melting furnace for magnesium recovery. Although a fume treatment system serves this area, some magnesium oxide excapes as a white smoke. The Company anticipates improving the effectiveness of this control system (a venturi scrubber) in conjunction with their efforts on the aforementioned washing area.

The company indefinitely discontinued columbium and tantalum production in November 1968. The schedule for compliance agreement between the Company and Mid-Willamette Valley Air Pollution Authority required engineering plans for fume control on this activity by May 15, 1969. This was

accomplished. The agreement also requires installation of the controls prior to renewing production.

The remaining atmospheric emission source considered as significant at this time is the clarifier and settling pond system. This area gives off undesirable odor and ammonia when pH goes beyond a certain range. A reduction in ammonia emission is expected when the ammonia distillation goes on stream later this year (start-up in October 1969 and continuous operation expected by January 1970). Improvements in pH control have been accomplished and efforts for further improvements are being made.

A chronological arrangement of the Wah Chang and Mid-Willamette Valley Air Pollution Authority compliance agreement is attached. Also included are documents from the Regional Authority indicating that the Company has met its commitments outlined in the schedule. In addition, a letter from the Company to Mid-Willamette Valley Air Pollution Authority indicating reduced emissions, control installations, process changes and future efforts is attached.

The current situation is apparently susceptible to operator mistakes or upset episodes. The company is conducting operator training programs to alleviate these problems.

SUMMARY

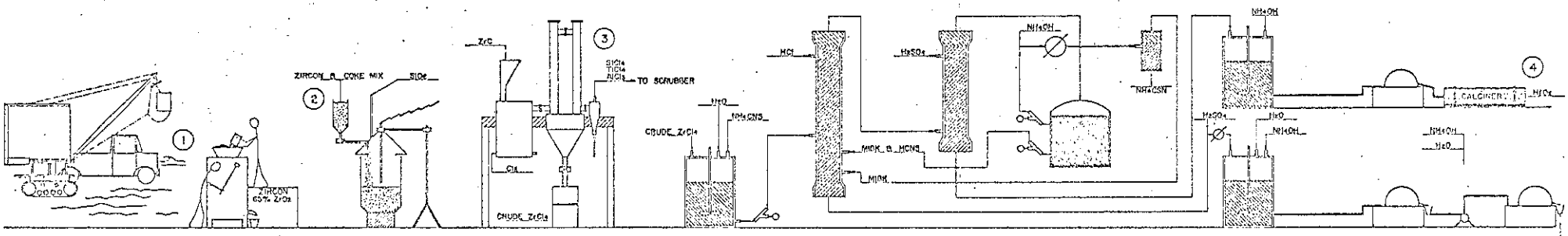
Wah Chang Albany Corporation produces and/or fabricates a variety of "space-age" metals at its plant, located West of Interstate Hwy. I-5 on the northern boundary of Albany. During the past two years the Company has installed several pieces of control equipment and effected many process changes which have resulted in decreasing atmospheric emissions. Probably the most noticeable was the discontinuation of the zircon sand carbiding operation, noted for its persistant white particulate plume. This was accomplished on August 29, 1969. Improved as well as additional scrubbing devices were installed during 1969 which lowered the discharges of chlorides and ammonium ion thereby effecting a reduction in the visibility reducing cloud or mist attributable to Wah Chang.

The success to date by the Company is offset by the failure of its efforts to control the odor problem and frequent upsets or accidents which result in visible emissions. The company has abandoned wet chemistry

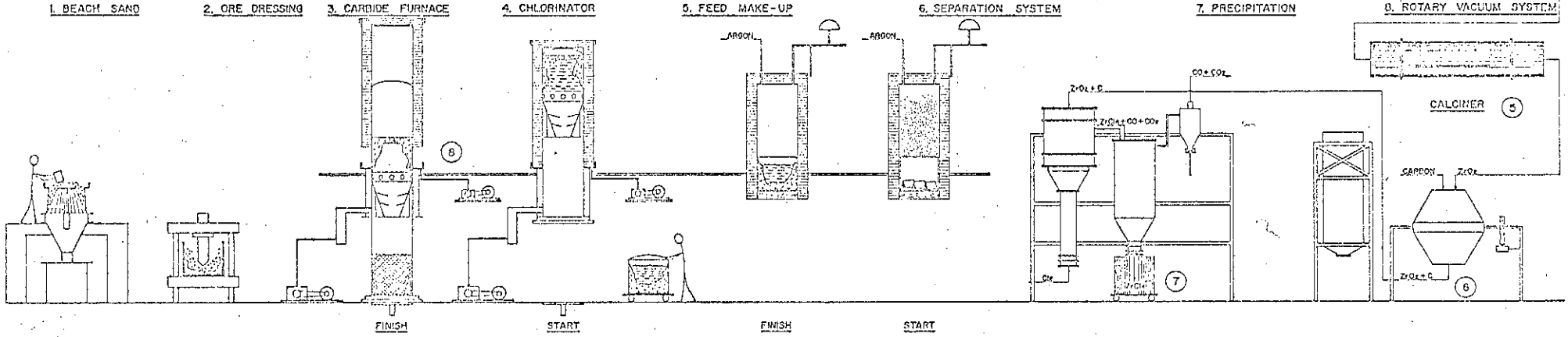
approaches as a means of odor control. Current efforts are directed toward high temperature incineration. A consulting engineer has been retained to assist them on this problem. The company has indicated that it expects preliminary design to be finished in time for testing sometime in November 1969. An employee training program is being conducted to minimize upset and accident occurrences.

Additional efforts are underway or programmed for further reduction of emissions from reduction retort cleaning, magnesium recovery, clarifier and settling ponds.

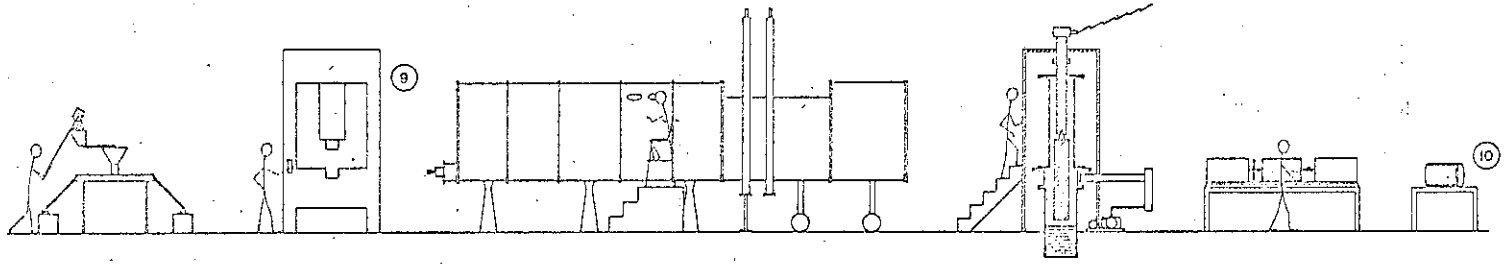
Wah Chang Corporation has been successful in meeting its commitments in the compliance agreement with Mid-Willamette Valley Air Pollution Authority. Both the Company and the Regional Authority realize that additional efforts are necessary and plan to proceed with emphasis to be placed on the odor problem.



1. BEACH SAND
2. ORE DRESSING
3. CARBIDE FURNACE
4. CHLORINATOR
5. FEED MAKE-UP
6. SEPARATION SYSTEM
7. PRECIPITATION
8. ROTARY VACUUM SYSTEM



14. CRUSHER
13. BREAKOUT PRESS
12. DISTILLATION FURNACE
11. REDUCTION FURNACE
10. CHLORINATOR
9. BLENDER



15. BLENDER
16. PRESS
17. ELECTRON BEAM WELDER
18. VACUUM ARC FURNACE
19. MACHINING
20. ZIRCONIUM INGOT

FLOW SHEET
PRODUCTION OF ZIRCONIUM

WAH CHANG ALBANY
ALBANY, OREGON

A TELEDYNE COMPANY

MID-WILLAMETTE VALLEY AIR POLLUTION AUTHORITY

WAH CHANG ALBANY CORPORATION

Chronological Schedule of Compliance

October 15, 1968	--	Operator check list on Crude Chlorination barrel filling operation.
	--	Odor survey on Hafnium calciner.
October 31, 1968	--	Close down Columbium-Tantalum operation until next year.
November 1, 1968	--	Engineering plans submitted to Authority for New feed make-up.
November 15, 1968	--	Engineering plans submitted to Authority for Ammonia control on Zirconium-Hafnium side.
	--	Accurate test results on Precipitation tank in Building 11.
December 31, 1968	--	Procurement of control equipment for Rotary Vacuum System.
January 31, 1969	--	Monitor for Chlorine on Pure Chlorination scrubber--Results available.
February 28, 1969	--	Monitor crude chlorinator scrubber efficiency.
	--	Scrubber installed on New feed make-up.
	--	Operator check list submitted & implemented on New feed make-up.
	--	Old feed make-up shut down.
April 1, 1969	--	Controls installed and operating on Rotary Vacuum System.
	--	Routine monitoring of Rotary Vacuum System controls.
May 15, 1969	--	Engineering plans for fume control in Columbium-Tantalum process.
July 1, 1969	--	Feasibility report on conversion of crude chlorinator to Direct Sand Chlorinator.
	--	Engineering plans for control of direct sand chlorinator submitted to Authority.
	--	Review of Variance on Carbide plant.
	--	Engineering plans submitted for Carbide plant controls.

September 1, 1969	--	Engineering plans for control of Crude Chlorination submitted if conversion to Direct Sand Chlorinator not feasible.
October 31, 1969 (or startup)	--	Fume controls on Columbium-Tantalum process.
December 31, 1969	--	Crude Chlorinators converted to Direct Sand Chlorinators, if feasible.
	--	Crude Chlorinators either converted or adequately controlled.
	--	Direct Sand Chlorinators adequately controlled.

New Zirconium Calciner

7 days after startup	--	Notify Mid-Willamette Valley Air Pollution Authority.
30 days after startup	--	Supply test results.
90 days after startup	--	Engineering plans for adequate controls submitted to Authority.
270 days after startup	--	Adequate controls installed and operating.

CS:ks

FILE MEMO

TO : Wah Chang Albany Corporation File

FROM : Vic Prodehl

DATE : September 15, 1969

SUBJECT: AIR POLLUTION CONTROL PROGRESS

Wah Chang Albany Corporation produces and fabricates zirconium, hafnium, columbium, and tantalum tubing, sheeting, rods, and plates as a major supplier of refractory and reactive metals for the nuclear power generating industry.

The Problem

Wah Chang Albany's complex has many processes most emitting varying amounts and types of particulate and/or gaseous pollutants.

The complex has been well known for odor and blue haze visibility reduction problems. These problems have been readily detected on Interstate 5 during periods of atmospheric stagnation. Many of these observations have indicated that upset conditions as well as processes without controls have caused these problems.

Recognizing the magnitude and extent of the air pollution problem, the Mid-Willamette Valley Air Pollution Authority entered into a study of the control necessary during late summer 1968 which culminated in a Schedule for Compliance Agreement October 15, 1968.

Control Program

The Schedule required control of all significant particulate and gaseous emissions by December 31, 1969. (Please find attached an itemization of control projects which reflect the extent of control required.) The Authority is most pleased to report that Wah Chang has complied with the Schedule and terminated two processes contributing significant emissions ahead of schedule.

One of these processes is the source of the most significant visible emission known as the Zirconium Carbide Plant. The shutdown of this plant two months ahead of schedule resulted in a reduction of particulate emissions of 11,000 pounds per day. Control of ammonia fumes has resulted in a reduction of 1,000 pounds per day.

The Schedule has resulted in a reduction of pollutants emitted from 14,506 pounds per day to 1,144 pounds per day. Attached to the main body of this report is an itemization of emissions showing a comparison of the 1967 emission inventory versus the present estimated emissions.

The Authority is aware of the existing kitty odor emanating from Wah Chang. Attempts by Wah Chang to correct this problem, including periodic shutdown of the Hafnium Kiln, has not corrected the problem. The Authority is continuing to work with Wah Chang on this problem and it is expected a second Schedule for Compliance, including odor control, shall be completed late fall 1969.

PARTICIPATING COUNTIES:
BENTON
LINN
MARION
POLK
YAMHILL

To: EJW

MID-WILLAMETTE VALLEY AIR POLLUTION AUTHORITY

2585 State Street - Salem, Oregon 97301
Telephone 581-1715

August 21, 1969

Mr. Ken Spies, Director
Department of Environmental Quality
Control
1400 SW Fifth Avenue
Portland, Oregon 97201

SUBJECT: WAH CHANG AIR POLLUTION CONTROL STATUS REPORT

Dear Mr. Spies:

I express regret that I have not answered your inquiry regarding the status of the air pollution control schedule of compliance program for Wah Chang Albany Corporation. Inadvertently the letter was filed before an appropriate answer was prepared.

I am happy to report that the Wah Chang Albany Corporation has made very fine progress in complying with the schedule drawn up in 1968. As of this date, Wah Chang Albany has satisfied the requirements of the schedule and in some cases are ahead of the original schedule. Of special note is the zirconium carbide plant that has been a source of most obvious particulate emission. This plant is scheduled to be shutdown August 31, 1969, which is approximately two months ahead of the original schedule.

Regarding the inquiry pertaining to odor control and the original schedule, please be advised that the Authority has discussed this with the management of Wah Chang and corrective measures have been implemented. It must be noted that the odor problem associated with the Wah Chang process is one that will have to be corrected in successive steps. This is due to the basic requirement of controlling the major sources in the first phase and successive control of the remaining minor sources. I am sure that we can look forward to a schedule in the latter part of fall 1969, which will incorporate the remaining control for odor emissions.

I trust this resume shall provide you with the information necessary and should additional information be required, please feel free to give me a call.

Sincerely yours,

Michael D. Roach

Michael D. Roach
Director

MDR:dy

WAH CHANG ALBANY
P.O. BOX 460
ALBANY, OREGON 97321
(503) 926-4211

A TELEDYNE COMPANY

September 16, 1969

Mr. Victor H. Prodehl, Technical Director
Mid-Willamette Valley Air Pollution Aughority
2585 State Street
Salem, Oregon 97301

Dear Mr. Prodehl;

In response to your telephone request of September 15, 1969, I am sending a comparison of the quantities of contaminants in the Wah Chang gasseous emissions as measured in the Spring of 1967, and estimated at the present time. They are shown below:

Pounds Per Day

	1967					1969				
	SiO_2	NH_3	Cl_2	Cl^-	ZrO_2	NH_3	Cl_2	Cl^-	ZrO_2	MgO*
Zr-Hf Reduction & Chlorination Blg.1			158	902	8		4	118	7	
Zr/Hf Separations Bldg. #11		1500		76	600	400		4	50	
Crude & Sand Chl. Bldg. #14			54	208			3.5	8		
Carbide, Bldg.30	11,000									
Mag/Recovery and Pickle slab								50		500
	11,000	1500	212	1186	608	400	7.5	180	57	500
Total			14,506					1,144		

*and miscellaneous smokes

The control devices installed during the last two years are as follows:

	Type	When Installed	Efficiency	Emmission
1)	Three stage scrubber on Crude Chlorination, water and two caustic packed towers.	1st caustic-1967 2nd caustic-1968 3rd water-1969	99+ %	4#/day
2)	Three stage scrubber on Pure Chlorination. One caustic packed tower, one water packed tower, TriMer water scrubber.	1st caustic-1967 2nd water-1968 3rd water-1969	99+ %	2#/day
3)	Venturi Scrubber at Feed-makeup.	1969	99%	<1#/day
4)	H_2SO_4 scrubber for NH_3 at Zr/Hf Separations.	1969	99%	<10#/day
5)	Venturi & Cyclone scrubber on Zr/Oxide kiln at separations.	1969	99+ %	<50#/day
6)	Venturi - 3000 CPM at Mag/oxide (pickle slab area).		97+ %	<20#/day

In addition, we have eliminated the carbiding process and its inherent particulate emmission by developing a method for direct chlorination of sand, and built a plant to perform the operation.

During the period 1967 - 1969, the process for reducing zirconium tetrachloride by magnesium was modified to allow a completely different furnace to be utilized. This change virtually stopped a tendency to evolve some 200 pounds per day of chlorine and chlorides.

Conversion from fixed bed to fluid bed chlorinators designed from the start to eliminate emissions, and a complete revision of material handling procedures, have contributed greatly toward further reducing discharges of both chlorine and chlorides.

The persistant mercaptan odor has been minimized by hooding and venting the hafnium calciner, hooding and venting two holding tanks, and the hafnium filters. Vents from these areas are presently fed under pressure into the ammonia scrubber system, and peroxide is being added to oxidize the odor. As these strong sources are controlled, lesser areas of odor generation are uncovered. As fast as these points are verified, they are being added to the oxidizer treatment system. Plans for the immediate future call for collection of all emissions containing this odor, and passing them through either an afterburner or a chemical oxidizer in a packed scrubbing tower. Efforts to neutralize the odor chemically have not proven satisfactory.

We appreciate the help and cooperation your office has given us during this period.

Very truly yours,

W. A. Aschoff
Chief Engineer

WAA:eh

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